The Abject in the Technological Other

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THE ABJECT IN THE TECHNOLOGICAL OTHER

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ABSTRACT

A photographic project and exegesis demonstrating artificial intelligence and artificial life as occurrences of the abject.

In the photographic project 'O=2', the technologies of artificial intelligence and artificial life are examined in relation to identity, via an elaboration of the psychoanalytic concept of the 'abject'.

An exegesis of the creative project contains an investigation of computer technologies in regard to identity, an analysis of the basic concepts and paradigms of the sciences of artificial intelligence and artificial life, and an elaboration of the psychoanalytic concept of the abject - demonstrating A.I. and a-life as cultural instantiations of abjection. In addition, an examination of the creative work provides a further amplification of these analyses.

Both the creative work and the companion exegesis will contribute to cybercultural theory and arts practice, providing a psychoanalytic understanding of these scientific technologies.
I certify that this thesis does not, to the best of my knowledge and belief:

(i) incorporate without acknowledgement any material previously submitted for a degree or diploma in any institution of higher education;
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INTRODUCTION

Artificial intelligence (A.I.) is a nominal term for technological development whose teleological goal seems to be the birth of a new species that mirrors or exceeds human intelligence and consciousness. Similarly, artificial life (a-life) research simulates living organisms, attempting the actual 'in silico' creation of life itself (Levy, 1992). Technological developments that advance these mimetic goals concur with new understandings of human intelligence, consciousness and biology.

Artificial intelligence and artificial life involve both current technological application and futuristic speculation. While the objects of scientific research and market development, they are also the objects of our cultural imagination. Representations of A.I. and a-life exist in art (the visual art of Patricia Piccinini and Mariko Mori), film (The Terminator, RoboCop, Blade Runner, The Matrix, A.I., and i Robot), and literature (Margie Piercy's He, She, and It, Richard Power's Galatea, and Mary Shelley's Frankenstein). These representations exemplify and explore understandings of human identity in relation to this technology.

The photographic project 0 = 2 is a cybercultural arts practice, drawing on philosophical illuminations of science and technology in order to explore the imagined identities of these artificial creations. While many artists and theorists have explored subjectivity in relation to the notion of the cyborg (where the binary between human and machine has been collapsed), this creative work and its companion exegesis explore the specificities of identity in relation to a machine imagined as an autonomous other. Julia Kristeva's concept of abjection, as a repetition of patterns of identification and separation, is a relevant model for understanding and revealing unconscious processes at work in the construction of this artificial 'other'. Through the use of the psychoanalytic concept of the abject, this project attempts to determine the nature of these technologies in relation to identity.

The project's significance, for both theory and photography, is its unique treatment of the scientific concepts of A.I. and a-life in terms of the psychoanalytic concept of abjection. Both the creative work and exegesis add to both cultural analyses of A.I. and a-life, and contemporary photographic responses to these new technologies.
The aims of the creative project and its exegesis are: the identification and review of cybercultural analyses of the constructions of identity within computer technologies; the identification and review of the paradigms of the sciences of A.I. and a-life; an elaboration of Julia Kristeva's psychoanalytic concept of abjection, demonstrating the occurrence of the abject within A.I. and a-life; and a photographic response to these investigations.

The creative project 0 = 2 is a photographic and textual narrative of an imagined A.I./a-life identity. The project comprises a collection of 82 photographs using both traditional and digital photographic technologies. The narrative of 0 = 2 is an exemplification of abjection in relation to the technologies of artificial intelligence and artificial life.

In this exegesis, the concepts of A.I. and a-life are identified and examined via an elaboration of the psychoanalytic concept of the abject. Within Chapter 1, Identity and Technology, cyberculture analyses of computer technologies are identified and reviewed in relation to conscious and unconscious understandings of the body, mind, and life. Chapter 2, The Artificial Other, identifies and reviews the forms, concepts and paradigms of the sciences of A.I. and a-life. Chapter 3, An Abject Technology, both elaborates Kristeva's concept of abjection as a repeated pattern of separation and identification, and demonstrates A.I. and a-life as cultural occurrences of this pattern. Chapter 4, 0 = 2, The Mirror and the Knife, provides a theoretical explanation of the creative work in regard to this analysis.

An analysis of the paradigms of A.I. and a-life by a researcher outside of these disciplines could be considered a limitation of this project. Accordingly, this research reviews commentary from both inside and outside these fields, outlining the general concepts and paradigms of the science. However, this review reveals a range of commentaries from other disciplines, with varying levels of impact on A.I. and a-life research. Additionally, a cultural analysis of scientific disciplines - as manifestations of the cultural - seems both relevant and appropriate to this project.

Creative research for this project includes a small contribution to performance artist Stelarc's Prosthetic Head project in the form of programming and content creation. The Prosthetic Head is an 'embodied conversational agent' using artificial intelligence
natural language programming. This contribution provides practical experience of one particular model of A.I. research. Similarly, experience of utilizing the paradigms of A.I. and a-life within art is gained via collaboration in an A.I./a-life electronic music piece, performed in 2004 at WAAPA and the Artrage festival Coalesce. These creative research experiences both provide practical experience of A.I. and a-life technologies, and contribute to the photographic and textual construction of an artificial identity within the creative project.

$0 = 2$, as a photographic elaboration of abjection, demonstrates the sciences of A.I. and a-life as repetitions of abject patterns of separation and identification. Kristeva is a theorist "primarily interested in bringing the psychic to bear on the social, and in exploring how the unconscious articulates itself in culture" (Caputi, 1993, p. 38). The abject is a pertinent concept for an analysis of the unconscious processes at work in the construction of these technologies.
CHAPTER 1
IDENTITY & TECHNOLOGY

INTRODUCTION
The technologies of A.I. and a-life arise from, and contribute to, cultural understandings of identity. Cyberculture, as a multiplicity of theoretical and artistic practices, exists at the intersection of science, technology and culture. Cyberculture theory and art have embraced and critiqued discourses of science and technology for both their liberatory and oppressive potential. Similarly, psychoanalytic theory has understood the technologies of science as exemplifications of unconscious desires and impulses. A.I. and a-life are understood and researched according to both conscious and unconscious understandings of the body, the brain, consciousness, matter, sentience, and life.

IDENTITY AND TECHNOLOGY
Recent critiques of science have shown that the assumptions of objectivity and the actual factualness of science are embedded within the very cultural prejudices of gender, race, class and sexuality. Evelyn Fox Keller’s studies on gender and science reveal “gender and gender norms (as the) silent organiser...of the natural sciences” (Wertheim, 1997, p. 77). Similarly, technologies, as artefacts of the scientific enterprise, are neither neutral nor culture free. Nina Lykke (1996) asserts that from its beginnings the project of science has been to tame and domesticate nature into artefacts that represent “a happy future where humans are in total control of nature” (p. 23). Constance Penley and Andrew Ross (1991b) critique technology as fully implicit in the power relations of late capitalism in its “policing of bodies” and “rationalization of nature” (p. xii). Donna Haraway’s oft cited “A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century” (1985) popularised the constructionist notion of science and technology as culture. Haraway’s analysis includes a description of the construction of human bodies via the historical and ideological construction of both nature and biology. She asserts that biology is not comprised of the actual objects of its study, but is instead a discourse vital to the creation of ‘raced’ and ‘sexed’ bodies. For example, the human genome project claims the body as a text of code, resulting in practices affecting reproduction and the actual likelihood of life for bodies, that do or do not count as bodies in our culture (Penley &
Ross, 1991a). The concern of science with the truths of nature and matter is the antecedent for the construction of artificial intelligence and artificial life.

The notion of the body, the mind, and of nature itself, as ‘machinic’ (or machine like) is a seductive and compelling paradigm. A.I. and a-life embody notions of humankind as godlike in our ability to create a new species ‘in our own image’. Yet if we succeed in duplicating our distinct capabilities, these technologies could, of necessity, supersede these capabilities to the extent of human irrelevance (c.f. Joy, 2000; Kurzweil, 1999; Moravec, 1998). Additionally, A.I. and a-life seem to be both a copying, and a rejection, of ‘the body’ and ‘nature’. These technologies exemplify a contradictory complexity that is a challenge to understand and to record. Constructions of the body and the mind are central to the research undertaken in A.I. and a-life, while conversely, scientific understandings of the body’s relationship to the mind give rise to cultural theories of identity and subjectivity.

Scientists and commentators speculate futures based on the scientific advances of A.I. and a-life. Roboticist Hans Moravec (1998) predicts the future downloading of minds into computers in order to keep pace with the evolution of A.I. robots - “biological humans can either adopt the fabulous mechanisms of robots, thus becoming robots themselves, or then can retire into obscurity” (p. 283), ceding to the superiority of this new species. Similarly, Kevin Kelly (1995) predicts an emergence-based ‘neobiological’ future, where a cyborg-like merging of biology and technology extends to the entire environment. Performance artist Stelarc (1995) insists the merging of the body and technology announces the end of human evolution, resulting in the ‘transhuman’ or ‘extraterrestrial’ subject.

David Tomas (1995) considers the cultural influences of A.I. research. For example, in an analysis of representations of the body and the machine, he relates how Norbert Wiener’s cybernetics gave rise to new understandings of the body. Based on the ideas of computer scientist Norbert Wiener, cybernetics views the body and the computer as ‘networks’ acting upon each other in a continual process of ‘feedback’. The body and the machine were understood as “two functionally equivalent states or stages of cybernetic organization” (Tomas, 1995, p. 25). Tomas recognises the relevance of this paradigm beyond the field of cybernetics, asserting a cross discipline influence on the representation of the human.
For example, Tomas argues that the idea of 'feedback' impacted on communications theorist Marshall McLuhan’s 1964 idea of technology as a bodily prosthesis by proposing an interactive relationship between the body and technology. Tomas traces cybernetic notions of the body in relation to virtual reality (VR), where the body is “reimagined and reimagined to be an inconsequential historical residue, a kind of chimera, or puppet” (p. 38). He claims that the notion ‘the human as information’ is employed as a means of adaptation to an environment composed entirely of information (Tomas, 1995).

Sherry Turkle’s (1995) research claims the introduction of the Internet as a factor for changing views on community, sexuality and identity. For Turkle, our changing identity is part of the postmodern context, where the self is no longer individual, and the dualities of the real and the virtual are disturbed. She uses the example of Multi-User Domains (MUDS) and Internet Relay Chat (IRC) as down-to-earth user experiences of the postmodern abstractions of ‘fluid’ and ‘multiple’ identities (Turkle, 1995).

While it is interaction with computer technology that elaborates these postmodern identities, she also identifies a more ‘modernist’ construction of the computer. The logical and linear nature of computers exemplifies the modernist project of perceiving and understanding the world through its constituent parts. However, for Turkle, we have made a cultural shift from the “modernist culture of calculation toward a postmodernist culture of simulation” (p. 20). This shift is exemplified in the change from the modernist approach of A.I. to a-life’s more “postmodern aesthetic of complexity and decentering” (p. 20).

The relationship of the computer to the self is related by Turkle in a mimetic tangle where the brain is understood as a computer, the computer is likened to a brain, computer science uses biology to model intelligence and life, and biology conceives of the body as code.

Claudia Springer (1996) and Sadie Plant (1995; 1996a; 1997) recognize and celebrate the relationship between the computer and postmodern identity. For Springer, technologies such as A.I. invoke a Cartesian privileging of the rational mind over the
body. She cites Marvin Minsky’s notion of the brain as a “meat machine” (p. 39), where consciousness is an effect of machinic processes, and Hans Moravec’s ‘post-biological future’ as notions that foreshadow human extinction. However, the cyborg merging of human and machine makes the Cartesian dualism irrelevant. In postmodernism where the dualisms have collapsed, the human lives on as the ‘posthuman’ (Springer, 1996).

Sadie Plant (1996a) utilizes the notion of human and machine as a cybernetic system. For Plant, neural nets and parallel processing are related to the decentered and multiple self. Plant asserts that man’s desire to free himself from the body is an extension of the attempt to control nature (Plant, 1996a). Women and software, used by men as the tools and resources of this attempt, ‘self-organize’ and ‘self-arouse’ within the system (Plant, 1995). Transcendence from the body is an illusion, and man remains part of the system he is trying to control. Women, at home with the network and matrix, interact with the machine in a liberatory ‘fluid’ identity (Van Gelder, 1997). For women, “there is a virtual reality, an emergent process for which identity is not the goal but the enemy” (Luckman, 1999, p. 39).

Sandy Stone (cited in Dyson, 1997) relates how her research into ‘phone sex’ convinced her it was not information but ‘bodies’ being transmitted electronically over the telephone. Stone argues that technology makes us rethink our bodies. In the virtual world of the computer, subjectivity and the body are separate, leading to a new understanding of embodiment. For Stone (1992), virtuality is associated with the feminine - in cyberspace “penetration translates into envelopment...to enter cyberspace...is to put on the female” (p. 109). In cyberspace we are able to abandon the unified self, and ‘multiple’ and ‘liquid’ identities and genders result. However, Stone explicitly warns that these identities are still very much ‘grounded’ in bodies that “we forget...at our peril” (p. 108).

For Alison Adam (1998b), elimination of the body is based on the assumption that replication of a mind produces a person. Adam also criticizes A.I. and a-life research as not properly explicating the workings of knowledge, particularly the knowledge of women. She believes artificial intelligence is unlikely to occur, relegating it to the realm of science fiction. Similarly, she sees the a-life concept of emergence, where unanticipated behaviours emerge from the complex interaction of systems, as
'mystical' - concurring with Daniel Dennett's (cited in Kirkup, Janes, Woodward, & Hovenden, 2000) description of "Woo-Woo West Coast Emergence" that is "unsubstantiated... (and a) convenient level of description" (p. 252). Similarly, Herbert Klein (2000) dismisses the A.I understanding of the mind and body as a "facile elision of differences" (p. 6) where cognition is reduced to formalism.

Examining Hans Moravec's vision, N. Katherine Hayles (1999) asks how information became separated from the body. She draws a comparison between Moravec's notion of the human ability to place consciousness into a machine, and the 'liberal subject' that denies the biological body in representation. For Hayles, notions of the 'posthuman' rely on the privileging of consciousness in Western thought, whereas it remains only part of evolution - "an epiphenomenon...trying to claim that it is the whole show" (p. 3). She claims the separation of information from matter produces the notion of the body as prosthesis. Thus, Moravec's downloading of the brain is really just an extension of that process - a way of seeing the body as separate and inessential (Hayles, 1999). The liberal subject, criticised by feminists and postcolonialists for the privileging of a particular gender and race, also privileged the rational mind - which only "possessed a body" (p. 4). The posthuman, that favours the multiplicity of identity, is similar to the liberal subject, in that they both view embodiment as inessential. However, she insists, information works through, and is situated in, a medium such as the body (Hayles, 1999).

Anne Balsamo (1999) claims that virtual technologies offer a means of transcendence from race and gender identities. However, transcendence is based on the notion of language as a neutral, culture free system of signification. For Balsamo, the postmodern digital body is still inscribed within cultural systems, with transcendence "signal(ling) a desire to return to the 'neutrality' of the body, to be rid of the culturally marked body" (p. 287).

Zoe Sofia (1993), in her analysis of gender in relation to computer culture, makes a strong claim for the relevance of a psychoanalytic analysis of technology. Psychoanalysis, as a study of the latencies of the unconscious, reveals and names the

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1 Dennet reports 'Woo-Woo' as a term used to disparage 'New Age' philosophies commonly associated with California in the 80s and 90s.
desires concealed and unnamed in the 'rational' construction of technologies such as A.I. and a-life.

Sofia (1993) reports Freud's description of his nephew's 'fort/da' game (a repetitive discarding and retrieval of a cotton reel) as related to the child's separation from the mother. The child's play represents a resultant "desire for mastery" (p. 24) understood as synonymous with the cultural desire for mastery "through knowledge and manipulation of objects" (p. 24).

Similarly, both Freud and Melanie Klein situate the primal scene, where a child views his/her parents in the sexual act, as the unconscious drive behind the search for knowledge. In this psychoanalytic scenario the search returns always to the origin point - the mother's body (Sofia, 1993).

Freud understood art, religion, philosophy (and here Sofia adds 'technology'), as culturally legitimized neurotic impulses. Sofia (1993) argues that it is "maternal reproductive power...that is initially denied, subsequently mimicked, and then elaborated" in technology (p. 48). The child's throwing away and retrieval of the toy are related to sadistic and healing impulses where the desire for knowledge is seen as either a probing of, or a substitution for, the mother's body. She argues that technological constructions (such as A.I.) that compare the computer to the human mind then become a fantasy of masculine reproductive ability and a denial of human reproductive sexual difference (Sofia, 1993).

Barbara Creed's (1987a) psychoanalytic analysis of the film Alien again invokes the maternal as the site of sexual difference. Creed (drawing on Julia Kristeva's notion of the abject) theorizes the mother as a monstrous figure of abjection within the horror genre. The mother, as "origin of all life threaten(s) to reabsorb what it once birthed" (pp 129 - 130). The maternal, as the lack of separation between subject and object, is repressed in order to limit the disruption of the symbolic. Maternal excess is controlled in the horror film via a disruption of the cinematic gaze, in the looking, and refusal to look, of the spectator. Creed (1987a) posits the horror genre as a constant confrontation with, and denial of, the maternal. Similarly, Mary Ann Doane (1990) describes representations of technology, in the horror and science fiction genres, as functioning to control the 'excesses of the maternal'. She understands motherhood as
the limit of the mechanical, citing Huyssen's analysis of Metropolis where “the ultimate technological fantasy... is creation without the mother” (p. 114).

An analysis of films such as Alien and Blade Runner reveals primal scene concerns with origin and history. These concerns are related to a crisis in reproduction due to the reproductive power of new technologies. New technologies attempt to ‘debiologise’ the maternal, resulting in the disruption of the stability of the categories of the maternal and paternal – with an ensuing crisis in subjectivity that is based on these very categories (Doane, 1990). In an analysis of Alice Jardine's concept of ‘gynesis’ in sci-fi horror films, Barbara Creed (1987b) asserts that women’s bodies signify the monstrous. Creed relates Jean-Francois Lyotard’s claim that reproductive technologies threaten the first home of the subject – the mother’s body. These technologies therefore place the unconscious relations of the subject and the body in crisis.

In an analysis of the artistic representations of the cyborg, Bruce Grenville (2001) sees the cyborg figure as an expression of our cultural anxiety about technology. Grenville argues that automata are the opportunity both to mimic the human, and to perceive our difference from the machine. Freud’s notion of the ‘uncanny’ (as the familiar, that once repressed, returns as the uncanny) is invoked by Grenville in the form of the machine that is so familiar “it threatens to consume us” (p. 21). Grenville understands notions of the body as ‘meat’ or ‘wetware’ in relation to the mind machines of A.I. and virtual reality, as a reworking of the Cartesian mind/body split. He claims that these notions work to shift our anxiety about engulfment by the machine, through the possibility of transcendence (Grenville, 2001).

In each of these analyses, technology functions to either control the monstrousness of the maternal, or replace its reproductive abilities. Additionally, in Grenville’s analysis, the monstrous maternal is not controlled, but reasserted by the reproductive abilities of technology.

The monstrous also surfaces in relation to the ‘copy’, or ‘double’, birthed apart from the maternal, in Marie-Helene Huet’s (1993) research into representations of monsters. The monster is also invoked as a variant of Haraway’s machine/human ‘cyborg’ figure (c.f. Badley, 1995; Braidotti, 1996; Haraway, 1997; Lykke, 1996). The monster is
seen as a representation of the blurring of boundaries that, while evoking fear and loathing, remains a site for actions of liberation such as feminism. While both the monster and the cyborg, as border creatures, create fertile domains for understanding the relationship of technology to subjectivity, they are categories that serve to represent only the disruption of the human/machine binary. An analysis of A.I. and a-life in respect to the abject is an attempt to understand both the disruption and reinforcement of that very boundary.

CONCLUSION

A.I. and a-life are fields of scientific research attempting to map intelligence and sentience. The teleology of these fields is the construction of a technological 'other'. A.I. and a-life research and development, like that of other sciences, advances distinctly cultural understandings of the body, mind, and identity. Cyberculture theorists, such as Kelly (1995), Stelarc (1995), Springer (1996) and Plant (1995; 1996a; 1997), have celebrated the cultural technologies of A.I. and a-life as postmodern, in that they liberate the subject from oppressive, unitary identity. For these theorists, technology is the means by which the posthuman self adapts to the postmodern world, with the self becoming fluid, multiple, female, and decentred. However, cyberculture theorists, such as Hayles (1999), Balsamo (1999) and Adam (1998b), have also critiqued these technologies as mystical, reductionist, and modernist understandings of consciousness, where a privileging of mind over body reinscribes an oppressive identity.

Through a psychoanalytic analysis, A.I. and a-life can be seen to intersect with desires for control and transcendence. The mother's body is investigated and regulated by the search for knowledge. Similarly, the construction of technology is part of a constant process of confrontation with and rejection of the maternal body. Technology controls or replaces the monstrousness of the maternal in an attempt to stabilise identity. The monster and the cyborg, as boundary creatures, utilize the monstrousness of the maternal as a useful site for disruption of oppressive cultural identities. However, A.I. and a-life can be seen as unconscious attempts to reinforce identity - an identity perpetually 'in crisis' and 'in process'. A.I. and a-life, as attempts to create a technological other, can be seen as an abjection of the maternal and the 'culturally marked' body. Kristeva's notion of the abject is a relevant and useful tool for an analysis of these scientific constructions.
CHAPTER 2  
THE ARTIFICIAL OTHER  

INTRODUCTION  
The field of Artificial Intelligence is based on the notion that the brain, as a natural phenomenon, is able to be modelled. Artificial simulations of the brain have impressively solved mathematical theorems, defeated the world chess champion, and even simulated a psychiatric therapist. The computational capacity of computers exceeds that of human subjects, yet the intractable problems for the field arise from attempting skills "that any five-year-old possesses: telling the difference between a dog and a cat, or understanding an animated cartoon" (Kurzweil, 1999, p. 88).

Recognition that intelligence exceeds computational ability led to the creation of neural networks modelled on the neurons of the brain. These networks, taught via the feedback of reward and punishment, identified and utilized pattern recognition as the essential factor of intelligence. Other forms of A.I. include 'evolutionary algorithms' (such as those largely running the stock market) that take feedback from the environment to make new, more proficient programs. Further areas of research include computing with light, utilizing the enzyme reactions of DNA to complete arithmetic and logical operations, quantum computing, and the atomic level robots of nanotechnology (Kurzweil, 1999).

While the field of A.I. has had many practical applications, artificial intelligence has never actually been proclaimed, as "the whole point of models is that they contain only certain features of the modelled domain and leave out the rest" (Searle, 1990, p. 31). In other words, the ground keeps shifting, and "simulation is not the same as duplication" (p. 31).

Similarly, artificial life research is based on an understanding of life itself as information. Biology is understood to be mathematical and logical, and therefore capable of simulation. A-life representations take the form of complex self-organizing systems that theoretically could evolve to the level of complexity of a human. Unlike the 'top down' approach of A.I. where solution-oriented structures are imposed on the system, a-life is a 'bottom up' model where simple rules are believed to lead to greater complexity. 'Automata', or 'self-operating' machines, programmed with
simple rules interact with each other and encounter programmed environmental factors, in a simulation of evolutionary processes. They live, die, reproduce, grow, self-repair, and adapt. Automata who exhibit behaviour that was not programmed to occur are showing evidence of 'emergence'. The notion of emergence is the key to a theory that sees life itself as a characteristic of the complex organization of matter (Levy, 1992).

As in artificial intelligence research, advances in the field occur through attempts to understand real life biological processes. A description of a real life process could lead to a simulation, which in turn could lead to a new understanding of the natural world. In both research fields a distinction is drawn between ‘weak’ and ‘strong’ theoretical positions, with the former understanding the research as illuminative, while the later prophesises definitive results – such as the replication of mind and life. The crux of both fields of research seems to be the distinction between the known and the not known of the body and of biology.

ARTIFICIAL INTELLIGENCE

The term artificial intelligence was coined by John McCarthy for a 1956 Dartmouth College conference. However, A.I.’s beginnings are customarily located in the late 1940’s invention of the digital computer and the ensuing publication of Alan Turing’s paper “Computing Machinery and Intelligence” (Devlin, 1997; Selkirk, 1986). Turing’s paper effectively described the means by which digital computers might replicate intelligence. For Turing, digital computers were discrete state machines that calculated by means of movement from one discrete state to another (i.e. 0’s and 1’s). As a result of this method of calculation, a single computer was capable of carrying out any appropriately designed calculation or program, and was thus regarded as the equivalent of all computers. Digital computers were consequently considered universal machines (Turing, 1950). The Church-Turing Hypothesis, that “any effective procedure can be implemented via a Turing [universal] machine” (Franklin, 1999, p. 79), concretised the means by which intelligence, if formalised, could be replicated.

The first noteworthy A.I. program, developed in response to Turing’s paper, was Newell, Simon, and Shaw’s ‘Logic Theorist’, which used propositional logic and heuristic rules (rules of thumb) to prove mathematical theorems. Newell and Simon’s ‘General Problem Solver’ (G.P.S.) followed, with an attempt to solve general logic
puzzles from "think aloud protocols" (Adam, 1998a, p. 37). Intelligence was considered formal, logical, and able to be organized according to discoverable rules. As with the 'Logic Theorist', heuristics were used to organize the complexity of the real world into the simplified data required for problem solving (Minsky, 1998). For Adam (1998a), these programs operated within a 'bounded rationality' that is symptomatic of this early research paradigm of Symbolist or Good Old Fashioned A.I. (G.O.F.A.I.). Programs utilized discrete, and therefore simplified, rules-based data suitable for computation. The basis of the Symbolist paradigm is the representation of knowledge by means of symbols – which are then manipulated by various processes of reasoning and logic (Devlin, 1997).

The clumsiness and slowness of these early programs led to attempts to replicate intelligence via pattern recognition. Minsky's frames and Schank and Abelson's scripts were programs designed for analogous reasoning via the use of stereotypical situations (for instance, one script attempted to describe all possible situations and objects encountered inside a restaurant) (Adam, 1998a). Winston's 'Toy Blocks World', where robot arms manipulated toy blocks is an example of the microworlds created to model intelligent behaviour within exceptionally simple environments. Similarly, expert systems modelled the knowledge of experts within a given specialty such as medicine or law (Adam, 1998a). Successes attributed to these domain specific programs afforded hope of either a scaling-up, or joining together, of programs in order to provide a real-world model.

These early Symbolist models were critiqued as simplistic and reductionist understandings of intelligence. The use of heuristics was seen as an inadequate attempt to describe and simplify complex processes that are not always available to conscious awareness (Devlin, 1997). Scripts and frames were understood as retrospective understandings of responsiveness to unique and specific situations, accordingly, these programs entrenched normative and stereotypical understandings of the world (Adam, 1998a; Collins, 1995). Similarly, according to Devlin, domain experts were seen to rely more on intuitive and situational knowledge than formal rules. The initial success of microworlds was viewed as unrealistic as it did not subsequently lead to application within more complex environments – thus Yehoshua Bar-Hillel (cited in Devlin, 1997) termed the scaling-up scenario a "fallacy of the
successful first step” (p. 165). Each of these criticisms of A.I. affirmed a recognition of the real world as infinitely too complex to formalise within symbols.

Symbolist A.I. is also critiqued as a refusal of embodiment. For Wilson (2002), Turing, both within his paper and an ensuing report, established the subsequent disembodiment of A.I. paradigms. Turing (cited in Wilson, 2002) “propose[d] to try and see what can be done with a ‘brain’ which is more or less without a body” (p. 48). Adam (1998a) and Devlin (1997) compare Symbolist A.I.’s disembodied ‘knowing that’, or propositional knowledge, with the embodied ‘knowing how’ of more skills-based knowledge. Dreyfus (1992) elaborates this distinction with *simple-formal, complex-formal* and *nonformal* categories of knowledge. Simple-formal knowledge is rule based and context free, and can therefore be successfully programmed within A.I. systems. Complex-formal knowledge refers to situation-dependent knowledge – programmable in reference to limited environments, but requiring infinite heuristics to account for more complex situations. Nonformal knowledge is situation-specific, exists without definitive rules, and is currently unprogrammable. The impossibility of programming nonformal knowledge is clearly evidenced in attempts to model natural languages. For Dreyfus, machine translation of natural language is impossible beyond ‘generic and typical’ elements – meaning in language is essentially context-dependent and “being-in-a-situation turns out to be unprogrammable in principle using presently conceivable techniques” (p. 303). Adam (1998a) concurs, arguing that while propositional knowledge can be replicated in A.I., ‘knowing how’ skills knowledge requires the presence of a body, she contends that Symbolist A.I. is reductive – in that it subsumes this situational ‘knowing how’ knowledge via the elevation of propositional knowledge.

Adam (1998a) identifies two forms of situational knowledge ignored by Symbolist A.I.’s elevation of propositional knowledge: the embodied, and the social. *Embodied situatedness* relates to the physicality of being human. An example is Searle’s (1980) claim of the exclusively human quality of *intentionality* – whereby meaning and understanding are related to desires, beliefs and intentions. For Searle, intentionality is a mental state resulting from biological processes of the brain that cannot be replicated by a machine (Searle, 1980; c.f. ‘Chinese Room’ argument Searle, 1990). *Social situatedness* refers to the non-universal status of knowledge, i.e. knowledge is gender, class, culture, and otherwise context based. For Adam the normative status of
knowledge is evidenced in Symbolist A.I.'s assumption of a universal subject who is male, white, middleclass, and a replica of the typical A.I. researcher. Collins (1995) argues that the social is the paramount determinant of knowledge and because knowledge is socially located, no social isolate, such as a computer, can exhibit the full range of human abilities...the difficult question is to explain how computers can exhibit any knowledge at all. (p. 298)

Additionally, he relates how researchers observed A.I. practitioners using complex sociological and psychological terminology naively, simplistically, and 'without loss'. For Dreyfus (1992), the propositional knowledge of Symbolist A.I. presupposes knowledge separated from its physical context. Wilson (2002) claims that this separation also includes neglect of the developmental, time-based aspects of knowledge. For Collins (1995), limitation and simplification of context result in reliable data, serving a scientific paradigm that regards experiment as the provision of “unambiguous data that can then be fitted to a theory” (p. 288). However, for Dreyfus, Symbolist A.I. transpires as a failed experiment that “disconfirm[s] the traditional assumption that human reason can be analysed into rule-governed operations on situation-free discrete elements” (p. 304).

Connectionism (or Neural Networks) is the main rival to the Symbolist paradigm. It developed alongside Symbolist A.I. from the late 1940s until the 1969 publication of Minsky and Papert's Perceptrons, a canonical critique of the connectionist model. Re-emerging in the 1980s, Connectionism offered a simulation of intelligence modelled on the actual physicality of the brain's neural networks – with Connectionist machines employing large numbers of neuron-like connections, parallel processing, and pattern recognition-based learning. Employing a Behaviourist conception of learning via reinforced responses to stimuli, the neuron-like connections are weighted and adjusted according to 'correct learning' (Adam, 1998a). Connectionism is a 'bottom-up' model of intelligence with deliberately "unpredictable and nondeterministic" (Turkle, 1997, p. 2) results.

Connectionism's revival in the 1980s was credited to the improvements and availability of large parallel computers. Papert (cited in Adam, 1998a) critiques this assumption, arguing that the successful models of the 1980s are capable of running on small systems like those available in the 1970s. He maintains that Connectionist
models research simplistic problems with no substantial evidence of 'scaling-up' to more realistically sized networks. For Hoffman (1998), unpredictability generates doubt about the reliability of the Connectionist paradigm, including confusion regarding what has been learned, and can be learned, by a particular network. He also claims neural network systems only resemble brains in terms of large numbers of connections and parallel functioning, arguing that while Connectionism therefore has attractive functionality for practitioners, it does not credibly duplicate biology. Minsky and Papert (1988) concur, arguing in Perceptrons that this model was based on the first, little understood, microscopic images of brain structures. For Adam (1998a), Connectionist models use the same propositional knowledge of Symbolist systems when training connections, with the operator supplying embodied and situated knowledge. An operator's decision to strengthen particular connections relies on an unconscious subsumption of their situated knowledge within more rule-based reasoning. Clocksin (1998) agrees, seeing no substantial improvement on the Symbolist model “the computer is still carrying out one abstract task in isolation, free of the context of its developmental milieu, defined or parameterised in a way judged appropriate by its author” (p. 108).

ARTIFICIAL LIFE

Connectionism is often partnered with the emerging discipline of Artificial Life due to a similitude in bottom-up design and theories of emergence. In the paradigm of Artificial Life, the attempted formalisation witnessed within A.L. extends to the classification and replication of life itself. The field can be divided into three subcategories: wetware, hardware and software (Taylor & Jefferson, 1995). Leaving aside wetware (which usually refers to artificial processes of building and manipulating RNA molecules), both hardware and software categories are modelled within computer systems.

'Hardware artificial life' refers to those models attempting the creation of situated or embodied organisms. An example is the 'affect' paradigm whereby 'Kismet', a robot head engineered and programmed to physically express emotions, reacts to social stimuli via internal 'drive states'. These 'states' basically register differing levels of social stimulation and assign an appropriate emotion (Wilson, 2002). Within the same laboratory, Rodney Brooks' insect-like robots are lauded as models of situated learning and decentralized intelligence. Within a model Brooks calls subsumption
architecture, an insect is programmed with simple behaviours, added one at a time, and distributed throughout its 'body' as each new 'competency' of exploration of its environment is mastered (Davis, 2002). However, learning does not actually take place, as each new skill is hardwired by researchers - Brooks' model imitates intelligence without any representations of knowledge (Franklin, 1999).

'Software artificial life' refers to what is commonly known as a-life - where automata live, die, reproduce, and interact with the environment, in simulations designed to resemble the actual biological processes of life. The ability of computers to calculate data at enormous speeds ideally situates them to simulate evolutionary processes that occur naturally over millions of years. Whereas A.I.'s top-down paradigm attempts the creation or discovery of the logical rules governing intelligence, a-life is a bottom-up model, attempting to build the complexity of life from simple underlying processes. Life is self-replicating, evolving and autonomous. It is redefined as information, and emerges from the complex organization of matter (Kember, 2003). Emergence is defined as the occurrence of properties or behaviour not programmed into the organism (Hayles, 1996), whilst second order emergence refers to the occurrence of behaviours that are catalysts for adaptation within the system (Kember, 2003).

A-life research was inspired by John von Neumann's 1953 'self-reproducing automata'. First developed on a checkerboard, cellular automata, represented by black and white checkers, were manipulated in a simulation of biological reproduction. Conway's 'Game of Life' developed von Neumann's concept further, in a computer simulation utilizing Darwinian concepts of evolution, automata live, die, reproduce, and self-repair (Kember, 2003). Further models simulate the flocking of birds, the behaviour of insects, and evolutionary arms races (Kember, 2003; Levy, 1992). The paradigm of a-life has been used for the development of computer games, autonomous agents on the Internet, and the regarding of the Internet itself as an artificial life form. Similarly, theorists such as Sadie Plant (1996b; 1997) and Kevin Kelly (1995) have broadened the concepts of a-life to encompass the entirety of human culture as a connectionist or complex system (Kember, 2003).

The paradigms of Artificial Life hold a certain appeal within cyberculture - with postmodern conceptions of identity as decentred, distributed, constructed over time, and situated within the environment. However, this confluence is preceded by what
Evelyn Fox Keller (1994) nominates a ‘circularity of terms’ between post-WW2 physics, biology and cybernetics. A-life’s search for the simple building blocks of nature is presaged by the attempt within physics to discover the mathematical basis to the universe and by biology’s discovery of DNA (Horgan, 1995). For Keller (1994), molecular biology’s identification of simple building blocks was supplemented with the notion of ‘linear causality’. Keller argues that this notion, which has become the ‘central dogma’ of DNA, was a misappropriation of the cybernetic term ‘information’ – a misuse eliding notions of circularity within its actual technical meaning. Keller and Kay (cited in Kember, 2003) claim that there is a “plastic and contingent relation between genes, structures and functions” (p. 17) – in other words, despite the prevailing narrative of linear causality, DNA does not hardcode a one-way linear flow of information. Therefore, Keller asserts, the model ‘life = information’, reproduced within the paradigm of a-life, is simply a reductionist metaphor. Similarly, the terms ‘organism’ and ‘self-organization’ – also arising from the cross-influence between cybernetics and microbiology – are claimed as reductive misnomers that conceal a complex symbiosis between organisms and environment (Keller, 2002; Umland & Wessel, 2002).

Hayles (1996) identifies a similar elision of meaning in the use of biological language within a-life. She demonstrates how the designation of terms such as ‘ancestor’, ‘mother cell’, and ‘behaviour’ to elements of a computer program, does more than confer equivalencies between the elements and biology. Hayles recognizes a-life as a tautological narrative whereby the life-like qualities of computer systems are justified by the extra meanings these terms gain in a human context. This circularity extends to claims that a-life simulations are actual instances of life. For Hayles, this is a ‘biomorphizing’ of a-life systems designed "precisely so they would be able to manifest these qualities" (p. 150).

Hayles reasons that a-life researchers do not analyse the complexity of nature hoping to reveal its simple origins, but create the simple parts, justifying their impending complexity via the nebulous concept of emergence. Kember (2003) nominates emergence as the ‘non-vitalists vitalism’, claiming it reinscribes what the reductionist disciplines of A.I. and a-life eschew – a mystical understanding of life such as the vitalist’s idea of a hidden force (i.e. chemical or electrical) at the centre of life. If emergence is that which surprises the programmer, then Saunders (cited in Kember,
Kember considers this

the paradox of creation that is at the heart of the ALife project: the God-like act of creating life is 'stolen' or appropriated by man and then credited to the computer... (with) the ALife scientist... an engineer masquerading as a scientist, a creationist masquerading as an evolutionist, a constructivist masquerading as a naturalist. (pp 55 - 59)

CONCLUSION

The human creation of intelligence and life is attempted though the repeated classification and formalisation of mind and sentience within various models of A.I. and a-life. The formal rules and pattern-based reasoning of early A.I., whilst providing usable data for computation, did not adequately reflect the complexity of intelligence. Symbolist A.I.'s assumption of the universality of knowledge failed to account for the situational and embodied nature of intelligence. Connectionist A.I. promised an improved conception of intelligence modelled on the physicality of the brain. However, Connectionist models were critiqued as naïve, unrealistic models not credibly replicating biology. In addition, operator training of Connectionist systems appeared to utilize the same propositional knowledge of Symbolist models. In Artificial Life research, hardware models of embodied and situated learning were critiqued for a similar reliance on operator knowledge. The new paradigm of a-life attempted the creation and replication of life itself. However, a-life's tautological use of biological terms, along with the somewhat vague and mystical concept of emergence, failed to justify these systems as authentic replications of life. Intelligence and life remain equally mysterious categories, eluding accurate classification and formalisation.

In his 1950 paper “Computing Machinery and Intelligence”, Alan Turing himself claimed a certain mystery in regard to consciousness and “a paradox connected with any attempt to localize it” (p. 160). While the nature of computers confirms the replication of any formal process, replication is limited to what has been, or is able to be, defined. Defined elements of intelligence or sentience have been critiqued for the non-inclusion of essential elements, and are therefore deemed illegitimate definitions. Although regarded by researchers as being able to be more accurately defined by further research, elements remaining undefined are considered mystical or vague. However, as Kember (2003) reminds us, claims of replication are ultimately not
assessable, due to an "always shifting and contested criteria" (p. 59) for intelligence and life. It remains unknown if intelligence and life are knowable and therefore able to be replicated by these technologies.
CHAPTER 3
AN ABJECT TECHNOLOGY

INTRODUCTION

Feminist psychoanalytic theorist Julia Kristeva’s (1982) notion of the abject as “the subject’s reaction to the failure of the subject/object opposition to express adequately the subject’s corporeality and its tenuous bodily boundaries” (Grosz, 1989, p. 70) is a useful concept for the exploration of human subjectivity in relation to the technological ‘other’ of these scientific creations.

Julia Kristeva, though critical of feminism, is situated alongside the postmodern (or French) feminists Luce Irigaray, Michele Le Doeuff, and Helene Cixous. However, Kristeva’s work, as part of postmodern feminism, has been criticized as too academic. Similarly, as part of psychoanalysis, Kristeva has been seen as essentialist in her positioning of women. Kelly Oliver (1993) claims that a number of theorists, such as Grosz (1986, 1989, 1990) and Silverman (1988), have argued that Kristeva subverts essentialism. Similarly, Oliver outlines criticisms of Kristeva as: an ‘anarchist’; a ‘conservative’; ‘opening avenues for change’; ‘closing avenues for change’; ‘historical’; ‘ahistorical’; as ‘dense’ and ‘transparent’. Oliver understands these contradictory positions as arising from interpretations of the ambiguities in Kristeva’s writing (Oliver, 1993b).

It can be argued that Kristeva is not essentialist, but part of the tradition of ‘difference feminists’ who highlight the constructed (not biological) differences of women as powerful sites of liberation. However, it is not the feminist value of Kristeva’s theories that is the focus of this study. Rather, Kristeva’s notion of the abject, as a theory of a ‘subject-in-process’, repeatedly reaffirming boundaries by the expulsion and rejection of the improper, is a useful model to understand the construction of A.I. and a-life.

Drawing on an intellectual tradition of existentialism, deconstruction, linguistics, and the psychoanalytic theories of Jacques Lacan, postmodern feminist theorists deconstruct the notion of a unified identity and subjectivity, understanding the self as “fundamentally split between its conscious and unconscious dimensions” (Tong, 1998, p. 196).
Jacques Lacan’s concepts of the *imaginary* and the *symbolic* order are crucial to an understanding of the abject. For Lacan, the pre-oedipal infant perceives no distinction between itself and the world, characterized by belief in ‘oneness’, or ‘sameness’, with the mother. The child moves from this *imaginary* via the *mirror phase* - where the child perceives itself ‘as a self’ through the reflection of the mother’s gaze (Tong, 1998). During a third phase, the *Oedipal crisis*, the dyadic unity with the mother is further broken by the intervention of the phallus. The child, fearing symbolic castration, relinquishes the mother in return for language (Tong, 1998). Therefore, entry into the symbolic order is entry into language and culture.

For Kristeva, the maternal *semiotic*, not the imaginary, is the precursor to the symbolic. The semiotic is the site of mother and child symbiosis, a heterogeneous flow of energies that exists prior to identity, form, signification, and hierarchical division (such as that between subject and object) (Grosz, 1989; Lechte, 1990). The semiotic is both inside (never fully excluded from) and outside the symbolic. The linear, rational, unity of the symbolic is disrupted – by that which is abjected by the symbolic. The maternal body gives rise to the self as a ‘subject-in-process’ (Oliver, 1993b).

To exist in the symbolic, the subject must have some control over abjection. In this psychoanalytic theory, subjectivity is constructed through relationship with, and distinction from, the ‘other’. The abject signals the impossibility of these very categories of self and other (Grosz, 1986), and therefore a self in “perpetual danger” of return to the non-identity from which it arose (Kristeva, 1982, p. 9).

Sexual identity is formed in the attempt to separate from the symbiotic relation to the mother’s body. While the male child can abject the mother’s body via his identification with the father, the female child identifies with the mother, and therefore has difficulty with this separation (Tong, 1998). For Kristeva, civilization is built on the repression of the maternal (Grosz, 1989). Abjection, via the maternal body, is associated with both women and those rejected by culture “the Jews, Gypsies, homosexuals, deformed, diseased” (Kristeva, 1982, p. 206).

Abjection is related to repetitive bodily processes of “incorporation, depletion, and loss” (Grosz, 1986, p. 109) where objects taken into and expelled from the body are
nevertheless never separate from the body. These objects give rise to feelings of disgust and fear, and necessitate the forming of social taboos and rituals. There are three categories of abjection for Kristeva - food, waste, and sexual difference. The category of food involves oral disgust; waste is related to filth and disease; and sexual difference is linked to menstruation and maternity (Grosz, 1989).

Elizabeth Grosz cites the abject as recognition of the body as the basis of consciousness, whose unity is gained only via the expulsion of the impure and unclean (Grosz, 1986). The abject threatens identity, and all the other seemingly fixed categories of culture, yet the abject is also the maternal body expressing itself within that culture. Kristeva (1982) claims that literature is an "unveiling of the abject" (p. 208), similarly, A.I. and a-life can be seen as an elaboration of the abject and "the horror of being" (p. 208).

THE ABJECT

Kristeva's theories could perhaps be regarded as a critique of Symbolist A.I. in that her entire work negates the Cartesian separation of body and mind by means of her remotivation of Freud's theory of the drives. For Kristeva, the drives traverse both body and language, being both biological and cultural "operating in between these two realms and bring[ing] one realm into the other" (Oliver, 1997, p. xvii). Language is comprised of both the stases of the symbolic and the discharge of drives within the semiotic.

Kristeva also appears to favour the Artificial Life paradigm in her description of identity as an 'open system'. She uses the language of a-life to illustrate the psyche's response to stimuli as an 'adaptation' bringing forth greater complexity (Lechte, 1990, p. 184). Identity is not the Cartesian 'cogito' or transcendental ego - it is not unitary, but dynamic, with the semiotic drives operating as a continual articulation of the body within language (Oliver, 1997). However, the drives are only part of a larger pattern of abjection and unification operating between the body and culture. Rather than an endorsement of a-life, an application of Kristeva's theory to A.I. and a-life reveal both sciences as equivalent instances of abjection.

Kristeva asserts the existence of patterns in the body prior to the mirror stage and signification. A pattern of abjection - as an identity crisis called into being by the non-
separation of subject and object - arises prior to birth, at birth, and in the subsequent regulation of the infant's body by the mother. Mother and child do not yet exist as distinctly separate entities: “before the umbilical cord is cut, who can decide whether there is one or two?” (Oliver, 1993b, p. 57). Nevertheless, the logic of separation and division has begun. From the breast the infant incorporates food that is ‘not-yet-body’, and, from the anus, ejects faeces that are ‘no-longer-body’ (p. 57). The oral and anal drives are ‘anaclitic’ (spin-offs), rather than direct translations, of physical needs into psychological desires (Moi, 1985) - the mother’s regulation of the infant’s body, by means of rituals related to food and cleanliness, initiates a model for both drives and their satisfactions. Similarly, the mother’s own body is the original model for the excess the drives expel (Lechte, 1990). The anal drive’s excess demands rejection, bringing both pleasure and loss:

these drives move through the sphincters and arouse pleasure at the very moment substances belonging to the body are separated and rejected from the body. This acute pleasure therefore coincides with a loss, a separation from the body, and the isolating of objects outside it. (Kristeva, 1974, p. 151)

For Kristeva (1974), the body is not unified and would be torn to pieces by the drives but for its nature as a process - a process whereby its plurality is integrated within sign systems. Negativity is “both the cause and the organizing principle of the process” (p. 109). Named both rejection and abjection (Weir, 1996, p. 100), it is “the movement found in the separation of matter....that produces the theses [of signification]” (Kristeva, 1974, pp 107 - 110).

The anal drive’s rejection and expulsion enact a pattern of ‘separation’ – a pattern that is repeated in the abjection of the maternal body and acquisition of language in the mirror stage. Another pattern exists here in relation to ‘identification’. Kristeva terms the dyadism of the child’s relation to its mother prior to the mirror stage the narcissistic structure. Within this structure the infant identifies with the mother’s breast, creating the pattern for all subsequent identifications. This pattern of identification is repeated in the oral drive’s pleasure in incorporation (Oliver, 1993b). For Kristeva, the infant’s identification with the ‘pattern’ of the breast is a ‘reduplication’ of a pattern that generates all object relations:

the logic of reduplication, put in motion by the first identifications with the mother’s body – sets up the logic of the psyche: repetition. The logic of reduplication itself becomes a pattern reduplicated by the psyche. (p. 72)
This pattern emerges again in the oscillation between the semiotic and the symbolic in language. The semiotic, as a discharge of the drives, both disrupts and generates the unity of the symbolic. Just as this unity is present prior to the mirror stage, in the pleasure of incorporation and identification, semiotic negativity is also a generative element within language. The \textit{thetic break} is Kristeva's term for the point at which the separations within the semiotic reach a threshold. This threshold generates a larger break in the form of the mirror stage and the subsequent entry into language. Thus, what Kelly Oliver (1993a) terms a \textit{dialectical oscillation} found already within the material body, leads from one level to another and eventually gives rise to the speaking subject. This is not a static oscillation. Rather it is a productive oscillation that crosses ever-new thresholds because of the dynamic tension between rejection and stases, semiotic and symbolic. (p. 2)

After the mirror stage, rejection transforms into desire. The subject after the mirror stage is the subject of signification, is separate, and always in relation to an 'other' in order to stabilize its identity. For Kristeva, the pattern of separation and unification into subject and object is endless (Oliver, 1993a). The subject is always in crisis, the abject constantly invoked, and attempts at unity and separation are endlessly undone.

Kristeva (1982) calls abjection a precondition of narcissism, of the self/other relation, that fails in its attempt at "self-sufficient haven" (p. 14). She thus designates abjection a 'narcissistic crisis' expressed when the separating and repeating 'economy' of the semiotic is repeated in the symbolic. Abjection is revealed in all that is not contained within a sign system:

\begin{quote}
What having been the mother, will turn into the abject. Repelling, rejecting; repelling itself, rejecting itself, Ab-jecting. In this struggle, which fashions the human being, the \textit{mimesis}, by means of which he becomes homologous to another in order to become himself, is in short logically and chronologically secondary. Even before being like, "I" am not but do separate, reject, ab-ject. (p. 12)
\end{quote}

Abjection, as "the demarcation imperative" (p. 68) is both a recognition of the desire for transcendence of the body - and its impossibility. Abjection is a recognition of the "impure, defiling elements of... uncontrollable materiality" (Gross, 1990, p. 88) that continually threaten and are never eliminated. Just as taboos and rituals attempt to contain the abject 'in-between' of the body's spit, faeces, and menstruation, cultural practices and rituals such as religion, literature, philosophy, art, and analysis, exist to defend against the constant return of the abject. Catharsis, purification, sublimation
and repression are all utilized by the psyche in relation to abjection. For Kristeva, religion displaces, socialization practices repress, and literature, poetry and art serve to sublimate abjection (Grosz, 1986). Similarly, within language, the abject maternal body is replaced by the seeming unity of the sign. In this respect, A.I. and a-life could also be considered as ongoing cultural rituals of repression and purification of the defiling, uncontrollable materiality of the body.

AN ABJECT TECHNOLOGY

There are three modalities by which A.I. and a-life can be considered as cultural instantiations of abjection. The thetic pattern of separation and identification can be witnessed in the sciences of A.I. and a-life within: the sacrifice of the maternal, the phobic attempt to place body and mind entirely within a sign system, and in the attempt to stabilize identity via the creation of a technological other.

A.I. and a-life can be seen as reduplications of the sacrifice of the maternal initiated in pre-Oedipal processes and then repeated within the thetic. In the thetic, the subject's unity in the symbolic is gained via the sacrifice of the semiotic maternal, with identity secured by the exchange of the maternal abject for the 'objects' of language (Reineke, 1997):

Kristeva signals that reason, logic, grammar, syntax, univocal meanings - the so called 'higher' achievements of civilization - function only because of a sometimes violent repression and sacrifice. (Grosz, 1989, p. 49)

A thetic crisis occurs when the pre-Oedipal separations between mother and child are called into question by boundary failures. For the child, those initial separations comprised a terrifying conflict for identity where "the stakes [were] 'me or mommy'" (Reineke, 1997, p. 27). A revisiting of that conflict, within a thetic crisis, witnesses the abject maternal again threatening obliteration of identity. For Kristeva, thetic crises also occur culturally, prompting larger cultural rituals of abjection. In the case of the cultural ritual of sacrifice, the thetic is reduplicated, but instead of murdering the maternal, the conflict is resolved by the actual murder of the body (Oliver, 1993b) - "killing substance to make it signify" (Kristeva, 1974, p. 41).

Similarly, A.I. and a-life can be understood as cultural rituals of abjection that reduplicate the thetic sacrifice of the maternal body. A.I. and a-life attempt to replace
the reproductive powers of the maternal and the monstrousness of her subsequent authority over existence. This rejection of the maternal is then reduplicated in A.I. and a-life via sacrifice of the impure materiality of the body, in an attempt at an entirely symbolic, and therefore stable, technological identity. Kristeva asserts that these rituals function to conceal the murder of the semiotic mother, keep her threat at bay, and prevent us from having to commit actual matricide (Reineke, 1997). They are “body-bounding practices...[that] also bind the social order” (p. 96). Within cultural rituals:

society may be read as [the] generalized text of an ongoing battle with abjection...[where negativity] is placed under control of the sign and the institutions that support it. (p. 91)

A reduplication of the patterns of separation and identification within language is evidenced in the classification practices of A.I. and a-life. These sciences can be understood as attempts to contain the abject semiotic body within language:

a technocratic, state-dominated social milieu can severely contain the semiotic both in the sense of a severe and overly strict father, and in the sense of placing everything within a representation. (Lechte, 1990, p. 157)

For Kristeva, there is a phobic fear of the unnamed: “fear is the mark of the failure of language to provide a symbolization to contain drive activity” (Lechte, 1990, p. 161). The unnamed, as that which has not been defined or separated into an object of language, is an abject ‘non-object’ that indicates an insufficient separation from the maternal (Lechte, 1990). Labelling signals a desire for a regulated, rationalized, unified reality (Moi, 1985). A.I. and a-life’s constant labelling and classification of the materiality and processes of the body and mind serve a phobic desire for purification via the regulation and rationalization of the abject semiotic.

For Kristeva, identity formed through the mirror phase relies on a cohesive image of self inside a body: “it is a subject, an ego, only with reference to the mapping and signification of its corporeality” (Gross, 1990, p. 85). The body is the abject reminder of origins and mortality and “the disavowed condition of consciousness” (Grosz, 1989, p. 74). The ego recoils from the idea of being tied to or limited by the body’s form....Abjection is a sickness at one’s own body, at the body beyond that ‘clean and proper’ thing, the body of the subject. (p. 77)
This mapping of the body's corporeality within the mirror phase is extended culturally in A.I. and a-life's attempt to classify and formalise the hidden unknowns of identity and life. However, computer technology provides the means by which this classification and mapping exceeds the creation of knowledge. Within the digital paradigm, formalisation allows replication, which, within 'strong' claims, means the duplication of a bounded, autonomous, identity—a stable identity able to transcend the abject of the body.

While unsuccessful, A.I. and a-life's attempt to duplicate identity can be understood as a cultural instance of abjection. Nichols (1988) argues that artificial intelligence systems have replaced the mother as our imaginary other. However, it can be argued that this artificial other, as image of both self and other, is neither, and therefore an unstable abject:

human identity remains at stake, subject to change, vulnerable to challenge and modification as the very metaphors prompted by the imaginary Others that give it form themselves change...What had been fixed comes unhinged. (p. 28)

A.I. and a-life models transpire as copies that threaten the 'original' of identity. However, while this autonomous, technological identity exists only in the imagination, the reverse is also asserted, as identity is always in excess of the proposed models of A.I. and a-life "something is always left over, 'a remnant experienced as the body'" (Reineke, 1997, p. 53). The A.I./a-life identity remains abject, caught between subject and object, never an autonomous other.

If achieved, the creatures of strong A.I. and a-life would perhaps be considered instances of the sublime and uncanny. For Jervis (1998), technology that appears autonomous is often associated with the feelings of helplessness and awe attributed to the sublime. However, as Sofoulis (1988) asserts, the sublime, as "that which is not yet realized" (p. 12), once realized, is no longer sublime and gives way to the uncanny "as soon as it is realized...the sublime loses its transcendent 'purity'. As the word is made

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2 While not irrelevant, a detailed analysis of the links between abjection and the concepts of the sublime and uncanny when applied to A.I. and a-life, is beyond the scope of this study. Future research could provide elucidation in this regard, particularly in relation to Kristeva's remotivation of Freud's concepts of negativity and the death drive, in relation to these concepts.
flesh, it becomes corrupted” (p. 12). Freud’s notion of the uncanny is often associated with automata. However, for Freud, feelings of uncanniness arise from familiarity with that which has been previously repressed – accordingly, uncanniness, in relation to A.I., is ultimately a confusion of the double and the self, relating to the pre-Oedipal lack of separation into subject and object. For Freud (1955), the double’s promise of immortality is reversed, and it becomes “the uncanny harbinger of death” (p. 235). A purely symbolic, and therefore stable identity remains an illusion, ultimately overwhelmed by what it denies – the original lack of identity in the pre-Oedipal semiotic:

For a while, a double can freeze the instability of the same, give it temporary identity, but eventually it explores the abyss of the same, probing those unsuspected and unplumbable depths. The double is the unconscious depth of the same, that which threatens it, can engulf it. (Weir, 1996, p. 179).

The abject lack of separation between mother and child precedes identity, initiates the conditions of its existence, and repeatedly negates it. The doubles of A.I. and a-life are a cultural manifestation of the continual processes of separation into subject and object within identity. There is, in each instance of this pattern, an abject remainder, a defiling non-object, that prompts the next iteration of identification and separation. A.I. and a-life, as reduplicated patterns of abjection, are but “the ‘negative hallucination’ of an unachieved identification” (Weir, 1996, p. 180).

CONCLUSION

Julia Kristeva’s notion of abjection is demonstrated as a pattern that exceeds its pre-Oedipal origins – the separations and identifications of the maternal body are repeated within the oral and anal drives, within the thetic break, in the semiotic and symbolic elements comprising language, and in larger cultural rituals of abjection. The thetic sacrifice of the maternal, phobic containment of the semiotic body within language, and use of an ‘other’ to stabilize identity, are all reduplicated within the cultural practice of A.I. and a-life via sacrifice, classification, and duplication, of the abject materiality of the body and life.

If achieved, the technological ‘other’ of A.I. and a-life may be considered an instance of the sublime or uncanny. However, as objects of a scientific imagination constructed to “destabilize and reinvent (its) methods and objects of knowledge” (Haraway, 1989, p. 324), the duplication of identity within successive A.I. and a-life models remains a
repeated attempt to categorize the unknown, abject remainder of the body and life. This imagined duplication of identity remains an abject process of identity - A.I. and a-life are revealed as cultural reduplications of abjection.
CHAPTER 4
0 = 2, THE MIRROR & THE KNIFE

INTRODUCTION
The project 0 = 2 is a photographic construction of an A.L./a-life identity, neither robot nor android, but a bodiless self in the network behind the lens, the screen, and the code. The communication of this artificial persona is imagined as an endless narrative, fragmented and dispersed throughout the images, sounds and words of the network, unseen and unknown in its entirety. The network is not a technological web with images of satellite and surveillance, but refers to the larger complexity of the representations of science and of culture. This project is envisaged as a selection of fragments from this larger narrative, whereby the persona, a relative 'ghost in the machine', utilizes the textual code of its construction and the photographic technologies of identity, to communicate, unheard, the loss and desires of its existence.

THE MIRROR & THE KNIFE

0 = 2 represents A.L. and a-life’s classification of intelligence and life within images of a ‘fantastic voyage’ into the hidden unknown of the body and of nature - a voyage that ultimately reveals only the unconscious screens and masks of our cultural identifications and abjections. The technologies of photography have long been implicated in the ‘biological gaze’ of science, whereby even the highest resolution images construct and create as they examine (Keller, 1996). Within this project, cultural images are both found inside, and projected upon, the microscopic detail of our vision.

This confounding of the anatomic real and the culturally constructed is also represented within these photographs through a confusion of the categories ‘natural’ and ‘artificial’. What appears natural has often been digitally constructed, while the ‘natural’ body, photographed or printed atypically, appears blatantly artificial. Similarly, a certain artificiality emerges within photographs of genitalia - as the not-

3 Sawday’s (1995) treatise on Renaissance anatomy reports these tools as the attributes of *Anatomia*, the goddess of division.
represented, the hidden and threatening, of the over-photographed and investigated body.

This project also attempts to mirror the tensions of A.I. and a-life, the “flow of opposites into each other” (Lechte, 1990, p. 117) of these technologies of abjection. Television stills were photographed using a rule-based cut-up technique intended to creatively underline and plunder differences between formal and unconscious processes. ‘Cut up’ is a technique, pioneered by William Burroughs, involving the physical cutting up and rearranging of texts in order to elicit unforeseen meanings (Skerl, 2004). In this case, ‘cutting-up’ refers to the splicing of the screen by the shutter-click of a camera, with images removed from their contextual meaning within television programs and rearranged into a photographic narrative. Similarly, unusual effects were created in some images from a complicated mixing of digital and analog technologies. For example, in a series of photographs, an x-ray was used as the basis for a photogram, the photogram was then used in place of the negative for a photographic print, and finally, this print was digitally scanned, manipulated, separated into multiple images, and printed.

Similarly, the content of particular photographs refers to tensions of the self/other relation as a dynamic of abjection of the maternal “the abject appears in order to uphold ‘I’ within the Other. The abject is the violence of mourning for an ‘object’ that has always already been lost” (Kristeva, 1982, p. 241).

A.I and a-life’s attempt to transcend the abject materiality of the body and life is countered within this project by a restating of the maternal within these sciences. Whereas A.I. and a-life abject the maternal and the body in an attempt to stabilize identity, Kristeva argues that art ‘reinvests’ the denied maternal, thereby both constructing and destroying symbolic identity (Grosz, 1989) “if art represents a crisis, it is above all a resurrection. The crisis exists only for mirrors that are enamoured of stable images” (Kristeva, 1997, p. 171). The attempt in A.I. and a-life to place the abject materiality of the body and life entirely within a sign system, is countered by the maternal’s “permanent calling into question” (Caputi, 1993, p. 5) of identity. Accordingly, images of the maternal breast, as the originating object of patterns of identification and separation, are inserted into the scientific diagrams of A.I. and a-
life. Within these photographs, the 'discrete state' of the Turing Machine is revealed as the infinite-state of the maternal relation.

These patterns of abjection are extended to the photographic via both pixellation and repetition of the body. Similarly, the metaphoric use of a shutter-release-cable as an umbilical cord represents the abject non-separation of subject and object in that pattern. Other images depict the vulnerability of the body as a disorderly container for identity, an identity continually disrupted by the separations and identifications of the drives.

The notion of abjection, as unresolvable binary process, is confirmed by Lechte (1990) as a "logic of ambivalence" (p. 109) antithetical to the logic of science. He reasons that the logic of abjection is not the 'true or false' (0 or 1) of the scientific and digital worlds, but 'true and false' (0 and 2) - the infinite and uroboric processes of the mirror and the knife. For Sofoulis (1983), the uroborus, the symbol of a snake circled to eat its own tail, relates to pre-Oedipal non-separation, while for Kelly (1995), it has long been associated with feedback and the 'repeat loops' of computer code. As a photographic representation of the endless separations and identifications of identity, $0 = 2$ attempts to amplify the uroboric reduplication of abjection in the technologies of A.I. and a-life.

CONCLUSION

$0 = 2$ is a narrative of identity as an open system in infinite crisis and process. The messy, unruly materiality of the body exceeds the clean and proper body of the symbolic. A.I. and a-life's fantasy of finitude is disconfirmed by the infinite context of the unquantifiable, abject materiality of the body and life. $0 = 2$ confirms "the only way to tell the story of these tense contradictions is to create/perform these ruptures as well" (Harrington, 1998, p. 1).
CONCLUSION

Through an elaboration of the psychoanalytic concept of the abject, this research investigated the nature of A.I. and a-life in relation to identity. A photographic response to these investigations led to the creation of $0 = 2$ – a photographic representation of an A.I./a-life identity. To achieve this aim, the creative project and its exegesis: identified and reviewed cybercultural analyses of the constructions of identity within computer technologies; identified and reviewed the paradigms and concepts of the sciences of A.I. and a-life; and elaborated Julia Kristeva’s psychoanalytic concept of abjection in order to demonstrate an occurrence of the abject within A.I. and a-life. This research reveals A.I. and a-life as cultural reduplications of abjection.

Technological creations such as A.I. and a-life involve cultural understandings of the body, mind, and identity. A.I. is critiqued for a privileging of the mind over the body, with a-life’s promise of a fluid and decentred identity revealed as both mystical and reductionist. A.I. and a-life entail unconscious desires and impulses to control, replace and transcend the monstrousness of the maternal body by its phobic placement within sign systems. Classification and formalisation of intelligence and life would enable the computer technology of A.I. and a-life to replicate identity. However, intelligence, life, and consciousness are situated and embodied, and therefore elude complete classification within the successive models of A.I. and a-life research. Creation of an imagined duplicate ‘other’ to stabilize identity remains unachieved, as there is always an abject remainder to the unquantifiable and unknown materiality of the body. An elaboration of abjection reveals the pre-Oedipal separations and identifications of the maternal body reduplicated in the cultural rituals of A.I. and a-life. As a consequence, the technologies of A.I. and a-life reveal an identity in constant crisis and process.

While an identity stabilized by successful duplication would perhaps be an instance of the sublime and uncanny, it was beyond the scope of this research to provide an in-depth analysis of these concepts in relation to abjection. However, this project suggests future avenues of creative exploration in this regard – particularly in respect to an extension of the photographic creation of a technological ‘other’ within this project, by the future creation of a photographic avatar – an electronic photographic
performance of an autonomous identity. Creative exploration suggested by this project also includes the use of both microphotography and astrophotography as technologies relevant to the creation of this avatar. Theoretically, a further investigation of the abject is suggested in relation to the sublime and uncanny in the technological ‘other’. Specifically, Kristeva’s remotivation of Freud’s concept of negation, as an expression of the death drive within abjection, could be explored in relation to concepts of the double and repetition, encapsulated by the abject figure of the uroborus.

This project’s significance is its unique contribution to both photography and theory as a demonstration of the scientific concepts of A.I. and a-life as reduplications of abjection. 0 = 2 is a photographic work elaborating the occurrence of abjection within these technologies:

As I lay bare, under the cunning, orderly surface of civilizations, the nurturing horror that they attend to pushing aside by purifying, systematizing, and thinking; the horror that they seize on in order to build themselves up and function? I rather conceive it as a work of disappointment, of frustration, and hollowing – probably the only counterweight to abjection. (Kristeva, 1982, p. 210)

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4 This concept owes a debt to Zoe Sofoulis’ (1988) The Frankensteinian Sublime in which she synchronistically identifies a link between Kristeva’s theory and the uroborus.
REFERENCES


