

# Anticipation: Technoscience, life, affect, temporality

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**Abstract** One defining quality of our current moment is its characteristic state of anticipation, of thinking and living toward the future. Anticipation has epistemic value, a virtue emerging through actuarial saturation as sciences of *the actual* are displaced by *speculative forecast*. It is a politics of temporality and affect. Key dimensions are: *injunction* as the moral imperative to characterize and inhabit states of uncertainty; *abduction* as requisite tacking back and forth between futures, pasts and presents, framing templates for producing the future; *optimization* as the moral responsibility of citizens to secure their 'best possible futures'; *preparedness* as living in 'preparation for' potential trauma; and *possibility* as 'ratcheting up' hopefulness, especially through technoscience. Anticipation is the palpable sense that things could be (all) right if we leverage new spaces of opportunity, reconfiguring 'the possible.' We illustrate exemplary sites of anticipatory practice, especially biomedical, highlighting how such sites are gendered, increasingly implicating young girls.

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## Introduction: Time, Knowledge, Affect

One of the defining qualities of our current moment is its peculiar management of time, or what might be called a politics of temporality.

Combining eternalism with ephemerality, this instantiation of ‘modernity’ offers both a promise of certainty (that the truth can be known for certain in a way that applies across time, into the future) coexistent with the acknowledgement of an ongoing deferral of truth as ever changing (as more sophisticated ways of knowing it continually emerge). The ‘future’ as a conceptual possibility thus plays an important role in this episteme. The future is always knowable in new ways, even as the grasping for certainty about it remains persistent. Few, however, question whether or not ‘the future’ can, and therefore must, be *anticipated*.

Anticipation as we see it has multiple valences, epistemic value and is a virtue. Its politics are temporal and affective. It emerges at a moment of actuarial saturation, when one realizes that the sciences of *the actual* can be abandoned or ignored to be replaced by a knowledge that the truth about the future can be known by way of *the speculative forecast*, itself relying on proliferating modes of prediction. Speculative forecast, in turn, has been loosened from the virtue of certainty and redirected as an injunction to characterize and inhabit degrees and kinds of uncertainty – adjusting ourselves to routinized likelihoods, hedged bets and probable outcomes. Preparedness is infinitesimally possible and infinitely malleable when one has a good working model of an anticipated ‘future.’ As much as speculative finance has become both a dominant mode of capital accumulation, spawning its own material and discursive effects of disaster prediction, anticipation has become a common, lived affect-state of daily life, shaping regimes of self, health and spirituality.

Crucially, predictable uncertainty leads to anticipation as an *affective state*, an excited forward looking subjective condition characterized as much by nervous anxiety as a continual refreshing of yearning, of ‘needing to know.’ Anticipation is the palpable effect of the speculative future on the present. The anticipatory excitement of the cliff hanger as a narrative mode is as familiar as terror-inducing apocalyptic visions. *As an affective state, anticipation is not just a reaction, but a way of actively orienting oneself temporally.* Anticipation is a regime of being in time, in which one inhabits time out of place as the future. Temporality has always had a politic, long capitalized and colonized in the name of the ‘present’ of particular locations, situations and actors. Within this longer history, anticipation now names a particular self-evident ‘futurism’ in which our ‘presents’ are necessarily understood as contingent upon an ever-changing astral future that may or may not be known for certain, but still must be acted on nonetheless.

Examples of regimes of anticipation abound at the juncture of technoscience and life. Nikolas Rose (2007), for instance, argues that the current ‘politics of life’ increasingly depends upon the optimization of future citizens by way of their ever more complexly geneticized psyches and molecularized biologies. As Adele Clarke and collaborators (2003, forthcoming) have shown, anticipation in the form of prediction, risk and

optimization profoundly structures biomedicine and technoscience. Marilyn Strathern (2000) offers the term ‘anticipatory audit’ to describe ways that contemporary accountability in the academy and elsewhere is oriented to pre-constituted futures. Cooper (2006), Orr (2006), and Lakoff and Collier (2008) each illustrate how regimes of security and simulation bring future disasters into the present in order to know how to organize ourselves for the inevitable disasters they predict. Regardless of whether disasters actually come to pass, they have already had their impact on our present lives. Crucially, the future increasingly not only defines the present but also creates material trajectories of life that unfold *as anticipated by those speculative processes*. Anticipation is rapidly reconfiguring technoscientific and biomedical practices as a totalizing orientation.

Anticipation pervades the ways we think about, feel and address our contemporary problems. Anticipatory regimes can be known as historically contingent, as multisited and as multilocal, while still holding persuasive force in the present. While we focus in this essay on certain practices of ‘anticipation’ visible in the worlds of health, medicine, technoscience and biopolitics, there are many other arenas of practice.

Anticipation has long been a component of political practice: decolonization, Marxism and feminism all rely on conjuring the possibility of new futures. While it is not new, anticipation is intensifying into a hegemonic formation, thereby raising the stakes for analysis along temporal, epistemological and affective logics. We must ask critical questions about the varied and specific forms anticipation takes as both an effect of political economies and a feature of them. Regimes of anticipation are culturally and biopolitically transnational. Anticipation reconfigures the ‘lay of the land’ as sites that in colonial logics were mapped as either primitive (past and out of time) or modern (present and in time) and turns them both into productive ground for anticipatory interventions, each forecasting its own type of darker and/or more hopeful futures.

### **Anticipation, Affect, Politics**

The present is governed, at almost every scale, as if the future is what matters most. Anticipatory modes enable the production of possible futures that are *lived and felt* as inevitable in the present, rendering hope and fear as important political vectors. Parsing anticipation means exploring the politics of affect as much as speculative epistemologies. The *breathless futurology* (Harrington et al, 2006, p. 3) of biotechnology and nanotechnology stun us, generating a sense that we not only can but must *hold* anticipation. Global warming and oil crises, predicted extinctions and biosecurity preparedness infuse a sense of looming time limits that generate urgency and anxiety about acting now to protect the future.

Anticipation as an affective condition is not simply a matter of the anxieties within individual subjects. Regimes of anticipation are distributed and extensive formations that interpellate, situate, attract and mobilize subjects individually *and* collectively. Ong and Chen (forthcoming), for example, discuss ‘communities of fate’ as involving ‘the affective mapping of collective interests engendered by biotech innovations that resuscitate folkloric notions of family, ethnicity and the nation.’ Liu (2008) views neoliberal modes of individuation as intertwining affective, and specifically ethnicity-based, socialities through stem cell-related technologies in Taiwanese biotech. Anticipation itself becomes the affective state that is lived and felt by those dwelling within this compressed and forecastable time, binding collectivities of nation, class or globe.

Anticipation is part of what Jackie Orr (2006) calls ‘psychopolitics,’ in which states, corporations and military complexes tactically project and distribute fear and anxiety as a means to interpellate and govern subjects. It is what Sara Ahmed (2004) calls ‘affective economies’ in which affect does not originate in individual bodies but is provoked in individuals through larger circulations and strategies, thereby accruing its value and potency as a moral economy through its distributions. Distributed anticipation – as mass fear or a politics of hope – can become politicized, mobilizing and sometimes creating states of war, nationalist communities, and economic productivity. In turn, within academia, ‘public sentiment’ and ‘political feeling’ have become forms of counter-conduct (Berlant, 2006, 2008).

Anticipation herein also differs from speculation, even while it authorizes speculative modes of engagement. Anticipation, as a lived condition or orientation, gives speculation the authority to act in the present. Anticipatory regimes offer a future that may or may not arrive, is always uncertain and yet is necessarily coming and so therefore always demanding a response. Anticipatory regimes in their specificity can conjure many versions of the future, but what all speculations share is the orientation towards and claim to the future as that which matters. Anticipation is not just betting on the future; it is a moral economy in which the future sets the conditions of possibility for action in the present, in which the future is inhabited in the present. Through anticipation, the future arrives as already formed in the present, as if the emergency has already happened. The telescoping of temporal possibilities is a crucial part of anticipation. At the same time, this process also entails a forced passage through affect, in the sense that the anticipatory regime cannot generate its outcomes without arousing a ‘sense’ of the simultaneous uncertainty *and* inevitability of the future, usually manifest as entanglements of fear and hope.

Querying anticipation as an episteme provokes consideration of an array of affective states ... not only anticipation and preparation (tied to hope), but also surprise, uncertainty, anxiety and unpreparedness (tied to fear). The unknown, for which no claims have yet been made, plays an integral role in producing action. Such concerns have begun appearing not only in feminist and queer

studies but in also in science, technology and medicine studies from what Novas (2006) has called ‘the political economy of hope’ as manifest by patient groups to the ‘collective fear and individualized risk’ associated with breast cancer testing (Press *et al*, 2000) and even cancer reporting in the mass media (Clarke and Everest, 2006). Silverman’s (forthcoming) analysis of parental involvement in autism research asserts the simultaneity of being desperate *and* rational as love is imbricated with biomedicine and new forms of community around doing science.

Considerable work has been done around ‘the pharmaceutical person’ (Martin, 2006) and the ‘management’ of individual affect ... including the biopolitical economy of Big Pharma in its transnational travels. Yet questions of relations between affect and the social within emergent anticipatory regimes remain largely unanswered. As these regimes become manifest and palpable through the potentials, promises *and payoffs* of molecularized technoscientific biomedicine, they beckon a specific response that understands how biomedical life takes up more and more space of anticipation. The transformations of biomedical knowledge production, distribution and consumption are manifest, for example, in lived experiences of searching the web to figure out ‘what is to be done,’ whether this means how or whether or not to medicate, operate or therapize (Clarke *et al*, 2003).

Parsing anticipation as an episteme also provokes the question of the opposite of anticipation – the unanticipated, the surprise, that for which no claims have yet been made. Anticipation is, in this sense, a strategy for avoidance of surprise, uncertainty and unpreparedness, but it is also a strategy that must continually keep uncertainty on the table. The sciences and technologies of anticipation demand that the phenomena be assessed and calculated – producing probabilities for anticipatory projects as interventions in the present. Within a regime of anticipation, the unanticipated or unexpected can, on the one hand, offer new territories for expanding anticipations and, on the other hand, may open up tactics for contestation or new forms of curiosity.

If anticipation is restructuring the social, it is also impacting scholarship across the disciplines. How might this skein of time/affect/knowledge be understood as generating effects that even the analyst cannot evade? Drawing inspiration from Frantz Fanon’s (1952/1968) articulation of the pained and exhilarating affective fractures of postcolonial blackness, we ask what critical affective enunciations and fractures might name the unrelenting compulsions to tack between dread and hope, to live as subjects in the domain of the not-yet, and to see anticipation as both opportunity and tyranny?

### **Exemplary Sites of Anticipatory Practice: Biomedical and Gendered**

Anticipatory regimes, like those of capitalism, tend to work through logics of expansion, in which new territories for speculation must be continually found to

keep the anticipatory logic moving. Anticipatory regimes expand their scope of inclusion, elongate their reach in time, in space, and in phenomenological terms. Abduction (discussed below) is the concept we adopt and adapt to capture the processes of tacking back and forth between futures, pasts and presents, framing the life yet to come *and* the life that precedes the present as the unavoidable template for producing the future. Abduction names a mode of temporal politics, of moving in and mobilizing time, turning the ever-moving horizon of the future into that which determines the present. Unlike previous moments of modernity, the future of now is that which not only gives meaning to the past, but conjures new temporalized domains, versions of the present as sites of contingent and malleable action. Histories of the future are replacing histories of the present.

Examples are plentiful. ‘The life cycle’ is a key site for the expansive force of anticipation with biomedicine offering new calculi that reconfigure death as the technical prediction of not when death has arrived, but rather of one’s ability to bring time of death to present decision-making about care (Kaufman, 2005; Banerjee, 2007). Feminist technoscience scholars have similarly shown how anticipatory modes reach before birth to fetal management (for example, Casper, 1998), and yet further back to conception (Franklin and Roberts, 2006), as active domains of the present that allow tactical interventions to prevent and/or enable imagined futures. Disease itself has also been pushed back to predictive ‘virtual pathologies’ identified as diagnostic risk signs probabilistically linked to symptoms that are made real in the predictive moment of now (Greene, 2007). Affect is also involved in anticipatory regimes as medical and health outcomes. The effects of living under anticipatory modes of engagement affect physical, mental and emotional well being in ways that are only beginning to be understood as long-term chronic disorders and stress-related disabilities. Anticipation can conjure what Sianne Ngai (2005) calls ‘ugly feelings’ of dread, fatigue and exhaustion, not just arousal. These too operate in and through expansive logics that anticipate chronic outcomes which must be prevented now.

Anticipation also works outwardly into multiple sites, locating itself in varied ways. Promissory capital speculation and development logics render some places as backward in time, needing anticipatory investment, while other places are deemed already at the cusp of the ‘new’ future, marked by the virtue of rapid change. This goes unquestioned because speculative capital operates *as if* the virtues of movement into valued futures are already known. Promissory market logics not only find new sites of investment, but produce them as problematized domains (Fortun, 2001; Rajan, 2006; Dumit, forthcoming). For example, food production is not only governed through a century old speculative logic of commodity ‘futures,’ it has also become a problem space for the control of anticipated epidemics linking animals to humans, connecting the FAO to the CDC to the WHO, creating new territorial linkages between Asia, Africa and North America under the specter of ‘emergent illnesses’ (Braun, 2007).

Global health programs are increasingly focused on notions of biosecurity and biodefense (King, 2002, 2005), another mode of anticipation (Lentzos, 2006). Tactics of biosecurity promote the notion that epidemic disasters are if not the only then at least the most important contemporary large-scale international and local public health issues (Lakoff and Collier, 2008). Efforts to control the spread of disease (vector control and eradication) give way to 'prevention' (vaccines and integrated health, education, welfare programs); and finally these have given way to transnational 'response regimes' organized around anticipated epidemics affecting humans and other species (for example, Miller, 2002). The anticipatory regime enables structured responses to crises that are not simply predicted but already made real. Anticipated 'crises' become the model and the 'event' that demands immediate response via health security measures which generate equivalent financial demands in their wake (Pigg, 2008). Investment in the deployment of security systems replaces investment in the improved health of nations; eradication of risky behaviors (raising chicken or cattle) replaces eradication of viral or bacterial pathogens (Hickler, forthcoming). Similarly, focusing on individual 'body burdens' of environmental pollution via biomonitoring displaces attention and funding from environmental monitoring and regulation (Shostak, 2005; Washburn, 2009). Anticipation is a mode of both creating markets and responding to projected needs, whether or not such crises are yet born out in the public sphere.

Biotechnology also operates within and generates anticipatory regimes *vis-à-vis* bodies and their parts. The markets for human tissue, embryos, organs and clinical trial subjects arise from biomedical industries that create the future need for transplants, new drugs and optimized families (Waldby and Mitchell, 2006). Herein, speculative capital and promissory futures drive health sector investments in reorganizing the present so that biomedical science and markets can meet the demand in advance of the crisis. One might call this anticipatory or preventive biomedicalization (Clarke *et al*, 2003, forthcoming).

Reproduction as a process that is both aggregate and increasingly parsed at micrological levels is particularly territorialized through anticipatory logics (Clarke, 1995). Governed as that which gives rise to racialized evolutionary futures through eugenics in the first half of the twentieth century, today, manipulations of cells, DNA and endocrinology promise continual generation of variation and remixure. Thompson (2005) calls the contemporary 'biomedical mode' of reproduction a form of 'promissory capital' that traffics in the hope and hype of living-being's generative futures. This orientation to remixing the future becomes what Waldby and Mitchell (2006) call a kind of 'biovalue' or what Franklin (2003) calls 'biowealth.' In other words, at micrological substrates, reproduction has been rematerialized as not just a difference engine, but a futures generator in regimes of anticipation. Similarly, at larger scales, anticipatory regimes reconfigure populations as evidence for rising

epidemics of everything from infertility to ‘attention deficit disorder.’ The logic of population control since the 1960s was and is anticipatory, managing reproduction now to ‘avert’ future births and bring about modeled futures of increased GDP and modernity (Murphy, 2008).

Girlhood is one site among many where distinctively gendered anticipatory regimes are at stake. In neo-liberal development regimes coalescing since the early 1990s, ‘girlhood’ has been identified as a crucial site for the creation of ‘human capital.’ Human capital is intrinsically an anticipatory form, calling for investment in the skills and health of humans for the sake of greater rates of return towards GDP in the future. Investing in the education and health of poor girls has been identified as the ‘greatest investment,’ and not only in terms of potential for earning future income. Because education has been identified as correlated with lower *future* fertility, such investments are now considered more cost-effective pre-emptive measures than providing birth control *per se* (Summers, 1992). Thus in reproductive politics more broadly, girlhood has become targeted as an actionable domain that temporally expands backward in the life cycle the intervenable risks in which future fertility is at stake.

Another new anticipatory claim on early girlhood is the rapid worldwide expansion of the markets for Gardasil – a patented vaccine against HPV infection that must be administered before sexual activity commences. It claims girlhood as a site where both formations of capital and health are anticipatory. While virtually all cervical cancer is correlated with HPV infection, the vast majority of HPV infections do not turn into future cervical cancers. Moreover, HPV infection is endemic among sexually active women. Still, Gardasil conjures pre-sexual ‘girlhood’ as a new domain for vaccinating against future sexually transmitted disease. It also creates a new global market in the name of anticipatory cervical cancer preparedness, now promoted as global health by key foundations (Carpenter and Casper, 2009).

A third new claim on girlhood is refocusing breast cancer prevention on pre-puberty through reduction of environmental exposures in the home. The NIH-sponsored Breast Cancer and the Environment Research Centers is a networked ‘transdisciplinary study of the effect of early environmental exposures on mammary development and potential breast cancer risk’ in girls and mice (<http://www.bccrc.org/organization.htm>). The project is a governmental response to breast cancer activists’ long-term demands for research on potential environmental causes of breast cancer, and the activists have been ‘designated’ new roles as ‘prevention educators’ (Thomson, 2009).

In sum, management of the future within anticipatory regimes requires projecting ever further back into younger years, positing the future as urgent in ever earlier moments of organismic development. Anticipation thus reterritorializes and expands the domains and sites – not only in space, but also in time – that are called into the future.

## Dimensions of Anticipation

### Injunction

One of the valences of anticipation is ‘injunction.’ Anticipation is not only an epistemic orientation toward the future, it is also a moral imperative, a will to anticipate. From climate change, to emergent disease and biosafety, there is a moral injunction to anticipate as an act in which life, death, identity and prosperity are at stake personally and collectively. Anticipation calls for a heralding of the emergent ‘almost’ as an ethicized state of being. Being ready for, being poised awaiting the predicted inevitable keeps one in a perpetual ethicized state of imperfect knowing that must always be attended to, modified, updated. The obligation to ‘stay informed’ about possible futures has become mandatory for good citizenship and morality, engendering alertness and vigilance as normative affective states.

Insurance, actuarials and risk form a triptych in the anticipatory episteme that arouses injunction. They collectively frame an anticipatory catchment for subjectivity (Blackman *et al*, 2008). The injunction is in part a requirement to be obedient: to pay attention to the evidence that risk is real; to accept the knowledge that it can be calculated via actuarials; and then to either protect oneself from its deleterious possibilities or make use of its potential advantages through insurance. These three techne inscribe a risk subject who must anticipate his or her well-being ... financial, health, familial, social and/or political. *Risk subjects* are produced as a formation of capital emerging in acts of insurance in a state of perpetual precariousness. Anticipating risk means embodying risk as a sensibility for organizing one’s life ... living at risk. ‘The new world of vital risk and vital susceptibilities, demanding action in the vital present in the name of vital futures to come, is generating an emergent form of life’ (Rose, 2007, p. 7).

Such emergent forms of life are documented in Geeta Patel’s (2006) discussions of ‘risky subjects’ in India conjured at conjunctures of temporality, sexuality and capital since the neoliberal 1990s. Here risky subjects are enjoined to debt in the hopes of productive crops, but may well find themselves caught with sterile seeds and bad weather. So at the same time they purchase insurance to hedge their bets, navigating between dire poverty and capitalist accumulation as possible futures. Borrowing on uncertain futures, obtaining credit for what might happen, has resulted in a proliferation of the aspects of life in need of insurance. Not only does capital move through risk. Risk *itself* is a commodity, sold via insurance as a means to hedge against the future when one’s life depends upon it, turning life into something one invests in through anticipatory logics. For Patel, farmers caught in debt who take their own insured lives to create credit for their families makes painfully manifest the violence of regimes of anticipation. Today, the global economic recession sparked by finance capital’s delirious trade in futures and risks does the same.

## Abduction

Anticipation demands action. Abduction<sup>1</sup> is a means of determining courses of action in the face of ongoing contingency and ambiguity. Abductive reasoning is ‘... a sort of “third way” between the Scylla of inductive reasoning and the Charybdis of hypothetico deductive logic’ (Atkinson *et al*, 2003, p. 149). Ideas about how to ‘move forward’ are generated *by tacking back and forth* between nitty-gritty specificities of available empirical information and more abstract ways of thinking about them. In anticipation, abduction also acquires a temporal form: the tacking back and forth between the past, present and future. Abduction moves reasoning temporally from data gathered about the past to simulations or probabilistic anticipations of the future that in turn demand action in the present. Abduction thrives in the vibrations between the is and the ought, consummately modern yet augmented by anticipation in ways that undermine the certainties on which modernity thrives.

Abduction is the process of considering more precisely *how* to anticipate in actual practice. How is the present abducted by the future? What kind of preventive actions will be pursued? Which interventions are most appropriate? Given the risks, how can one optimize the future in the present? The concept of abduction underscores that what is at stake in anticipation is not only the many futures than can be brought into being later by virtue of what we do now, but also the abduction of the present for the sake of particularly constituted futures.

There are many abductive paths. Locke (2007) sees abduction as a fusion of rational control and irrational free-play, dual-thinking modes as necessary tension for anticipating the unruly. While for us such dualism is too narrowing, the openness, fluctuations and instabilities of abduction as lived experiencing of ‘trying to know’ what to do in time, what action to take ‘before’ in preparation for the inevitable yet avoidable ‘after,’ are central. On wider scales today, computer modeling and simulation are standard means of abduction. Taylor’s *Unruly Complexity* (2005) beautifully captures that which must be addressed in order to anticipate.

Abduction is a state of being. It names the ‘how’ of inhabiting the present as abducted for the future. Doyle’s *Wetware* (2003) captures the embodiedness of ‘abduction’ as a felt wresting of the present into alien futures. It is not neutral, it can present as the colonizing, coercing or recycling of affective orientations in the name of the future. Abduction can be a form of kidnapping, where life in the present is held hostage to the potential violence of the future. Jain (2007) frames one affective condition of abduction as ‘living in prognosis,’ where one’s life is oriented by the probabilistic likelihood of future death by cancer. Abduction is the work, the labor of living in anticipation, of being out of time.

Drawing upon insights of science, technology and medicine studies, Law (2004) argues that methods do not just describe social or natural realities but

are also involved in creating them. Methods, including abduction, are thus always already political. If ‘methods want to know and help to shape the world, then they need to reinvent themselves and their politics to deal with mess’ (Law, 2004, p. 1). As a method of coming to know, abduction captures the requisite ongoingness of dealing with mess through the emergent. Abduction, as the methodological orientation of anticipation, opens up the question of how anticipation is made visible in the present, where the future hails the present (Bryan, 2009), and we must respond.

### **Optimization**

Anticipation is also always in part about optimization as a ‘condition of possibility.’ Rose (2007, pp. 3, 262) notes that: ‘The vital politics of our own 21st century ... is neither delimited by the poles of illness and health, nor focused on eliminating pathology to protect the destiny of the nation. Rather it is concerned with our growing capacities to control, manage, engineer, reshape and modulate the very vital capacities of human beings as living creatures.’ Rose views optimization as the moral responsibility of citizens to secure their ‘best possible futures,’ drawing upon somatic expertise (the growing numbers and kinds of sub-professions dedicated to managing aspects of somatic existence) as needed.

We suggest that these biopolitics are also anticipatory in nature and in some senses optimizing by definition. If optimization entails the effort to secure one’s own, one’s family’s, one’s group’s, or even one’s population’s ‘best possible future,’ it also entails the sense that it must be continually expansive in orientation to do so. That is, optimization means not only maximizing one’s chances for a best possible future but also that the pursuit of the ‘best possible’ is legitimately infinite in its scope and always ongoing. This can penetrate to the innermost regions of the body, the outermost regions of the globe, the earliest or latest moments of life, the largest and smallest of measurable things. As the mode of anticipation does not need actual objects or events, but must only imagine them as possible, the scope of optimization is unlimited.

Fava’s (2008) work on the World Machine simulation of global climate change poignantly details anticipations as optimization. The complete simulation of global climate change is always elusive as relevant data can expand from polar ice core samples to the dust on paintings at the Turner Art Gallery. The whole world in turn is abducted as data points, such that the full simulation is never fully reached. But since anticipation always exists in the domain of the uncertain, or not fully certain, it remains contestable and therefore actionable. At the same time, the moral force of this simulation constructs the problem of climate change as necessarily tied to *all* the data points. The problem itself becomes unsolvable without a fully optimized solution that mobilizes everything and everyone. The tragedy here is the tyranny of optimization, in which

action is delayed in the name of optimization, and yet cannot possibly achieve completion. It changes the present and thus generates new possible futures.

In regimes of anticipation, optimization can become realized as a kind of hallucination, a simulated future that envelops us to provoke affective and sensory states as well as practical responses in the present. As Orr (2006, 2008) argues, efforts to simulate world disaster take place at the register of the ‘psychopolitical.’ War is fought not only on battlefields, but also in the hallucinatory register of how the future is simulated, projecting calls for particular militarizations. Optimizing the future becomes the *simulation* of that optimization. The hallucinatory presence of the nightmare or fantasy future transforms anticipation from a call to action into a call for compliance with tyrannical futures.

Alternatively, the optimizations so smoothly proffered by biocapital may be subverted by what Papadopoulos *et al* (2008, p. 73) call ‘imperceptible politics’: ‘It is only possible to work *on* the real conditions of the present by invoking imaginaries which take us beyond the present.’

## Preparation

Anticipatory tactics authorize certain kinds of technoscientific interventions. One set of examples coalesces around biomedicalization, here organized around the ethos of ‘preparedness.’ Genetic sites of such technoscientific anticipations denote a need for hedging against our biological futures. Individual DNA scans are now offered by the web-based genetic testing service company ‘23and me’ (supported by Google) at a reduced cost of US\$399 (Tansey, 2008). At a ‘celebrity “spit party” ... notables in cocktail attire ejected their saliva into test tubes.’<sup>2</sup> Another company, Cryo-Cell International, lets women save their menstrual fluid as a future source of stem cells (Pollack, 2008, p. A6): ‘Once you get sick, it’s too late!’ Human sperm banking is no longer only for others needing donor sperm but also for men facing surgeries or chemotherapy that might place future sperm ‘at risk’ (Almeling, 2007). Families are regularly compelled to purchase cord blood banking for their newborns as a routine component of hospital delivery (Waldby and Mitchell, 2006, p. 127). The notion that one should be prepared for one’s future by reading one’s genes, one’s immune ‘reactivity’ and one’s hormonal capacity is increasingly commonplace in clinical biomedicine. Significantly, such anticipations are not only diagnostic, they are productive. In these new ‘economies of vitality,’ biopolitics are inextricably intertwined with capital (Rose, 2007, p. 8) by virtue of temporal abductions.

Differences between prevention and preparedness matter in these anticipatory times. Anticipatory preparedness is speculative and reactive, in ‘preparation for’ the event and the trauma as if it were already here, rather than offering ‘prevention of’ it so that it never happens. For example, in the space of

anticipation, prevention *becomes* biopreparedness ... generating new and better means of dealing with inevitable disasters rather than actually preventing them. Preparedness is joined by 'pre-emption,' as in pre-emptive war authorized by a sense of 'imminent danger.' President Bush captured this logic (as opposed to deterrence) in the brevity of his argument for war in Iraq: 'If we wait for threats to fully materialize, we will have waited too long. We must take the battle to the enemy, disrupt his plans and confront the worst threats before they emerge. In the world we have entered, the only path to safety is the path to action. And this nation will act' (Massumi, 2007, p. 1). Anticipation authorizes pre-emptive actions in the present forced by a purported urgency in the future, legitimating, destroying, removing and/or eradicating now in the name of an anticipated future danger. Here violence is justified not only as defense, offense, or tactic, but also as preparedness ... anticipating a crime yet to happen.

Deferral also relates to preparedness as the putting forward of action and prolonging of anticipation, not as procrastination but again as abduction, of telescoping the future into the present. Deferral is the strategy currently pursued by some young career women in the United States anticipating their future marriage and maternal potential by cryogenic freezing of their unfertilized eggs, a temporal and affective 'commodifying of time and hope' (Romain, 2008).

### **Possibility**

Last, anticipation brings in its wake new kinds of engagement with 'possibility.' Anticipation predicts where there is opportunity now for what was previously impossible. Tied to optimization, anticipatory regimes create spaces for 'ratcheting up' our technologies, economies and politics in response to our urgent need to be prepared, such as injunctions to 'grow' economies by expanding anticipation into new domains and registers. These leverage new spaces of opportunity and also reconfigure our sense of 'the possible.' For example, stifling concerns about the ethicality of genome research in view of holocaust genetics are now effaced by an urgent sense that genetic cures and therapies lay just around the corner – coming soon (Franklin and Roberts, 2006). Imperatives for research are produced by claims that possible genetic diversity value from the past is in danger of being 'lost' to the future if scientists do not act now (Reardon, 2005). New markets for cells and tissue emerge as spaces for adding 'biovalue' proliferate and concerns over 'use-value' give way to promises of 'value-added' (Thompson, 2005, 2008; Franklin, 2005, 2006; Waldby and Mitchell, 2006). Neoliberal politics that dismantle government services simultaneously open up the space for new kinds of capitalism: millennial capitalism, disaster capitalism, casino capitalism based on

risk, apocalypticism and forecasting doom (Strange, 1997; Comaroff and Comaroff, 2001; Klima, 2002; Klein, 2007).

Again development investments in ‘human capital’ are good examples. Human capacities – to learn, to be healthy, to work, to reproduce – are configured as forms of capital open to speculation not only for individuals and their families, but also for states and transnational investment. Different people from different economic and hence investment milieux are calibrated as having differential rates of return, offering new ways of mapping human possibility. Thus, one’s level of human capital becomes not only a measure of differential worth, but also a data point in a risk calculus of future labor and longevity.

One outcome of these processes of anticipatory regimes is a kind of erasure not just of existing problems but also of recognition of them as problems *per se*. Naomi Klein (2007), for instance, points to this in her critique of neoliberal capitalism when she notes that ideas of freedom and democratic futures can be threatened by disaster (man made or natural) unless given remedies for building free markets and privatized public sectors in the present. When disasters happen, this logic of anticipating a future demise (the failure to recover or the imperative of it) authorizes erasure of multiple existing regimes of intervention, such as public health and social welfare. Entrepreneurial and private sector investments subsidized heavily by governments are seen as the only route to a future that is democratic and free, while traditional public services are bankrupted and whole sectors of the population are eradicated and evicted. The events of Hurricane Katrina and the subsequent levee system failures in New Orleans in 2005 are exemplars (Adams *et al*, forthcoming).

The palpable sense that things could be (all) right if only we anticipate them properly defines the way in which ‘possibility’ works here. Notions of global warming, precocious puberty, and genetic telescoping, for example, all work through anticipation to create the sense that the future is inevitable ... in some senses already ‘here’ as a site for active intervention. It must not only be engaged, but also be engaged properly and effectively to avoid traumatic outcomes. Management of the future becomes a pre-occupation of the present through the obligatory passage-point of ‘possibility.’ Possibility is no longer set against the limitation of the ‘impossible,’ but rather simply permeates the zones of danger that circulate in and through forecasts as a managerial effect. It is possible, so the injunction goes, to manage the anticipated. Vigilance is requisite.

## On the Salience of Anticipation

Anticipation is one of ‘the practices employed to navigate daily life and to sustain relations, the practices which are at the heart of social transformation

long before we are able to name it as such' (Papadopoulos *et al*, 2008, p. xii). In sum, anticipatory regimes:

1. are formed through the future as palpable in the present;
2. are both an epistemic value for knowledge production and ethicized value for subjects;
3. mark a shift from regimes of truth to regimes in which anticipation is formed through modes of prediction and instrumentality;
4. have affective dimensions, binding subjects in affective economies of fear, hope, salvation and precariousness oriented temporally toward futures already made 'real' in the present;
5. are imminent in logics of capital, but also exceed them;
6. reconfigure the 'lay of the land' such that primitive and modern are recoded as sites of insecure or hopeful futures; and
7. are recalibrating scholarship across disciplines, sparking concern with temporal and affective intellectual orientations.

We are inside anticipation even in this text as we attempt to map its features. What would it mean to not-anticipate? What strategies of refusal might be imagined? What is at stake in disrupting or refusing anticipation? Or perhaps a better tactic is not to refuse anticipation as such and instead charge ourselves as accountable to anticipation, practicing what Melinda Cooper (2006) calls a 'creative sabotage of the future,' seeking what Papadopoulos *et al* (2008) call 'escape routes' through 'remaking the present.' Instead of ceding the injunction to anticipate, one might ask what kinds of desirable accountabilities to and kinships with the future might be fostered through such work.

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## Notes

- 1 Abduction is derived from Peirce (1929) for example, pragmatist philosophy: 'According to Peirce, the presence of *genuine doubt* or *uncertainty* or *fear* or *great pressure to act* is a favorable "weather situation" for abductive lightening to strike... . It is a state of preparedness for being taken unprepared' (Reichert, 2007, p. 221, original emphasis). See also Strubing (2007).
- 2 See [http://www.motherjones.com/blue\\_marble\\_blog/archives/2008/11/10615\\_the-spitterati-part-one.html](http://www.motherjones.com/blue_marble_blog/archives/2008/11/10615_the-spitterati-part-one.html); see also Schulman, 2008).

## References

- Adams, V. and Pigg, S. (eds.) (2005) *Sex in Development: Science, Sexuality and Morality in Global Perspective*. Durham, NC: Duke University Press.
- Adams, V., Van Hattum, T. and English, D. (forthcoming) Chronic disaster syndrome: displacement, disaster capitalism and the eviction of the poor from New Orleans. *American Ethnologist* (in press).
- Ahmed, S. (2004) Affective economies. *Social Text* 22(2): 117–139.
- Almeling, R. (2007) Selling genes, selling genders: Egg agencies, sperm banks and the medical market in genetic material. *American Sociological Review* 72(2): 319–340.
- Atkinson, P., Coffey, A. and Delamont, S. (2003) *Key Themes in Qualitative Research: Continuities and Change*. Walnut Creek, CA: Alta Mira Press/Rowman and Littlefield.
- Banerjee, A. (2007) Disciplining death: Hypertension management and the production of mortal subjectivities. *Health: An Interdisciplinary Journal for the Social Study of Health, Illness and Medicine* 12(1): 25–42.

- Berlant, L. (2006) Cruel optimism. *Differences* 17(3): 20–36.
- Berlant, L. (2008) *The Female Complaint: The Unfinished Business of Sentimentality in American Culture*. Durham, NC: Duke University Press.
- Blackman, L., Cromby, J., Hook, D., Papadopoulos, D. and Walkerdine, V. (2007) Creating subjectivities. *Subjectivity* 22: 1–27.
- Braun, B. (2007) Biology, virtuality, security: Geopolitics and the waywardness of matter. Paper presented at the University of Toronto, April.
- Bryan, B. (2009) ‘Hail the cure!’: Althusser, biotechnology, and biopolitics. In: S.J. Murray and D. Holmes (eds.) *Critical Interventions in the Ethics of Healthcare: Challenging the Principle of Autonomy in Bioethics*. Surrey, UK: Ashgate Publishing, pp. 81–95.
- Carpenter, L.M. and Casper, M.J. (2009) Global intimacies: Innovating the HPV vaccine for women’s health. *Women’s Studies Quarterly* 37(1/2): 80–100.
- Casper, M.J. (1998) *The Making of the Unborn Patient: A Social Anatomy of Fetal Surgery*. New Brunswick, NJ: Rutgers University Press.
- Clarke, A.E. (1995) Modernity, postmodernity and human reproductive processes c1890–1990, or mommy, where do cyborgs come from anyway? In: C.H. Gray, with H.J. Figueroa-Sarriera and S. Mentor (eds.) *The Cyborg Handbook*. New York: Routledge, pp. 139–155.
- Clarke, A.E., Shim, J., Fishman, J., Fosket, J. and Mamo, L. (2003) Biomedicalization: Technoscientific transformations of health, illness, and US biomedicine. *American Sociological Review* 68: 161–194.
- Clarke, A.E., Shim, J., Fishman, J., Fosket, J. and Mamo, L. (eds.) (forthcoming) *Biomedicalization: Technoscientific Transformations of Health, Illness in the US*. Durham, NC: Duke University Press (in press).
- Clarke, J.N. and Everest, M.M. (2006) Cancer in the mass print media: Fear, uncertainty and the medical model. *Social Science and Medicine* 62(10): 2591–2600.
- Comaroff, J. and Comaroff, J. (eds.) (2001) *Millennial Capitalism and the Culture of Neoliberalism*. Durham, NC: Duke University Press.
- Cooper, M. (2006) Pre-empting emergence: The biological turn in the war on terror. *Theory, Culture, Society* 23(4): 113–135.
- Doyle, R. (2003) *Wetware: Experiments in Postvital Living*. Minneapolis, MN: University of Minnesota Press.
- Dumit, J. (forthcoming) Drugs, algorithms, markets and surplus health: Lively capital. In K.S. Rajan (ed.) *Lively Capital: Biotechnology Ethics and Governance in Global Markets*. Durham, NC: Duke University Press (in press).
- Fanon, F. (1952/1968) *Black Skin, White Masks*. London: MacGibbon and Kee.
- Fava, S. (2008) World machine (Blueprint v0.9.1): The mathematical certainty of global environmental catastrophe. Presented at meetings of the Society for Social Studies of Science, Rotterdam.
- Franklin, S. (2003) Ethical biocapital: New strategies of cell culture. In: S. Franklin and M. Lock (eds.) *Remaking Life and Death: Toward an Anthropology of the Biosciences*. Santa Fe, NM: School of American Research Advanced Seminar Series, pp. 97–128.
- Franklin, S. (2005) Stem cells R Us: Emergent life forms and the global biological. In: A. Ong and S. Collier (eds.) *Global Assemblages: Technology, Politics and Ethics as Anthropological Problems*. Malden, MA: Blackwell, pp. 59–78.

- Franklin, S. (2006) Embryonic economies: The double reproductive value of stem cells. *BioSocieties* 1(1): 71–90.
- Franklin, S. and Roberts, C. (2006) *Born and Made: An Ethnography of Preimplantation Genetic Diagnosis*. Princeton, NJ: Princeton University Press.
- Fortun, M. (2001) Mediated speculations in the genomics futures market. *New Genetics and Society* 20(2): 139–156.
- Greene, J. (2007) *Prescribing by Numbers: Drugs and the Definition of Disease*. Princeton, NJ: Princeton University Press.
- Harrington, A., Rose, N. and Singh, I. (2006) Editors' introduction. *BioSocieties* 1(1): 1–5.
- Hickler, B. (forthcoming) Politics of animal health: Biosecurity and poverty alleviation in the lower Mekong. Dissertation in Medical Anthropology, UC San Francisco (in press).
- Jain, S.L. (2007) Living in prognosis: Toward an elegiac politics. *Representations* 98: 77–92.
- Kaufman, S.R. (2005) *And a Time to Die: How American Hospitals Shape the End of Life*. New York: Scribner.
- King, N.B. (2002) Security, disease, commerce: Ideologies of post-colonial global health. *Social Studies of Science* 32(5/6): 763–789.
- King, N.B. (2005) The ethics of biodefense. *Bioethics* 19(4): 432–446.
- Klein, N. (2007) *The Shock Doctrine: The Rise of Disaster Capitalism*. New York: Metropolitan Books.
- Klima, A. (2002) *The Funeral Casino: Meditation, Massacre, and Exchange with the Dead in Thailand*. Princeton, NJ: Princeton University Press.
- Lakoff, A. and Collier, S.J. (eds.) (2008) *Biosecurity Interventions: Global Health and Security in Question*. New York: Columbia University Press.
- Law, J. (2004) *After Method: Mess in Social Science Research*. London and New York: Routledge.
- Lentzos, F. (2006) Rationality, risk and response: A research agenda for biosecurity. *BioSocieties* 1(4): 453–464.
- Liu, J.A. (2008) Taiwanese biotech: Scalar biosociality? Paper presented at the annual meetings of the American Anthropological Association, San Francisco.
- Locke, K. (2007) Rational control and irrational free-play: Dual-thinking modes as necessary tension in grounded theorizing. In: A. Bryant and K. Charmaz (eds.) *Handbook of Grounded Theory*. London: Sage, pp. 565–579.
- Martin, E. (2006) The pharmaceutical person. *BioSocieties* 1(3): 273–288.
- Massumi, B. (2007) Potential politics and the primacy of preemption. *Theory and Event*, 10(2), [http://muse.jhu.edu/login?uri=/journals/theory\\_and\\_event/v010/10.2massumi.html](http://muse.jhu.edu/login?uri=/journals/theory_and_event/v010/10.2massumi.html).
- Miller, D. (ed.) (2002) *Terrorism: Are We Ready?*. Huntington, NY: Nova Science.
- Murphy, M. (2008) Economization of life. Unpublished manuscript.
- Ngai, S. (2005) *Ugly Feelings*. Cambridge: Harvard University Press.
- Novas, C. (2006) The political economy of hope: Patients' organizations, science and biovalue. *BioSocieties* 1(3): 289–306.
- Ong, A. and Chen, N. (eds.) (forthcoming) *Asian Biotech: Ethics and Communities of Fate*. Durham, NC: Duke University Press (in press).
- Orr, J. (2006) *Panic Diaries: A Genealogy of Panic Disorder*. Durham, NC: Duke University Press.

- Orr, J. (2008) The psychopolitics of simulation: Producing bioterrors. Unpublished manuscript.
- Papadopoulos, D., Stephenson, N. and Tsianos, V. (2008) *Escape Routes: Control and Subversion in the Twentieth Century*. London: Pluto Press.
- Patel, G. (2006) Risky subjects: Insurance, sexuality, and capital. *Social Text* 24(4): 25–65.
- Pierce, C.S. (1929) Guessing. *Hound and Horn* 2: 267–282.
- Pigg, S.L. (2008) Languages of sex and AIDS in Nepal: Notes on the social production of commensurability. *Cultural Anthropology* 16(4): 481–541.
- Pollack, A. (2008) Questioning the allure of putting cells in the bank. *New York Times*, 29 January: pp. A1, 6.
- Press, N., Fishman, J. and Koenig, B. (2000) Collective fear, individualized risk: The social and cultural context of genetic testing for breast cancer. *Nursing Ethics* 7(3): 237–249.
- Rajan, K.S. (2006) *Biocapital: The Constitution of Postgenomic Life*. Durham, NC: Duke University Press.
- Reardon, J. (2005) *Race to the Finish: Identity and Governance in an Age of Genomics*. Princeton, NJ: Princeton University Press.
- Reichertz, J. (2007) Abduction: The logic of discovery of grounded theory. In: A. Bryant and K. Charmaz (eds.) *Handbook of Grounded Theory*. London: Sage, pp. 214–228.
- Romain, T. (2008) The futures markets of human eggs: Commodifying time and hope. Dissertation in Anthropology, Stanford University.
- Rose, N. (2007) *The Politics of Life Itself: Biomedicine, Power and Subjectivity in the Twenty-First Century*. Princeton, NJ: Princeton University Press.
- Schulman, M. (2008) Double helix dept.: ptoeey! *The New Yorker*, 22 September.
- Shostak, S. (2005) The emergence of toxicogenomics: A case study of molecularization. *Social Studies of Science* 35(3): 367–404.
- Silverman, C. (Forthcoming) Desperate and rational: Of love, biomedicine, and experimental community. In: K.S. Rajan (ed.) *Lively Capital: Biotechnology, Ethics and Governance in Global Markets*. Durham, NC: Duke University Press.
- Strange, S. (1997) *Casino Capitalism*. New York: St Martins Press.
- Strathern, M. (2000) *Audit Cultures: Anthropological Studies in Accountability, Ethics, and the Academy*. New York: Routledge.
- Strubing, J. (2007) Research as pragmatic problem-solving: The pragmatist roost of empirically-grounded theorizing. In: A. Bryant, K. Charmaz (eds.) *Handbook of Grounded Theory*. London: Sage, pp. 580–602.
- Summers, L. (1992) The most influential investment. *Scientific American* 267(2): 132.
- Tansey, B. (2008) Startup offers scans of DNA. *San Francisco Chronicle*, 20 November: pp. C1, 8.
- Taylor, P. (2005) *Unruly Complexity: Ecology, Interpretation, Engagement*. Chicago, IL: University of Chicago Press.
- Thompson, C. (2005) *Making Parents: The Ontological Choreography of Reproductive Technologies*. Cambridge, MA: The MIT Press.
- Thompson, C. (2008) Stem cells, women, and the new gender and science. In: L. Schiebinger (ed.) *Gendered Innovations in Science and Engineering*. Stanford, CA: Stanford University Press, pp. 109–130.

- 
- Thomson, L.K. (2009) Environmental estrogens and vulnerable bodies: A sociological analysis of activist-initiated collaborative research. Doctoral dissertation in Sociology, UC San Francisco.
- Waldby, C. and Mitchell, R. (2006) *Tissue Economies: Blood, Organs, and Cell Lines in Late Capitalism*. Durham, NC: Duke University Press.
- Washburn, R. (2009) Measuring the 'pollution in people': Biomonitoring and constructions of health and environment. Doctoral dissertation in Sociology, UC San Francisco.