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Art and peripheral digital activity

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Abstract

As digital technologies have become more pervasive, this thesis argues, there has been an accompanying expansion of a phenomenon here called 'peripheral digital activity.' This activity includes unplanned and unexpected events that arise in conjunction with digital technologies and that are poorly classified using conventional notions of 'interaction,' 'user experience,' or purposeful 'use.' To ground this idea, the thesis looks to artistic strategies that might critically investigate the concept of peripheral digital activity, in this case arguing that Alfred North Whitehead's philosophy of organism, with its emphasis on whole-part relations, holds special relevance. The thesis proposes an original Whitehead-centred analysis of art as a manner or 'mode' of decision procedure. Developing this analysis via Whitehead's notion of actual entities and through a discussion of digital function, the thesis examines the practice of contemporary artist Tino Sehgal. Reading through theories of social and participatory art, the thesis arrives at Sehgal's proposition of 'cleaner conceptualism.' Outlining a systems-based interpretation of cleaner conceptualism, Sehgal's constructed situations are contrasted with the idea of art as a decision procedure proposed by Sol LeWitt. Whereas LeWitt organizes his idea of decision procedures as a dualist critique of instrumental rationalism, Sehgal creates a new mode of monist decision procedure. Using this monist strategy, Sehgal mobilises participants, collectors, and curators in a way that is entangled with and presupposes digital function even as his practice foregrounds non-technological body-to-body human engagement. The thesis claims that Sehgal's practice is one strategy for critically investigating the effects of peripheral digital activity. Proposing directions for future research, the thesis ends with a Coda that provides a preliminary analysis of the paintings Laura Owens as a diagnostic tool for investigating digital functional augmentation.

Acknowledgements

This thesis engages with Alfred North Whitehead's philosophy of organism. My reading of Whitehead is independent, conducted outside of contact with the process philosophy community, and the result of only a few years of concentrated effort. What headway I have made is due to a wealth of secondary literature. I have endeavoured to credit those authors appropriately throughout the body of thesis.

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Abbreviations

Consistent with other literature on Alfred North Whitehead, the following abbreviations are used for citations from Whitehead's major books (listed chronologically in the order of original publication). Page numbers for *Process and Reality* use the 1978 Corrected Edition throughout.

CN   *The Concept of Nature* (1964) [1920], Cambridge University Press.

SMW *Science and the Modern World* (1970) [1925], Free Press.

RM   *Religion in the Making* (1996) [1926], Fordham University Press.

SYM *Symbolism: Its Meaning and Effect* (1985) [1927], Fordham University Press.

FR   *The Function of Reason* (1958) [1929], Beacon Press.

PR   *Process and Reality* (1978) [1929], Corrected Edition, edited by David Ray Griffin and Donald W. Sherburne, Free Press.

AI   *Adventures of Ideas* (1967) [1933], Free Press.

MT   *Modes of Thought* (1968) [1938], Free Press.

ESP *Essays in Science and Philosophy* (1947). Philosophical Library.

Preface

The seeds of this project were sown in 2007 while I was on the Goldsmiths MFA Fine Art program. At the start of my MFA, I was making software-based artworks. For example, in one work I hacked a version of the classic Asteroids arcade game, flipping the movement of the bullets. Instead of the bullets firing from the ship towards the edge of the screen, the bullets began at the edge of the screen and moved towards the ship. This inverted the game logic, so that, rather than using asteroids as targets, players used them as shields to prevent inevitable suicide. The competitive aspect of the game was preserved but its narrative upended. I found the results intriguing, but I quickly discovered that a significant portion of my audience were not familiar enough with the original game to be able to determine the intervention I had made. I started looking for ways to combine software and digital elements with modes of making that were incontrovertibly gestures in art, where the digital component could not so easily be dismissed as niche genre art. I moved offscreen and started creating marks on paper.
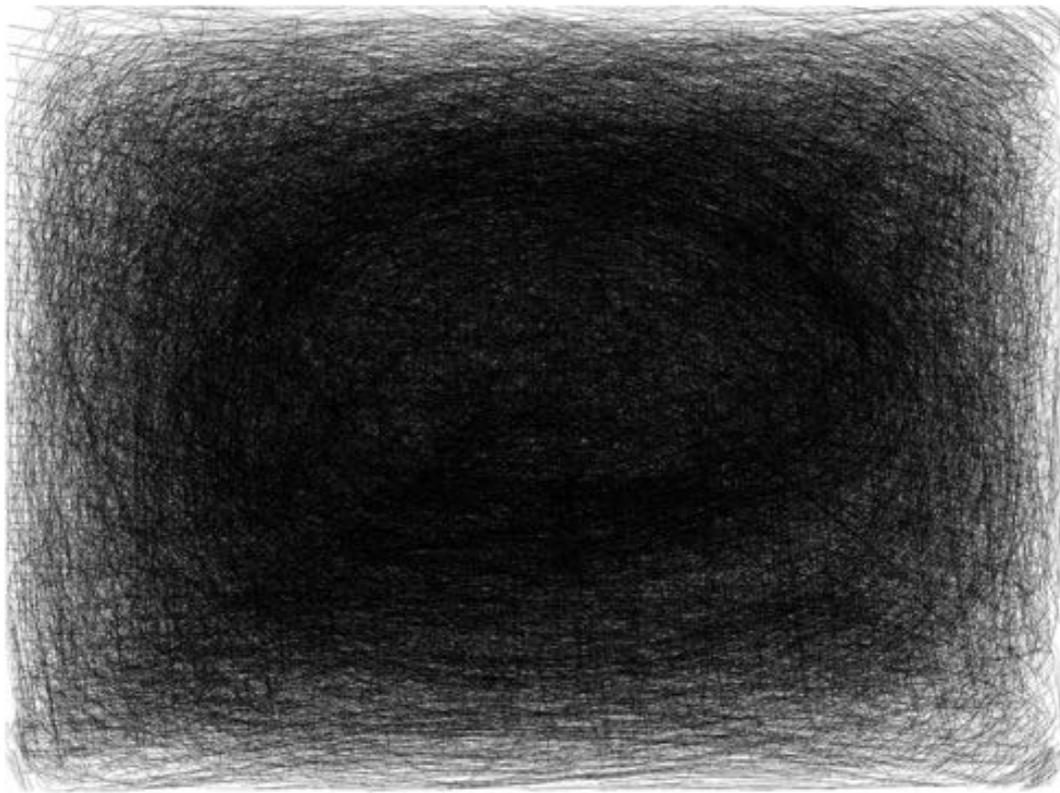
Jon Meyer, *One mile long line*.
Inkjet print, 24 x 18cm, 2007.

One mile long line, an inkjet print on a piece of paper, was the first artwork I created in this hybrid software/paper mode of making. It prompted prolonged discussions about how and why it was—or was not—a work of art. Is it a synthesis of a squiggle or an actual squiggle, and does it matter? Do we know that it is the distance described or that any hand was involved? Isn't it merely a flattened grid of black-and-white pixels held in a digital image and printed? How does digitally measured activity relate to endurance-based artworks and ballpoint-pen abstractions from the 1960s or to Duchamp's mile of string?
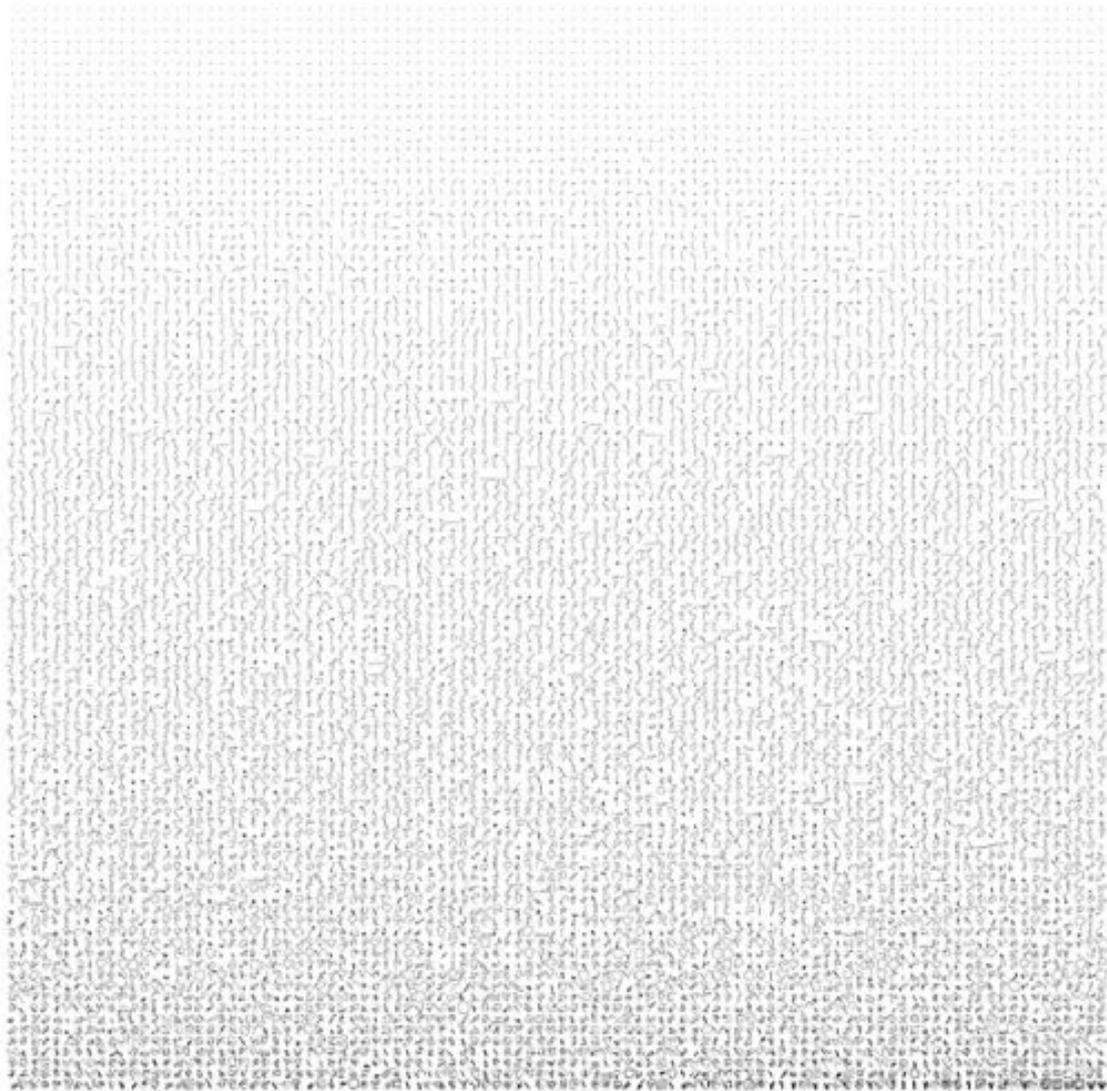
Jon Meyer, *Ten thousand squiggles sorted by length*.
Inkjet print, 100 x 100 cm, 2007.

The introduction of a metric, precisely 5,280 feet of marking activity, caused the work to fall somewhere between the conventions of mark making and those of industrialized software processes.

As a result, I found myself asking questions such as:

- Where is the tipping point between the idea of an artist's economy of line and art as a line economy?

- How are agency and authorship located within such hybrid software/paper practices when the artist also writes the software?

- How does participation, as a division between passive and active elements, play out within such dynamic systems?

- Why does something as seemingly straightforward as *One mile* mobilize an art practice, while more algorithmically sophisticated artworks had not?

In my PhD, I continued examining the role of the hand in a technologized gesture. In my drawing practice, I created a plethora of different drawing tools that were arduous and inefficient or unfamiliar to use. For example, one drawing tool emitted only one inch of line per hour. The research followed phenomenological lines, gravitating to Martin Heidegger's *Being and Time* with his notions of Zuhandenheit and Vorhandenheit ('ready-to-hand' and 'present-at-hand').

Through the course of this research, I started questioning the adequacy of terms I had been using, including notions such as interactivity, media, tool, algorithm, or technology, as ways of describing the experiences of my drawing practice. I began researching different unifying perspectives, initially through the notion of embodiment. In the course of this research, I listened to a lecture by Judith Butler on Alfred North Whitehead (Butler 2010). In a move I later discovered is the starting premise of Steven Shaviro's book *Without Criteria* (Shaviro 2012, viii), I tried to imagine my project with Whitehead taking the place of Heidegger. The research changed direction. I ceased trying to understand 'interaction' and started asking myself what I had excluded from my experience that might be discovered if I paid due attention. In this thesis, I further develop this idea through a Whitehead-centred investigation of peripheral digital activity.

1. Introduction

What are appropriate strategies and practices in contemporary art to critically investigate and reconfigure the effects of peripheral digital activity without reducing it to affective interactivity?

The Digital Periphery

The aim in this thesis is to apprehend the digital not in terms of 'interactive experience' or 'user experience' but simply as experience. Notions of interactivity and user experience reflect the habit, especially in the field of human-computer interaction, to conceive of the digital in terms of purposeful *use*. Complex networked binary decision systems generate much more than purposeful use. They produce numerous experiences that are unthought or unplanned, as 'users' are caught in moments of surprise when they encounter the non-useful tones of the digital. The glitch-art movement is one example of a strategy in which the brittleness of peripheral activity in technical systems is explored and aestheticized, reclaiming and reconfiguring it as a positive valuing within art. This thesis seeks to critically investigate these kinds of aesthetic strategies in more systemic terms. Let us begin by defining the terms more analytically.

I define the digital as the totality of internet-connected Turing-complete software programmable devices, plus any coupled devices that have the capacity to communicate with internet-connected devices electronically. The digital, in this case, is a vast, heterogeneous global system consisting of more than ten billion devices and many billions of lines of software instructions. It transports more than 4 exabytes of data on a daily basis and is deeply imbricated with social and material transformations. It is expanding on an exponential basis.

What all digital devices have in common—their lingua franca, the justification for identifying 'the' digital as a singular—is that any one device may connect to any other, exchanging data in a common binary protocol. Such interoperability means that ontologically, at least in principle, the digital is flat. Net Neutrality is the name of one movement that seeks to preserve this principle.

The digital cannot be understood in the abstract. Mainstay theorizations of the digital have tended to study the digital through interactive digital media, where individuals or small groups interact with a proportionately small number of devices.

In this thesis, I instead investigate what I call peripheral activity. I define *peripheral* activity as non-conscious, unintended, unanticipated, or unplanned activity—incidental activity that arises on the periphery of an individual's awareness, yet whose possible (non-peripheral) consequentiality can be large. Peripheral *digital* activity is peripheral activity which arises in conjunction with the heterogeneous complex systems of the digital as those systems listen, track, monitor, and prompt human behaviour indirectly, algorithmically, beyond conscious awareness, outside of direct perceptual discernment or intelligibility. Peripheral digital activity contrasts with (and often takes place alongside) purposeful and affective interaction. Peripheral digital activity has become a significant part of how online agencies gather, analyse, and use digital data.

To give some concrete examples, in a recent news article, a Tinder user submitted a request to the Tinder dating site asking for any personal data that the site had collected on that individual. The response was an 800 page document (Duportail 2017). The document included many details that the user was unaware Tinder had collected. In the article, Alessandro Acquisti, professor of information technology at Carnegie Mellon University, explains:

What you are describing is called secondary implicit disclosed information. Tinder knows much more about you when studying your behaviour on the app. It knows how often you connect and at which times; the percentage of white men, black men, Asian men you have matched; which kinds of people are interested in you; which words you use the most; how much time people spend on your picture before swiping you, and so on. Personal data is the fuel of the economy. Consumers' data is being traded and transacted for the purpose of advertising. (Duportail 2017)

The Tinder user, Judith Duportail, wrote, 'I am horrified … The dating app knows me better than I do, but these reams of intimate information are just the tip of the iceberg. What if my data is hacked—or sold?' (Duportail 2017). Duportail correctly identifies that peripheral digital activity is not simply a stored document. It is activity that is further acted upon as digital agencies seek to influence buying, voting, dating, viewing, learning, sharing, and other human behaviours.

In a second example, Greg Milner reports of a couple who entered a destination into a car GPS device and followed the computed route (Milner 2016). They became lost in the desert and subsequently died, an occurrence now frequent enough that emergency workers call it 'death by GPS.' The story illustrates how habituation through purposeful

digital interaction can be accompanied by unconscious, unintended, unanticipated, and in this case lethal activity, or what I characterize as peripheral digital disorientation.

As a third example, Mark Zuckerberg, shortly after the U.S. election, issued the statement that it was a 'pretty crazy idea' to suggest that Facebook software was in any way a factor in the election's outcome.[1] Within a week, he changed his position, claiming it was a problem Facebook was already working on. Zuckerberg is responsible for the deployment of considerable digital resources. His backtracking effort is evidence of large-scale peripheral digital disorientation through which Zuckerberg unwittingly became responsible for unquantified effects in the activities of a national election.

These three examples, I believe, point towards an increasing amount of activity that arises in conjunction with the use of digital devices, but which remains under-investigated. This thesis therefore seeks to open up an investigation of peripheral activity in digital experiences within and through art.

Art Research and the Digital Periphery

In the context of art, the research question stated in the first sentence can now be refined: What are appropriate strategies in contemporary art to critically investigate and reconfigure the *actions and knowledges* of peripheral digital activity? In other words, what ontologies are suitable for making explicit the kinds of inhabituations that result from peripheral digital activity, inhabituations that include the possibility of death by GPS? What epistemologies are suitable for the kinds of knowing that peripheral digital activity constitutes? What hermeneutics are useful to give a 'voice' to peripheral digital activity, to express its horror or its delight? How do these epistemologies, ontologies, and hermeneutics relate to the existing gestures and movements of contemporary art, which have not, so far, articulated well-developed positions in relation to phenomena such as secondary implicit disclosed digital information or peripheral digital disorientation?

I believe the development of such a critique is important in order to discover and create worlds with expanded forms of peripheral digital awareness. The aim is to

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[1] Based on Zuckerberg's comments on 11 November 2016 saying fake news, as an influencer in the election, was a 'crazy idea.' After the media quoted employees at Facebook saying, 'What's crazy is for him to come out and dismiss it like that,' Zuckerberg issued a follow-up a week later, saying, 'We've been working on this problem for a long time,' and outlining the steps in further plans to address the fake-news issue (Zuckerberg 2016a, 2016b, 2016c; Frenkel 2016).

consciously reconfigure and inhabit the digital periphery and to re-narrate its stories of horror and death.

However, such an analysis is challenging. It concerns two distinct areas: subjective experiences and computational systems. The research question is posed in terms of the forms of practice relevant in contemporary art, requiring further articulation of subjectivity and computation in terms of the gestures, histories, sites, and activities of contemporary art. Computation, subjectivity, and art each correspond to distinct disciplinary lineages, with their own traditions of epistemology, ontology, and hermeneutics. The phenomenon under consideration in this thesis, peripheral digital activity in relation to contemporary art, manifests as hybrid and complex events that do not fall neatly within one disciplinary area. The difficulty is compounded by the challenge, methodologically, of studying such events non-reductively, without, for example, reducing art to an instrumental role, reifying the phenomenon illustratively, or recasting it as interactive user experience. What is required is a starting point in the analysis that is able to travel across different perspectives while at the same time respecting the different disciplinary lineages and showing humility in terms of the kinds of partial and incomplete outcomes that are achievable. Again, such an analysis cannot be conducted in the abstract, necessitating the identification of particular artworks and artistic practices able to address strategies or forms of practice in contemporary art that can critically address peripheral digital activity.

I believe substantialist subject-predicate ontologies of subjects and objects, and their associated epistemologies, are poorly suited for an investigation of a phenomenon such as peripheral digital activity. In the case of the couple in the car in the desert, the individuals may have comprehended the series of decisions that ultimately led to their demise and may have identified the GPS unit as the 'object' responsible. In many cases, however, peripheral digital activity gives rise to subjective affective experiences in which there is no easy way of recovering any such explanation. This inexplicability is manifest in the anxiety of the individual who realizes her peripheral digital activity on a Tinder website could unleash highly relevant yet intractable consequences. Her statement that Tinder 'knows me better than I do' is an attempt to construe peripheral digital activity in the guise of a knowing subject, Tinder. Yet the user admits the horror of this phantom construal, with its poorly defined sense of 'know,' even as she continues to use Tinder. The difficulty with peripheral digital activity is that there may be no easily identifiable

object available on which a subject-object ontology may form or on which predictions of object-based behaviour can be hoisted. We need fresh ontologies and better ways of habituating ourselves to peripheral digital activity if we are to avoid unconscious actions in a context of exponentially expanding digital technologies unleashing the equivalent of mass GPS death.

The problems of subject-predicate ontologies in relation to digital networked subjectivities have been widely aired. Numerous researchers have proposed considering alternative ontologies. Jussi Parikka looks at software art as an 'art of the imperceptible' (Parikka 2010, 116) and proposes to theorize software art ecologically using Deleuzo-Guattarian processual philosophy and notions of 'assemblies' (2010, 119). Bruno Latour has spoken at length on the need to theorize the social in terms of networks and has specifically addressed the issues of digital networks as sociotechnical assemblages that redistribute action (Latour 2010, 1–2). In the introduction to *The Speculative Turn,* Levi Bryant, Nick Srnicek, and Graham Harman assert that anglophone continental philosophy is vigorously pursuing multiple non-Cartesian ontological visions. They argue that we must find adequate ways to address 'looming ecological catastrophe, and the increasing infiltration of technology into the everyday world (including our own bodies)' (Bryant, Srnicek, and Harman 2011, 3). Alexander Galloway even goes as far as to suggest that the fecundity of new philosophical ontologies of 'speculative realist' philosophers Ray Barrier, Iain Hamilton Grant, Levi Bryant, Quentin Meillassoux, Graham Harman and others should be considered in relation to the 'object-oriented' ontologies of computer programming languages. He sees similarities between these philosophies and 'the structure of ontological systems and the structure of the most highly evolved technologies of post-Fordist capitalism' (Galloway 2013, 347). David Berry, agreeing with Galloway, suggests that new developments in the digital bring forth requirements for new ontologies and metaphysics, and this in turn necessitates critical appraisals of the 'metaphysics of the computational' (Berry 2014, 5).

I am sympathetic towards this cause. In this thesis, I adopt Alfred North Whitehead's metaphysics and philosophy of organism as the guiding theoretical framework. I have chosen Whitehead for a number of reasons. First, as I will argue in Chapter 4, Whitehead's philosophy both predates and anticipates software patterns in ways that suggest his philosophy has a special relevance in considerations of the digital. Second, within discussions both of contemporary art and digital technologies, I believe

Whitehead remains an under-appreciated figure. Third, as a 'flat' ontology, Whitehead's metaphysics has the advantage of being both broad in its applicability and also widely investigated by a number of different communities. Fourth, I affirm Judith Jones's assertion that it is crucial to the historical development of process philosophy that 'numerous contending images of individual reality be developed, to create a body of work conceptually rich enough to challenge the long-standing attachment to substance-ontological notions of individual existence' (Jones 1998, 217). This thesis seeks to contribute towards such a contending image.

Art as Decision Procedure

For the purposes of the research question we started with, in this study, in place of a subject-predicate ontology, I adopt Alfred North Whitehead's speculative approach outlined in his philosophy of organism. Whitehead's relevance to the digital will, I hope, become apparent over the course of this text. Here, to begin, I use Whitehead's methods of 'genetic' and 'coordinate' analysis to start outlining a partial ontology for peripheral digital activity in art (for a helpful overview of coordinate and genetic analysis, see Auxier and Herstein 2017, 112–41). This analysis will be further elaborated in subsequent chapters.

Let us begin with the assertion that there is something called art, or 'art as a whole,' something that exists and that can be further subdivided. We can scrutinize art and discern art movements, histories, artworks, artists, art lovers, art buyers. Perhaps in this scrutiny we encounter Cady Noland's *Chicken in a Basket* (1989), which recently sold for more than $300,000.
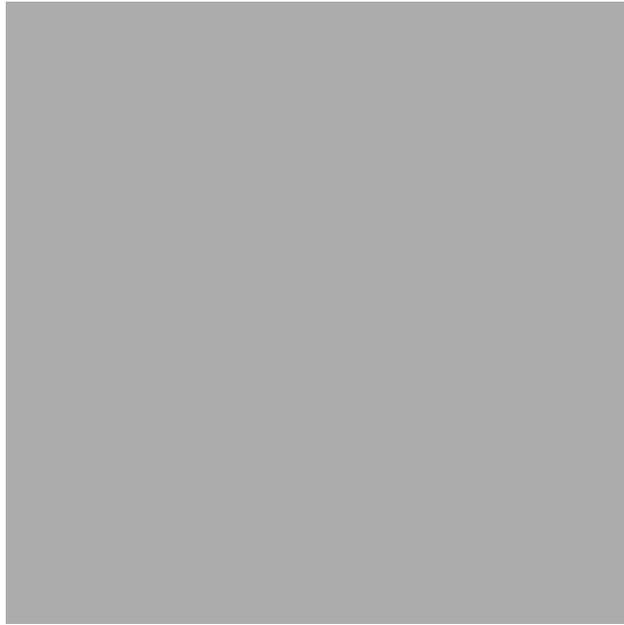
Cady Noland, *Chicken in a Basket* (1989), wire basket, rubber chicken, boxes, bottle, flags, baster, bungee, and beer cans, 7 1/2 x 19 x 12 in (19.1 x 49.5 x 30.5 cm).

If we accept that art exists, and that *Chicken in a Basket* is a part of art, this suggests we establish units of analysis in our study of such art. One common unit of analysis is the individual artwork, the basket and its contents as a unity, a 'work.' For our purposes in this study, we want a unit of analysis useful in making explicit the effects of peripheral digital activity.

In this thesis, our unit of analysis is coordinated through the notion of a 'decision procedure.' Before continuing, we need to be clear about the status of this notion. I do not identify a decision procedure in art as simply a straightforward, purposeful choice, such as is sometimes inferred by Marcel Duchamp's identification of the readymade as a 'choice' (Tomkins and Duchamp, Marcel 2013, 51–54). I am proposing a way of thinking of a decision procedure as something that arises as an event, that may be unplanned and unintended, but whose consequentiality involves valuing art in some way. Such a model of a decision procedure is not a 'theory' of art based on an identification of art with intentional choice. The order of explanation is the other way around. When I scrutinize Cady Noland's *Chicken in a Basket* within the scope and purposes of this project, I discern that there was a decisive occasion or event. The event has certain features I describe below, such that a rubber chicken—plus all the things that led up to it and surround it—ended up in a basket and subsequently became salient as art. Whether this was planned or intuitive or took several days or only an instant is not immediately

clear, but I can say, from my vantage now, that something decisive happened in terms of art. The concrete experiences of art compel us to appeal to such an explanation. Noland's rubber chicken, as a concrete thing in the world, is the reason for this thesis, or at least one of them. Randall Auxier Gary Herstein put it more formally: 'concrete existence *explains the abstract aspects of experience* and not vice-versa' (Auxier and Herstein, 2017, 2, emphasis theirs). In framing art as a decision procedure, my aim, in Chapter 5, will be to claim that art is able to create new modes or manners of decision procedure. With this in mind, in the rest of this section I begin to outline the notion of a decision procedure being developed here.

A decision procedure in art is an 'event' in the sense of a definite coming together of multiple agencies through which, simultaneously, participants are engaged, there is a valuing of art, and the decision procedure itself is choreographed. In one such event, a rubber chicken and some cans and a basket gained a definiteness in a valuing of art.

The word 'event' deserves a little expanding. A good example of an event of the Whiteheadian kind we are describing is a democratic vote, such as the one that occurred in the Brexit referendum. The character of an event is that it has bookend—for example the first polling booth opening and the last vote being counted— through which we say that there is a definite 'before' and an 'after,' in which the event took place. The event has a certain duration that designates it as an event. If we scrutinize the event, we can say that, in the Brexit referendum event, the U.K. voted to leave. Of course, this a highly compressed version of the referendum as event, since there is an inexhaustible amount of further detail we can discover if we examine it more closely: differing votes by regions or by age or time or party allegiance, for example. All of this, including our assignments of bookends, is part of what we give as 'explanation' of the event. An actual event simply *is*. Language is a tool we use to explain the event as a unique thing that is.

To return to art as a decision procedure, it presumably is a smaller-scale event than a national referendum, but it still has the character of having bookends, through which we say that it happened. It also has an inexhaustible quality, through which, as we study it more, we learn there is more to discover. We can describe decision procedures in art as events. In these events there is a choreographing of agencies, a valuing of art, and an establishing of relations to other decision procedures as well as to other non-art entities. Such relations may be to cans and baskets, which, in the absence of a decision procedure, are not units of art. Our assertion within this thesis and for the purposes of

our research is that all instances of art are accompanied by decision procedures. The decision procedure is the unit in our 'coordinate analysis.' It is how we coordinate the notion of art and subdivide it in more definite terms. This is not a claim that a decision procedure is all that is 'real' about art; i.e., that if we somehow summed up all decision procedures, we would have a total account of art. It is an abstraction only, an analysis providing a selective attention to certain structural features, or what Auxier and Herstein call a 'quantum of explanation' (Auxier and Herstein 2017, 69).

As an event, a decision procedure in art is a kind of materialization. The role of conscious, purposeful human decision making in a decision procedure may be vague. The passage of force registered in pigmented matter may be a decisive decision procedure in a painting, even if the painter at that moment had not anticipated that this particular mark would be the one which announced the completion of the painting as such. In other words, a decision procedure may be one in which spontaneous, sometimes surprising, or possibly non-useful peripheral activity is a factor. It may be only be after the fact that we recognize the event as a decision procedure for art.

Such decision procedures may relate to each other and to other more distant decision procedures. When I first encountered *Chicken in a Basket,* I thought nothing more of it. Later, in my studio, I was working with a digital drawing tool that limits my line lengths to 1.5 meters; after I finished my scribbling, a visitor saw one of my drawings and asked why I was drawing chickens. I titled the drawing *a meter and a half of rubber chicken.* The decision procedure here included a digital activity and a participation with a visitor that, on inspection, has some real, if unclear, relation to Noland's work.

A decision procedure, then, is a unit of analysis that I have chosen in the present inquiry in order to provide a scaffolding for thinking about relations that arise within art. I am asserting that within such decisive occasions there is some kind of some kind of forming and choreographing, some kind of engagement of agencies, and some kind of activating of art as a value. These are part of a 'genetic analysis' of a decision procedure, that is, a breakdown of a decision procedure as a unity into its parts for the purposes of our inquiry. The description to this point is still far too generic to be recognizable as any kind of art. I have left open what kinds of engagements and materials are enlisted in a decision procedure; how they are embodied; to what degree they are algorithmic; spontaneous, or conscious; and how the artistic valuing is evaluated and determined.

Within the thesis, I will further refine and extend my notion of a decision procedure in each chapter, focusing especially on notions that I will argue are relevant to peripheral digital activity. Such manner of analysis is relevant for this project because it doesn't predetermine *how* a particular decision procedure involves digital, material, or human engagement and how this engagement then choreographs a relation to the activating and valuing of art. In other words, it sidesteps a subject-object paradigm in which a knowing human 'subject' interacts with an 'object' by constructing a unit of analysis that spans different manners of activities and engagements, including what I am calling peripheral digital activity.

In our discussion, we have not established a fixed temporal or spatial frame. A decision procedure as an event in art is some definite span. It is some real, extensive occurrence. Consistent with our interest in peripheral digital activity, we allow that a decision procedure may refer to a broader span of spatiotemporal activity than is typically followed in theories of immanent interactivity.

The implication is that, in my analysis, I need to pay special attention to particular concrete decision procedures at hand, to understand *how* they choreograph relations of valuing art and engaging agencies. Such an examination may necessitate further mentalistic, materialistic, algorithmic, and artistic specification, according to the particular decision procedure being studied *and* the purpose of the investigation. The mode of analysis followed here is therefore partial, incomplete, and purpose specific.

The various kinds of mental, material, or digital activity invite distinct inquiries with their own associated methods, ontologies, and lineages. For ease of analysis, I will pursue discussion of different aspects of a decision procedure separately, on their own terms, and allow that a decision procedure choreographs and fuses these together. This arrangement facilitates our inquiry by providing a clearer structure for carrying forward the investigation, which I discuss in the thesis outline below.

Thesis Outline

In the previous section, I introduced a 'coordinate' and 'genetic' analysis of art as a 'decision procedure.' This analysis provides a scaffolding intended to introduce terms that I will further develop, in order to carry forward the investigation.

Each chapter dives into a topic and, at the end, returns to the notion of a decision procedure, modifying and elaborating the scheme on the basis of findings. Each chapter

is therefore an independent phase that is also cumulative part in the 'satisfaction' of the research question. Below is a roadmap:

Chapter 2, Whitehead-centred Research, acknowledges the diversity of Whitehead research and discusses how this project sits in relation to other work. I explain why the project is Whitehead-centric and retains close attention to the metaphysics Alfred Whitehead sets forth. I discuss issues in methodologies. The chapter concludes by suggesting that a 'decision procedure' is an *analogy* for what Whitehead calls an actual entity.

Chapter 3, Actual Entities, is devoted to providing a brief outline of Whitehead's metaphysics to clarify what actual entities are and how they fit within his scheme. I conclude this chapter by identifying the actual entity as the 'mattering' of decision procedures. While the chapter is primarily summative, the end of this chapter discusses Whitehead's philosophy in terms of notions of a 'maculate conception,' stressing the role of the periphery in each actual entity's process.

Chapter 4, Digital Entities, turns to discuss the digital in greater depth. I show why Whitehead is of special relevance in studies of the digital. Through a reading of James Bradley, I argue that Whitehead's actual entities can be thought of in terms of 'general function,' which I contrast with notions of digital function. The claim is that Whitehead's metaphysics already generalizes to digital entities: Digital function takes place through general function. However, digital function is a narrow idealisation of general function, which can result in a 'bifurcation' of the digital. The chapter concludes that in order to properly locate the mattering of digital function in artistic decision procedures, it must be reconnected to concrete and context-specific circumstances.

Chapter 5, Tino's Handshake, turns to contemporary art and examines the constructed situations of contemporary artist Tino Sehgal. The chapter begins by describing Sehgal's practice. I argue that Sehgal's acquisition process requires that we examine his work more systemically and not only in terms of the individual artistic encounters. I examine readings of participatory art and conceptual art applicable to Sehgal's practice. Tracing systems art in conceptualism, I discuss connections between systems art and Whitehead's systematic philosophy. The chapter then returns to the notion of 'decision procedures,' comparing Sol LeWitt's and Adrian Piper's conceptualism and decision procedures with the kinds of unfolding participatory activity in Sehgal's constructed situations. I propose that Sehgal's decision procedures are monist and seek to model

'general function.' The chapter concludes with a return to the discussion of peripheral digital activity. I argue that constructed situations offer an example of one strategy for critically investigating and reconfiguring the effects of peripheral digital activity.

Coda: Anonymous Painting Looks at the large-scale paintings of Laura Owens. I consider Owens's use of the phrase 'anonymous gesture' as another possible example of a monist decision procedure in contemporary art. Here, I adopt a Whiteheadian framing more loosely, so as to point towards future directions for the research.

2. Whitehead-centred Research

In Chapter 1, I identified Whitehead's philosophy of organism as a guiding theoretical framework for the thesis. In this chapter, I situate my research in relation to the field of Whitehead scholarship and discuss methodologies. At the end of the chapter, I return to the notion of 'decision procedures' as art that I introduced in Chapter 1 and propose the decision procedure as a metaphysical analogy.

Whitehead's metaphysics addresses nature at its most general level, in terms of microcosmic 'actual entities' and not in terms of appropriate strategies or forms of practice in contemporary art. As Lewis Ford notes, 'Whitehead is concerned with metaphysically necessary principles of the widest scope, and has little to say about the contingencies of humankind and the human situation. Ethics (and political philosophy) cannot get started without some assumptions about these contingencies' (L. S. Ford 1998).

Whitehead offers *some* discussion of art in his philosophy, but there is little in the way of contingencies that could illuminate a thesis on contemporary art. Whitehead has been more frequently discussed in theology and science and remains relatively unknown within discourses of contemporary art. For this thesis, therefore, it is important to further overview the field of contemporary Whitehead research.

The Whitehead Revival

Since the 1990s, there have been renewed efforts to connect Whitehead's metaphysics to contemporary social and political life (Morris 1991, 3). This is part of what Mark Hansen diagnoses as a 'veritable renaissance of Whitehead scholarship' (Hansen 2015, 88), and Auxier and Herstein call 'the contemporary revival' of Whitehead (Auxier and Herstein 2017, 14).

The recent responses to Whitehead's philosophy of organism have been remarkably diverse. To give a few examples of the breadth of Whiteheadian research, in preparatory reading for this project some of the recent publications I encountered touched on topics as varied as: quantum mechanics (Epperson 2012), relativity theory (Desmet and Weber 2010), theories of mind (Weekes 2012), media theory and digital art (Hansen 2015; Barker 2012), sociology (Halewood 2014), gender and queer studies (Faber, Halewood, and Lin 2012), computational architecture (Parisi 2013), science studies (Stengers 2011),

and speculative realism (Shaviro 2014; Bryant, Srnicek, and Harman 2011). There is a wealth of commentary and research in the process studies community and the Center for Process Studies at Claremont, co-directed by Roland Faber, as well as within the field of theology, much in connection to Charles Hartshorne's influential process theology.

In my view, recent scholarship on the philosophy of organism can broadly be divided in two. Many projects draw on Whitehead and combine his notions, at times obliquely, with other influences and disciplines to support and inspire movement in new directions. Examples include the scholars Bruno Latour, Donna Haraway, Mark Hansen, Brian Massumi, and Judith Butler—thinkers who admit a Whiteheadian influence, and add a range of other theoretical positions so as to pursue novel modes of thought.

Other projects seek to understand the coherence, implications, and spirit of the framework established by Whitehead, an approach I label Whitehead-centred (or 'Whiteheadist'). Here we find numerous subgroups. Scholars such as Jorge Luis Nobo (1986) and Judith Jones (1998) aim to critique, modify, and develop Whitehead's metaphysical categories, including the category of the ultimate, the eight categories of existence, the twenty-seven categories of explanation, and the nine categorial obligations of *Process and Reality*. Others seek to elucidate Whitehead's project more broadly at a higher level, staying true to the spirit of the philosophy of organism; in this group one exemplar is Isabelle Stengers's *Thinking with Whitehead* (Stengers 2011), a book that is a valuable resource for humanities researchers looking for an entrance into Whitehead's project. Stengers follows the line of scholarship that argues Whitehead's thought is not a rigorous whole but represents a complex, sliding, piecemeal development (L. S. Ford 1985; Lucas 1989; Stengers 2011). Others seek new interpretations of Whitehead. One important recent example for this thesis is by Auxier and Herstein (2017). They reject the 'compositional analysis' approach of Stengers and Ford, and stress the importance of mathematical methods and modelling for understanding Whitehead. Others provide important comparative and contextual analyses and interpretations of Whitehead's philosophy, including Steven Shaviro (Shaviro 2014, 2012) and David Ray Griffin (Griffin 2007). Finally, there are many other efforts to carry Whitehead's reformist notions of subjectivity towards other discourses and disciplines, for instance, Michael Halewood's mapping of Whitehead into sociology (Halewood 2013) and Melanie Sehgal's research on Whitehead connected to new materialist feminist thought (Sehgal 2014).

This thesis follows a Whitehead-centred route, seeking to harness Whitehead's approach more directly in a study of peripheral digital activity in contemporary art. Such an application of Whitehead's metaphysics presents its own hurdles. I do not attempt to further distil or synthesize Whitehead's philosophical doctrine with other contemporary theoretical positions such as those by Latour, Deleuze or Butler. It is not that I believe such combinations are wrongheaded—on the contrary, they are crucial to the project of updating Whitehead's thinking for the present. However, multiple theoretical braids create interpretive demands and, with them, the risks of talking at cross purposes. As Whitehead notes, 'Most of the muddles of philosophy are, I think, due to using a language which is developed from one point of view to express a doctrine based upon entirely alien concepts' (*ESP* 117). Given the terrain this thesis already covers, I focus my efforts primarily on developing an interpretation of Whitehead that is useful within the purposes of this project, bringing together notions of art and the digital.

Media Theory and Metacomputation

There is relevant related Whitehead research, in terms of media theory and computation, and also in the humanities. I outline some of this research below.

Both Mark Hansen and Tim Barker (Hansen 2015; Barker 2012) examine Whitehead's views while drawing on their backgrounds in media theory. Media theory has long held an interest in dynamic processes, a topic Whitehead has much to say about. Media theorist Marshall McLuhan was known to have been influenced by Whitehead (Coupland 2010, 45, 59). Media theory therefore offers one productive route for bringing together discussions of Whitehead, art, and the digital.

I do not directly address media theory in this thesis. One factor in this decision is that adopting a media-theoretic perspective risks eliminating from consideration conceptualist, social, and participatory practices of art which do not automatically assume that art has a theory of media. A second point of concern is the multiple overloading of notions of mediation and media. For instance, Barker observes that the term 'mediation' is used in one way in the tradition of media studies, drawing on the legacies of Hegel, Marx, and Engels. He then proposes to reconfigure this tradition, introducing his own use of the term 'mediation' as a name for generative process (Barker 2012, 10–12). A third source of usages come from Whitehead himself. Whitehead uses the term 'mediation' to refer to how one entity arbitrates or modulates

others (*PR* 49, 141) as well as to characterise the degrees of separation between entities (*PR* 226). Elsewhere, Whitehead writes that 'the world can be conceived as a medium for the transmission of influences' (*PR* 286). This notion of the 'world as medium' corresponds to the doctrine that activity is generational, with one generation of actual entities feeding forward data to the next, so that activity can be analogized as a transmission of data in a medium. Untangling these multiple overlapping usages is a significant project and risks distracting from our focus on Whitehead. Given these concerns, I have chosen to defer an investigation of media theory to later work.

Another pathway for combining Whitehead, art, and the digital is charted in Luciana Parisi's new materialist discussion of computational architecture (Parisi 2013). A major goal in Parisi's work is to argue that computational algorithms, as found in parametric architecture, represent a new category of non-anthropic 'thought' that is not predicated upon a neurological mind having those thoughts (Parisi 2013, 235). That is, for Parisi, the algorithm is a distinct and novel species. The objective, then, is to formulate a language to characterise this kind of computational thinking-being as a new yet alien mode of thought, to capture what it is like to be such an algorithm. Here Parisi moves beyond the conventional ways of describing algorithms as stepwise procedural operations. She introduces terms such as 'infinite infinities', 'incomputabilities,' 'computational interferences,' 'randomness,' 'infinite quantities of data,' and 'incompressible data.' Parisi's argument draws on a close reading of Whitehead recast using computational terminology. For example, where Whitehead proposes that the world is not reducible to logical axioms, Parisi's version of this is: 'Against the metacomputational view of a universe contained in simpler axioms, I will argue that incomputable limits are truly intrinsic to computation' (2013, 20). Or again, where Whitehead claims there is no pre-fixed ordering of becoming, Parisi's framing is: 'Ontological complexity or chaotic incompleteness does not emerge from order, but is rather the unconditional condition … of procedural calculations' (2013, 20). Said in another way, the purpose of Parisi's project is to leverage Whiteheadian concepts to intervene in metacomputation, not metaphysics. Her mixing of computer terminology with Whitehead's neologisms can sometimes lead to double vision as we decode whether a given proposition stands as a metaphysical claim, a metacomputational claim, or both. Among those challenged by Parisi's account will be computer scientists, who will not recognize her definition of algorithms as 'data structures that are internally conditioned by infinities as

incomputable entities' (2013, 83). Stated modestly, Parisi's goal is to make explicit an under-diagnosed issue of error within the theory of algorithms. Her more extraordinary claim is that computational algorithms themselves constitute original modes of speculative thought (2013, 9).

I admire Parisi's project, but I have chosen not to follow Parasi for this thesis. I share with Parisi many of the same starting points and convictions. At the same time, her primary concern appears to be to establish computation as a novel and important kind of agency on its own, albeit with more mysterious (infinite, incomputable) underpinnings than is proposed by cognitivists and emergentists (2013, 170). This leads Parisi to highlight computational technologies as separate from us. They 'do not exist in direct relation to human thinking,' have 'a certain degree of autonomy' (2013, preface), and may 'have acquired a new, ontological status that is unrelated to the preexistence of biophysical bodies' (2013, 1). Her motivation in stressing this separation is, I believe, to put pressure on the notion of computation. She wishes to challenge the view of computing as a fixed sequencing of operations, in order to argue that algorithms 'cannot be contained by a [conventional] metacomputational ontology' (2013, 7). This explains why Parisi investigates computational complexity and advanced technical applications such as parametric geometries in architecture, rather than examining the architectural sites themselves. I affirm the thrust of Parisi's critique. As for Parisi, my interest in peripheral digital activity is precisely how digital activity escapes our conscious thinking patterns. At the same time, in this project my focus is on the digital as we encounter it together. In my view, even the simplest networked devices, ubiquitously deployed, can be more consequential than computationally exotic algorithms. The Paris attackers in 2015 used SMS messaging on cheap disposable devices, to devastating effect. They required no encryption, hardly any data, and only the most straightforward messaging algorithms. Such digital exploits call for new kinds of peripheral digital awareness.

Humanities and the Social Sciences

Turning away from media theory and metacomputation, the question remains which approaches we use to bridge between Whitehead and contemporary art. What I consider next casts a broader net, looking at some of the ways Whitehead has been taken up in higher-level terms within other areas in the humanities.

Here we quickly encounter scepticism as to whether metaphysics can play a role at all. Rehearsing long-standing anti-metaphysical attitudes (see, for example, Rorty and O'Shea 1995), Christian Thorne in a recent essay challenges new materialists on whether a philosophical ontology of primordial nature is able to contribute to debates on human affairs and politics. At the core of Thorne's argument is the issue of metaphysical levelling:

Let's say you believe that the entire world is made out of fire … water itself is a mingling of fire air with burning air. The cosmos is ablaze. … How are you going to derive a political program from this insight, and in what sense could that program be a politics of fire? How, that is, are you going to get from your ontology to your political proposals? For if fire is not just a political good, but is in fact the very stuff of existence, the world's primal and universal substance, then it need be neither produced nor safeguarded. No merely human arrangement—no parliament, no international treaty, no tax policy—could dislodge it from its primacy. It will no longer make sense to describe yourself as a partisan of fire, since you cannot be said to defend something that was never in danger, and you cannot be said to promote something that is everywhere already present. Your ontology, in other words, has already precluded the possibility that fire is a choice or that it is available only in certain political frameworks. This is the fate of all political ontologies: The philosophy of all-being ends up cancelling the politics to which it is only superficially attached. (Thorne 2013)

Whitehead only partially addresses Thorne's criticism. I want to briefly expand on this here, since it offers insights into how we might take up Whitehead's project.

Thorne lists three ways that metaphysics might avoid a totalising emptying of politics. His first proposal, that metaphysics may allow for some hierarchy, is the route I believe Whitehead follows. Whitehead's philosophy of organism analyses our cosmic epoch in terms of actual entities. Actual entities do not exist as universally undifferentiated sameness: The actual entities inside a black hole differ from those in a stone. According to Whitehead, actual entities are multifarious and peculiar, 'they differ among themselves: God is an actual entity, and so is the most trivial puff of existence in far-off empty space' (*PR* 18).

This difference is not merely a selection of different combinations of properties. Whitehead argues that existence presents categories that 'proceed from "contrasts," to "contrasts of contrasts," and on indefinitely to higher grades of contrasts' (*PR* 22). Here,

what is important to stress is that, for Whitehead, actual entities operate through different kinds of contrast irreducible to simpler analysis. He argues that actual entities are more than a collective disjunction of component elements. What does this mean? In Whitehead's speculative scheme, each actual entity is a particular unique individual with its own self-determining aim. It may be analysable in simpler terms, but it cannot be reduced to neat categories or classes: 'This doctrine has the same ground as the objection to the class-theory of particular substances. The doctrine is a commonplace of art' (*PR* 229).

As an example, a ray of light may be analysable in terms of its red, green, and blue components. But this does not mean that if we construct a hue from a mixture of red, green, and blue, the result is the same thing as the original spectral ray, even if it appears similar to our eye, as a prism quickly demonstrates.

Similarly, actual entities cannot be built mechanically from component parts. Whitehead takes this a step further. In the spirit of the British emergentists, he argues that actual entities construct novel and irreducible grades of contrast that feed forward to the next generation, leading to an 'emergent evolution' of contrasts (*PR* 229). In other words, actual entities in the world are self-modifying and evolving, constructing new and varying types of ontological order.

Emergentism draws on observations in physics that, as the structural complexity of a system increases, new physical properties arise that were not predictable from or reducible to those previously exhibited, either by their simple constituents or by their sum. This is the idea of 'the real emergence of qualitative novelties, arising from the increasing structural complexity of phenomena' (Brioschi 2013, 83). In Whitehead's metaphysics, actual entities can have greater or lesser intensities of patterned contrast (the topic of intensity and contrast is explored in Jones 1998, 41), which can feed forward generationally. If intensity of contrast is unevenly distributed, politics returns to metaphysics, since, as Thorne colourfully puts it, 'if you possess ontological rankings of this kind, you should be able to set some political priorities on their basis, finding ways to reward the objects (and people? and groups?) that carry their fiery qualities close to the surface, corona-like, and, equally, to punish those objects and people who burn but slowly and in secret. You might even decide that it is your vocation to help the world's minimally fiery things—trout ponds, shale—become more like its maximally fiery things—volcanoes, oil-drum barbecue pits' (Thorne 2013).

However, even a brief examination of Whitehead's theory of emergence hits potholes. Whitehead offers no full treatment of emergence; he does not clearly articulate his views in connection with other emergent cosmologies such as those by Morgan, Alexander or Bergson; he does not propose emergence as a mechanism to explain the arising of mentality and consciousness. George R. Lucas closely studies the place of evolution and emergence in Whitehead's philosophy (Lucas 1989, 50–65) and concludes that 'Whitehead is not an emergent evolutionist, nor is he an evolutionary cosmologist in the more general sense. No clearly definable doctrine of evolution is in evidence in his philosophy. His statements about evolution and the emergent evolutionists are vague, and occasionally even contradictory. He does not appear overly concerned with giving further interpretation to the idea of evolution, and evidently he had not clearly thought through his own position on evolution in anything approaching a systematic sense' (1989, 68). Emergentism is one mechanism within Whitehead's metaphysical toolkit but not one that can be used to adequately solve Thorne's problem. Whitehead provides no full answer to Thorne's issue, namely a systematic pathway that navigates from low-level metaphysical actual entities to his broader political, social, and cultural proposals.

On the other hand, Whitehead *does* frequently discuss broader issues. Whitehead moves from theorizations of metaphysical categories to wide forays into art, culture, history, and politics without drawing bright lines between disciplines. We find this especially in works such as *Modes of Thought* and *Adventures of Ideas*, though discussions of the implications of his philosophy of organism for human life occur throughout Whitehead's writings. For example, in a discussion of his theory of symbolic reference, Whitehead inserts the phrase 'it is the task of reason to understand and purge the symbols on which humanity depends' (*SYM* 7). Or, in *Modes of Thought*, he writes, 'History is the record of the expressions of feeling peculiar to humanity' (*MT* 37). These sidelong remarks reflect Whitehead's refusal to reduce his philosophy to metaphysical technicalities (Halewood 2013, 122). Whitehead's aim is not merely to conceive of a rigorous description of the smallest puffs of existence. His project in parallel, and inseparably, shifts from the construction of abstractions to descriptions of the consequences of these abstractions for us. Whitehead both builds and 'plays' his abstractions in his head and seeks to communicate this to us within his philosophy. Such an iterative approach to conceiving and testing is integral to his work. We see this at the

start of *Process and Reality.* Whitehead first defines 'speculative philosophy' as 'the endeavour to frame a coherent, logical, necessary system of general ideas in terms of which every element of our experience can be interpreted' (*PR* 3). Whitehead immediately adds:

Philosophers can never hope finally to formulate these metaphysical first principles. Weakness of insight and deficiencies of language stand in the way inexorably … Our datum is the actual world, including ourselves; … The true method of discovery is like the flight of an aeroplane. It starts from the ground of particular observation; it makes a flight in the thin air of imaginative generalization; and it again lands for renewed observation rendered acute by rational interpretation. (PR 4–5)

Here we see Whitehead's response to Thorne's issue of metaphysical levelling. Whitehead asserts that, while metaphysical theories are incomplete and partial, it remains possible to interrogate these abstractions and engage in analogical question asking at a high level, through iterations of thinking and testing from the 'ground of particular observation.' Indeed, such iterative refinement is how renewed interpretation is formed. In Whitehead's philosophy, instead of presenting only a metaphysical model, his objective is to make available both aspects of his conception, his metaphysical inquiry into first principles and his flights of imaginative generalization. Such a position may not give us a fully worked-out political ontology, but it points in directions we may travel. It is what Stengers describes as an 'etho-ecology': an approach that connects the *ethos*, or way, of a living being with its *oikos*, the whole to which it belongs, including the 'many links, niches, and collectivities produced by the *ethos* that mutually imply one another, and on which each depends in one way or another' (Stengers 2011, 164). If we commit to such an etho-ecology in an inquiry into peripheral digital activity and art, the next question that arises is how we might we adapt this ethos methodologically.

A Whitehead Methodology?

One factor uniting Whitehead scholars and artists, including Isabelle Stengers, Steven Shaviro, Michael Halewood, Brian Massumi, Steve Goodman, Luciana Parisi, Erin Manning, Mark Hansen, Mike Michael, Melanie Sehgal, Martin Savransky, and others is the desire to extend Whitehead's flights of imaginative generalization. The aim is, to use Stengers's phrase, to take up 'the baton of Whitehead's text' (Stengers 2011, 25). Stengers continues:

What matters to me is to inhabit the movement that Whitehead proposes for thought, and, without stopping this movement, to experience and put to the test the way in which it is or is not able to receive questions that Whitehead did not ask because they are not those of his time. In other words, my choice is not to interpret but to try to transmit, that is, also, as every lover of Whitehead knows, to take up again in my way, tying it in to my questions, that which has no other truth than the set of resumptions to which it will give rise. (Stengers 2011, 25)

Stengers here offers the beginnings of a sketch of a Whiteheadian methodology. For the remainder of this section, I discuss issues of methodology, as it pertains to our present research question on art and the digital.

Within practice-based art research, the issue of methodology is a knotted one. Scholarly texts (e.g. Elkins 2009; Sullivan 2010; Gray and Malins 2004) offer contextualizing overviews and look at some of the historical factors that have given rise to practice-based art PhD's. They also indicate possible categories to assist artist-researchers. One common reference is Christopher Frayling's three types of art research that might grow: research into art and design, research through art and design, and research for art and design (Frayling 1993). Yet while such references provide guidelines, the diversity of projects in practice-based art research mandates addressing methodology on a case-by-case basis.

For Whitehead-centred research projects, the topic of methodology is knottier still. Whitehead argues that the movement between empirical actualities and intellectual generality is frequently hindered and narrowed by the normative procedures of method. As Whitehead cautions in *The Function of Reason*, 'The more clearly we grasp the intellectual analysis of a way [of] regulating procedure … the more decidedly we reject the inclusion of evidence which refuses to be immediately harmonized with the method before us. Some of the major disasters of mankind have been produced by the narrowness of men with a good methodology' (*FR* 20).

Whitehead critiques not only how practices produce knowledge but also how we validate knowledge in a given field. To give an example of research conducted for this project, one can ask what research knowledge is held in the production of drawing that is executed using a digital drawing tool that constrains line output to one inch per hour? Or in a drawing made by a researcher in collaboration with their domestic partner to reproduce a digital image by drawing it one pixel at a time by hand? If we start from pre-

existing categories of knowledge and disciplines, the answers to these questions tend to reinforce a theory/practice split, in which practice is held to be separable from publishable research outcomes (Manning 2016, 1). Yet it was through *doing* these drawings, starting from the midst of a concrete 'interaction' I believed I already understood, that I encountered unquantifiable experiences that changed the course of my inquiry. I started to consider the digital not as a purposeful 'interactive technology' and instead in terms of peripheral activity, something that shaped the manner of my experience in ways I found ineffable. How should such ineffable experience be constituted in terms of knower and known in a field of knowledge and justified through an appeal to methodology?

Erin Manning takes up precisely this question in her critique of method in *The Minor Gesture* (Manning 2016, 1–39). Manning's aim is to encourage researchers to listen to excluded voices, the voices 'of knowledges not yet parsed for the academic establishment' (2016, 5–6) that are lurking within experiences. These voices do not yet fall neatly into relations of the knower-known or the subject-object, since those relations are themselves immanent to the composition of a particular occasion's coming to be. Manning stresses what she calls the 'more-than' status of doing, the way that doing exceeds prior bounds:

When something does*, new relational fields are forming, and with them, new modes of existence. A new mode of existence brings with it modalities of knowledge. These modalities of knowledge are not yet circumscribed—they are transversal to the modes of operation active in the relational field. They are still in-act. This is the force of radical empiricism: it gives us a technique to work with the in-act at the heart of experience. (Manning 2016, 5)*

There is a possible spiral within Manning's critique. She points out the pitfalls of method, and the importance of *doing.* She then describes radical empiricism (a label that spans 'art-based research,' 'research-creation,' and Whitehead's metaphysics) as a technique aimed at avoiding those pitfalls. But her critique of method and emphasis on doing is itself amenable to being packaged as a methodology. I believe this is no accidental circularity. It corresponds to a view of methodology that is dynamic and historical. According to Whitehead, methodology 'starts as a dodge facilitating the accomplishment of some nascent urge of life' (*FR* 14). It is a gambit to survive, which then becomes an accomplishment of living well. Over time, however, the satisfaction of

repetition fades, until the methodology becomes mere life, and the spirit of adventure compels life towards new methodologies (*FR* 14–15). While Manning states that she is 'against' method, it is perhaps more accurate to say she is against the imposition of method from without. She calls for a renewal of a dynamic methodology that is immanent to each project: '[This] means taking the work's affirmation, its urge of appetition, at face value, asking what thought-feeling does in this instance, and how it does it' (Manning 2016, 14). To repeat Stengers, it is 'to take up again *in my way*, tying it in to my questions, that which has no other truth than the set of resumptions to which it will give rise' (Stengers 2011, 25, emphasis added).

This self-disclosing aspect of methodology may be why, when Halewood and Michael address the issue of Whitehead-centric methodology in the field of sociology, they do so 'tentatively' (Halewood and Michael 2008, 31). They offer preliminary guidelines (Halewood and Michael 2008, 44; Halewood 2013, 5), commenting that the guidelines do not 'raise these to principles or injunctions: our tactics are best regarded as emergent in their instantiation within the actual occasions of research practice' (2008, 53). It is incumbent on each project to self-identify its methods and guidelines.

Working with Analogies

It is time to step back from our survey of secondary literature and consider the methodological strategies proposed for this study. In this section, distilling from Halewood, Michael, Manning, and Auxier and Herstein, I point to some of the guidelines followed in this research:

Side-by-side ontologies. This thesis aims to marshal far-flung discourses, including those of digital technologies and contemporary art, within a Whiteheadian perspective. A danger of Whitehead's metaphysics, with its emphasis on the smallest occasions of existence, is that it risks sidestepping the 'art' elements. Whitehead rejects or provides alternative conceptualizations for many of the staple 'habits of thought' (*PR* xiii), including the subject-predicate form of expression and permanent substances. In doing so, Whitehead upends basic language idioms. To introduce Whitehead in a discourse on art necessitates re-envisagement, transformation and reinvention of terms[2]. Whitehead provides clues that serve as starting points. But the scale of a Whiteheadian reformation is extreme, and researchers must decide how and when to turn to such a metaphysics,

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[2] Michael Halewood makes a similar point in relation to the 'social' (Halewood 2013, 3–5).

based on the benefits it may bring to specific problem areas. Pragmatically, this suggests adopting a Whiteheadian ontology side by side with substance-ontological perspectives, and acknowledging that such hybrid contraptions are historically situated. In what follows, I explicitly make room within the body of the thesis for the inclusion of other (non-Whiteheadian) voices and world-views, without attempting to read everything through a Whitehead-centred lens. Discussions from multiple paradigms are allowed to jostle, following their own manners, adding what they can.

Iterative refinement. Technical terms in Whitehead's text, e.g., the word 'prehension,' do not have a single standing. Each term's use is shaped by the unfolding analysis, sometimes even within a paragraph, in order to clarify a point, always in reference to the initial coordinating whole established at the start of each book (Auxier and Herstein 2017, 112–41 and passim). Whitehead's analysis of technical terms varies from topic to topic and paragraph to paragraph and according to the *purpose* of the investigation. This is similar to the way that Latour stresses that his actor network theory 'prefers to travel slowly, on small roads, on foot' (Latour 2005, 22), or that Halewood describes his project as 'tracing' a culture of thought. In this thesis, I work by refining and retracing and modifying. Each chapter returns to the he topic of a decision procedure, with due reconsideration, attending to the research question that initiated the inquiry.

Analogies. Whitehead's is not an elementalist; i.e., he is not proposing that we can define the low-level entities of the universe, and then, through some systematic mechanism of composition, arrive at explanations at a higher level. Counter to scientistic reductionism, Whitehead applies his methods of analysis at different levels, constructing different schemes that fit together analogically. The idea is that 'the whole' may be analysed as *analogous* levels with different degrees of generality, exposing different characteristics. Auxier and Herstein explain:

[T]he whole takes on a different character at various levels of generality. For example, the 'whole' as articulated by the theory of perception is called 'nature,' and its parts are perceptions, their objects, and the forms of relation between these. Taken together, the (symbolically) coordinate result of these parts is called 'science,' when it is derived according to certain kinds of genetic specification (mainly measurement), while that same whole is called something like 'beauty' when derived according to certain intensities of organization, best exemplified in art. The point is that the levels of

generality in other of Whitehead's inquiries, apart from Process and Reality, are similar but not identical with those in Process and Reality. *(Auxier and Herstein 2017, 38)* [3]

Here, I believe, we find another response to Thorne's critique of metaphysical levelling and how we can begin to move towards politics from metaphysics: by choosing concrete projects, setting purposes and scopes, choosing appropriate analogies, and following research iteratively.

In our case, given art as a primary axis of our research question, in Chapter 1, I identified art as the 'whole' of our coordinate analysis. There is no reason to always use Whitehead's technical terms, such as 'actual entities' or 'prehensions' or 'concrescence.' This is not a metaphysical treatise but one concerned with art and the digital. At the same time, we want to propose analogies that are plausible in Whiteheadian terms. Care is needed in in how we construct such analogies.

In this thesis, I align a 'decision procedure,' an event within art, with what Whitehead calls a 'society of actual occasions' (*PR* 205). I discuss actual entities and actual occasions in more detail in the next chapter. Here I want to note that when I describe a decision procedure as engaging with agencies valuing art in a form of self-choreographing, these closely echo Whitehead's construction of actual entities. He describes actual entities as 'feeling' other actual entities, accreting value, and self-forming in phases of concrescence. I am proposing an analogy that encapsulates details of Whitehead's metaphysics and uses higher-level terms rather than employing phrases such as 'historical routes of intermediate objectifications,' as I would need to do as a metaphysician.

Whitehead appears to validate such an approach when discussing art. I provide a more extended quote below for context:

When you understand all about the sun and all about the atmosphere and all about the rotation of the earth, you may still miss the radiance of the sunset. There is no substitute for the direct perception of the concrete achievement of a thing in its actuality. We want concrete fact with high light thrown on what is relevant to is preciousness.

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[3] Auxier and Herstein cover the topic of analogies more mathematically and at greater depth. For them, a central claim is that in Whitehead's metaphysics, the quanta of explanation 'have reality *only* as analogies, and not simplistic identities' (Auxier and Herstein 2017, 81). Victor Lowe, in his biography of Whitehead, makes a similar point. Whitehead does not specify the time span of actual occasions. Instead, says Lowe, Whitehead's cosmology is a general way of thinking, so that 'anything in human experience may be treated as an actual occasion so far as it approximates to the design of an actual occasion set out in the philosophy of organism' (Lowe 1990, 232, 268)

What I mean is art and aesthetic education. It is, however, art in such a general sense of the term that I hardly like to call it by that name. Art is a special example. What I mean is art and aesthetic education … Thus 'art' in the general sense that I require is any selection by which the concrete facts are so arranged as to elicit attention to particular values which are realized by them. For example, the mere disposing of the human body and the eyesight so as to get a good view of the sunset is a simple form of artistic selection. The habit of art is the habit of enjoying vivid values.

*But in this sense, art concerns more than sunsets. A factory, with its machinery, its community of operatives, its social service to the general population, its dependence upon organizing and designing genius, its potentialities as a source of wealth to the holders of its stock is an organism exhibiting a variety of vivid values. What we want to train is the habit of apprehending such an organism in its completeness. (*SMW *199, underlining added)*

In this passage, Whitehead is not proposing an object-based definition of art, but suggesting that art is a kind of activity of functioning and valuing, of selecting and attending *in order to* apprehend organisms as varied as sunsets or factories.[4] The claim, following Auxier and Herstein, is that Whitehead is here working through analogy. In *Science and the Modern World,* where this passage occurs, the coordinate 'whole' is 'the progress of civilization' (*SMW* 1). Whitehead's 'selecting,' 'eliciting attention to values,' and 'arranging' are part of his genetic analysis of art in this context, for this purpose. His analogy has similarities to my own proposal of a decision procedure in engaging, activating of values, and choreographing. Whitehead is asking us to imagine, at the basement of it all, a teeming processual horde of 'actual entities,' while working, analogically, at a much higher level.

Although the terms of the current project are different, I am proposing something similar here in my notion of a 'decision procedure' of art as an analogy for a Whiteheadian society of actual entities. I have described a decision procedure in art as a choreographing, an engaging of agencies, a valuing of art, all set within a relational flux of activity. In this case, we must explain in more detail what is entailed by relations and choreographing, and what kinds of entities we are setting in motion. In other words, we

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[4] As a point of historical context, Whitehead published this in 1925, two years after László Moholy-Nagy joined the Bauhaus Weimar and ordered *Construction in Enamel 2 and 3* made at a local enamel factory, allegedly by telephone. The Bauhaus was an art school modelled on the organisation of a factory. For an interesting discussion of the Bauhaus and Moholy-Nagy's interest in art's relations to organisms and systems theory, see Terranova 2016.

must spend some time looking beneath the hood to understand how Whitehead proposes that processual 'societies' of actual entities work. In the next chapter, I first briefly outline some of the key features of Whitehead's metaphysics and, at the end of the chapter, return to our discussion of decision procedures in art.

3. Actual Entities

At the end of Chapter 2, I suggested that the 'decision procedures' of art within this study are held to be analogous to Whitehead's processual entities. At the heart of Whitehead's philosophy are 'actual entities.' For the purposes of the present study, and given that Whitehead's ontology is unfamiliar within contemporary art, this chapter introduces actual entities and describes some key features of Whitehead's metaphysics in broad strokes. Whitehead uses unfamiliar notions, so we here lay down some of the rudiments of his terminology, including terms such as 'concrescence' and 'eternal objects.' At the end of the chapter, I return to decision procedures, and discuss them in terms of the mereology of whole-part relations in Whitehead's metaphysics.

The Bifurcation of Nature

Before discussing the details of Whitehead's system, it is important to introduce one of the central problems that Whitehead seeks to address in his metaphysics, so as to understand *why* Whitehead proposes a radical reformation of philosophical first principles.

Whitehead identifies an intractability between subject and object in Western philosophy. He argues that, since Galileo, Descartes, and Locke, the postulated divide between *res cogitans* and *res extensa* and the distinction between primary and secondary qualities has caused troubles. This is because it creates a tendency in Western philosophy to view extensive matter as inert, static, and bereft of sensible qualities. This leads to what Whitehead describes as a bifurcation of nature, that is:

*… the bifurcation of nature into two systems of reality, which, in so far as they are real, are real in different senses. One reality would be the entities such as electrons which are the study of speculative physics. This would be the reality which is there for knowledge; although in this theory it is never known. For what is known is the other sort of reality, which is the byplay of the mind. Thus there are two natures, one is the conjecture, the other is the dream. (*CN *29)*

A bifurcation occurs in any theory that would 'bifurcate nature into two divisions, namely into the nature apprehended in awareness and the nature which is the cause of awareness' (*CN* 29). Stengers states it this way: 'Nature "bifurcates" as soon as, in one way or another, the mind is called to the rescue, *qua* responsible for "psychic additions,"

to explain the difference between what we are aware of and what is supposed to belong to nature' (Stengers 2011, 38).

Through such a bifurcation in science, we find 'conjectures' of molecules and electrons. Human experiences are described in terms of objectively felt qualities such as the warmth of a beach, the blueness of a sky, or the rustling of leaves, but these are a dreamlike fluttering of one's mind. In a bifurcated world view, the conjecture and the dream are incommensurable.

For Whitehead, the bifurcation of nature perpetuates a number of fallacies. He describes several 'myths' in *Process and Reality* (*PR* xiii and passim), including:

- 'vacuous actuality': the belief that matter is lifeless and devoid of subjective immediacy (*PR* 29)

- the 'sensationalist doctrine' of perception, which holds that all knowledge of the external world arises from the mediation of private sensations (*PR* 142)

- the 'subject-predicate' form of proposition, through which statements such as 'The whale is big' are explained away as self-evident metaphysical first principles (*PR* 13)

- 'primary substances': the classical notion of permanent substances, in which individual substances are not present in each other and can relate to other substances only externally

- 'misplaced concreteness,' that is, overconfidence in explanations of concrete circumstances, neglecting the degree of abstraction involved (*PR* 7)

Whitehead argues that as long as philosophy perpetuates a bifurcation of nature and retains these myths, it will be incapable of addressing the 'solidarity of the universe,' and will 'render this problem incapable of solution' (*PR* 57). Whitehead's metaphysics is the culmination of a lifelong effort to overcome the bifurcation of nature. He seeks to reunite two world views: to see the warmth and redness of a sunset and the theories of its molecules, electrons, and photons in solidarity, as different ways of grasping at relations that are already present in nature. Both types of explanation are 'essential factors in the composition of "really real" things whose interconnections and individual characters constitute the universe' (*MT* 150). The sometimes bizarre contortions that Whitehead finds necessary within his metaphysics are indicative of how pervasive the issue of the bifurcation of nature is and how difficult it is to overcome the bifurcation of

nature non-reductively, without forcing all explanations to a lowest common denominator.

The recent revival of interest in Whitehead is, I believe, a sign that a growing number of scholars recognize that the bifurcation of nature remains a pressing contemporary issue across multiple fields of study. As Erin Manning observes, 'To posit two systems—one "within the mind" and one "without the mind"—is a methodological posture still very much alive in the critical apparatus of the disciplinary model' (Manning 2016, 3). As more researchers seek ways to think across disciplines, holistically and ecologically, Whitehead's scheme has gained relevance.

More specifically, in terms of this thesis, I return to the discussion of bifurcations in the next chapter, when I consider how theories of software lead to a bifurcation of the digital. For the remainder of this chapter, I want to sketch in broad strokes some of the key features of Whitehead's scheme, so as to explain why I believe Whitehead is a useful thinker of 'peripheral' activity.

Setting a Scope

This thesis is an application of Whitehead's ideas, not a philosophical contribution or metaphysical treatise. The intended audience includes those who are not Whitehead experts. I therefore take certain liberties. I will not, for example, discuss the historical climate Whitehead was addressing. or his interlocution with the philosophers he references, including Aristotle, Bacon, Bergson, Berkeley, Descartes, Hume, James, Kant, Leibniz, Locke, Hume, and Spinoza—thinkers Whitehead famously consigned to a 'series of footnotes to Plato' (*PR* 66). Such a discussion is central to understanding Whitehead's project but goes beyond what I can cover here. Similarly, the treatment that follows is a higher-level descriptive characterisation of some of the key features of his scheme, using a near-obligatory high-level topic-based survey format. The topical format is flawed as a means of discussing Whitehead's philosophy, since it fails to address the synoptic coherence of his project. Whitehead wishes to produce a metaphysics of solidarity, to place all in the same boat 'to sink or swim together' (*CN* 148). If philosophy were like a game of Mikado,[5] Whitehead aims to create a Mikado configuration in which every stick touches many other sticks, with no stick standing alone. However, his is far

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[5] Also called pick-up sticks, a game in which brightly coloured sticks are thrown on the table, and the objective is to remove sticks without disturbing other sticks in the pile.

from a static configuration. Whitehead modifies, edits, and refines his meanings within his analysis, and even within a single sentence. He pursued different problems in different books. The same technical term may have different interpretations depending on this shifting configuration. Reflecting the difficulty of interpretation that results, within the secondary literature there are a multitude of different readings of his philosophy. Presenting such a project by dividing it into topic areas with brief discussions vastly oversimplifies this challenging aspect of Whitehead's philosophy. I have chosen a topical format focusing on aspects of his philosophy out of necessary expediency for the purposes of this project, in order to impart the rudiments of Whitehead's system without turning this text into a thesis on Whitehead. To that end, I draw on a variety of secondary sources as interpretive aids[6] and cover only selective topics, paying heed to the needs and scope of the present research question.

Actual Entities and Lifecycles

Whitehead holds that concrete existence can be analysed in terms of a fluxing process consisting of myriad entities. Whitehead uses the term 'actual entity' to refer to one of these entities of existence. 'Actual entities … are the final real things of which the world is made up. There is no going behind actual entities to find anything more real. … The final facts are, all alike, actual entities' (*PR* 18). Anything that exists is made up of teams of actual entities. Actual entities are the concrete, indivisible units the universe is made from, the 'atoms' in Whitehead's system, though it is important to remember that actual entities are not tiny particles we can discover, e.g., using the instruments of science. Whitehead is referring us to *microcosmic* things, not *microscopic* ones; i.e., these are the kind of entities necessary to describe how the world is constructed in a processual metaphysics. What physicists call an electron is for Whitehead a whole shower of actual entities. Whitehead's interest is in the smallest concrete things of the actual world: actual entities are an abstraction he develops to help explain the world's concrete units. Whitehead follows a Leibnizian monadic style of thought: There is only one type of primitive actual entity. All the things we encounter in experience, from

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[6] In my reading, I am most influenced by a triad of Whitehead scholarship: Judith Jones (1998) captures the internal, poetic, and genetic aspects of the concrescence of actual entities; Auxier and Herstein's (2017) new interpretation of Whitehead persuasively describes the models, methods and principles underlying his philosophy; and Stengers (2011) conveys the spirit and arc of Whitehead's thought beyond itself.

boiled sweets to sunsets to symphony orchestras, are teeming conglomerations of actual entities. A complex organism such as a human is a welter of 'societies' of 'living occasions' born from actual entities (Whitehead uses the term 'actual occasion' when thinking about actual entities from without, in morphological relation to other actual entities). As Melanie Sehgal puts it, actual entities are therefore an abstraction that offers 'a hypothetical starting point for our heterogeneous fields of experience and knowledge, including everyday experience as well as the counter-intuitive findings of quantum physics' (Sehgal 2014).

Metaphysical theories either assume persistence and then must explain flux, or they assume flux and then explain how things can persist. Whitehead follows the latter approach. Actual entities are in flux. Whitehead calls his approach a philosophy of organism. As a hylozoist, he describes actual entities using metaphors of biological life. A vast stream of actual entities are born each moment. Each actual entity has a lifecycle, in which there two distinct periods: The first period is a spontaneous burst of dynamic activity called concrescence; this is followed by a second and everlasting period of stasis. Both extremes are necessary in order to account for the varying ways things endure.

If all things are made up of actual entities, this implies there must be a means for each actual entity to form itself differently, to account for the different kinds of things we encounter in the world—a fleck of consciousness is different from an electron. There must be a way for actual entities to form different individual facts in the world. Whitehead addresses this through the first, dynamic part of an entity's lifecycle, the actual entity's 'concrescence.'

Whereas atoms in physics have electrons, neutrons and protons, each of Whitehead's actual entities are processual units, so each goes through various stages of process. The name 'concrescence' is the term Whitehead uses for the phases of process that each actual entity has when it is actively forming itself. Just as worker bees work and then die, actual entities concresce and then perish. Each actual entity conducts its concrescence independently of other contemporaneous actual entities, outside of what we experience as the passage of time. Concrescence refers to the phase when an entity receives the world and formulates its response to the world. The response may be as trivial as a repetition of a previous pattern or as complex as a puff of conscious decisive thought. Each actual entity's concrescence is the formulation of its definite response, its 'this is me in my here and now.'

Concrescence lasts for a flicker and then completes when the actual entity reaches 'satisfaction' and terminates, or 'perishes.' It then 'transitions' to the next stage of its existence, where it emerges as a 'fact' of the past, at a concrete time and place. It is a 'definite, determinate, settled fact, stubborn and with unavoidable consequences' (*PR* 219). After terminating and transitioning, the actual entity then becomes a fact that other concrescing actual entities receive as part of their past. They formulate their living 'now' in response to the past. In other words, each actual entity's concrescence takes place independently and, after concrescence completes, the actual entity then effects other actual entities: 'The "effects" of an actual entity are its interventions in concrescent processes other than its own' (*PR* 220). In this way, after terminating, the actual entity is a novelty in what Whitehead calls the 'creative advance' of the universe (*PR* 28). Said another way, concrescence is the 'becoming' of an actual entity, whereas after it perishes and transitions, it is a 'being' that impacts the becoming of other actual entities.

In this scheme, what we typically call an object, such as a plate, is a pulsing collection of generations of actual entities. It looks permanent to us because entities are successional; from one moment to the next, when an entity perishes, a new entity spawns to succeed it in a repeating pattern. Rocks or electrons or starlight may appear to endure unchanged for long periods of time, but for Whitehead they are successive waves of generations of entities—just as Derek Jarman's *Blue* (1993) looks like an enduring constant colour but is made up of many instances of blue.

It is in its perishing and transitioning that each actual entity becomes lodged in space and time. In Part IV of *Process and Reality*, Whitehead describes how successive generations of contemporaneous collectivities (or nexūs) of entities are divided into physical units of space and time. He presents a unique mereotopological 'epochal' theory of time that generalizes both relativistic and quantum effects.

For Whitehead, every actual entity 'decides' what it is. This is an odd use of the word. It does not mean that actual entities are making human-style judgements. It means that an actual entity's concrescence yields a definite determinate result, one that is consequential or 'decisive' for other subsequent actual entities. Each actual entity concrescences independently, but any consequences of the result it arrives at in its satisfaction are realized when the entity perishes and becomes a 'settled fact,' and new actual entities are instantiated to take up where the previous generation left off. This is

important for Whitehead's handling of causality. If actual entity A makes a decision, and B is in a subsequent generation, it may behave either conformally or non-conformally in response to A's decision. In the former case, A and B together exhibit efficient cause. In the latter case, B exhibits final cause. Each actual entity 'arises as an effect facing its past and ends as a cause facing its future. In between there lies the teleology of the Universe' (*AI* 194). Whitehead argues that while actual entities are overwhelmingly conformal, i.e., efficient cause prevails, there must exist the potential for free behaviour, for the entity to be its own final cause. This potential for spontaneity is necessary to account for the great wealth of different kinds of 'living occasions' that exist in the world, including humans but also other animals and simpler life forms.

While teleological cause appears an odd requirement to insist on for physical things, it is important in how Whitehead addresses the impulses and desires of biological life. Here Whitehead makes his 'actual entities' perform double duty. In order to avoid a bifurcation between biological creatures, in possession of a mental life, and non-biological things, Whitehead retains his monistic approach and uses the same abstract actual entities for both. Actual entities have the equipment necessary for 'higher grade' forms of life, including human consciousness. Whitehead achieves this by extending the description of spontaneous concrescence to incorporate sufficient receptive and reactionary mechanisms to provide for aesthetics, thought, judgement, emotion, intuition, and intellection, achieved through a rich relational model (which I describe in the next section).

One of the major confusions in the philosophy of organism is that, since the same actual entity serves this double duty, Whitehead uses multiple and synonymous names for his metaphysical notions. Depending on the context and the role he wishes to emphasize, Whitehead draws on terms from ontic, mentalist, biologic, mathematical, subjectivist, and physicalist vocabularies, sometimes in ways that run counter to conventional usages. In discussions of morphology, actual entities are called 'actual occasions.' In its live period, an actual entity is called a 'subject' or a 'living immediacy' in its 'becoming,' having its 'experience' for 'itself.' An actual entity has a 'subjective aim' and a 'subjective form' that shape the kinds of subjective experience the actual entity may have. Whitehead repeatedly reminds us that his 'subjects' are concrescing actual entities: 'Apart from the experiences of subjects there is nothing, nothing, nothing, bare nothingness' (*PR* 167). When a subject concludes its pulsing concrescence and reaches

satisfaction, it perishes and enters into the world beyond. As Whitehead says, it is no longer its own subject but becomes a 'superject' effecting the lives of other subjects. It has reached its 'objective immortality.' Like passing a baton, a subject experiences a brief moment of becoming before transitioning into a superject objectified in the experiences of others:

*An actual entity is to be conceived both as a subject presiding over its own immediacy of becoming, and a superject which is the atomic creature [after reaching satisfaction and perishing] exercising its function of objective immortality. It has become a 'being'; and it belongs to the nature of every 'being' that it is a potential for every 'becoming.' (*PR *45)*

Whitehead seeks a single set of abstractions that can generalize to both physical and biological life forms. However, his subject-object terminology has a distinctly different readout from normal usage. Each entity is first subject, then reverses roles and is objectified by other subjects. A stone exists as a nexus of subjects (actual entities) each having a private living experience of a 'now.' But when we touch the stone as an object, what we feel is the stone as its 'superject,' i.e., as a nexus of actual entities that have perished and already are one generation in the past.

A remark by Marcel Duchamp is here quite helpful:

[It is] the interaction of the onlooker, which makes the painting. Without that, the painting would disappear in an attic. There would be no actual existence of a work of art. It's always based on the two poles, the onlooker and the maker, and the spark that comes from that bipolar action gives birth to something—like electricity. Don't say that the artist is a great thinker because he produces it. The artist produces nothing until the onlooker has said, "You have produced something marvellous." The onlooker has the last word on it. (quoted in Tomkins 2013, 31).

This very much has the flavour of the approach Whitehead adopts with actual entities—subsequent generations of actual entities are 'onlookers' to previous generations, and it is their subsequent activity that gives birth to new novelties. The question next is: What is the nature of the 'bi-polar spark' that connects an entity and its onlooker?

Prehensions

If there is one *type* of actual entity and a plurality of instances of actual entities of that type, this implies a theory of how actual entities can relate, i.e., how what Duchamp called a 'bi-polar action' can exist. As with his careful accounting of extent and causality, Whitehead commits to a robust theory of relation.

Whitehead rejects the notion that the relations between actual entities are entirely external to those entities, with the implication that each actual entity receives merely a 'representation' of the universe that is outside of it. He writes that 'it is a cumulation of the universe and not a stage-play about it' (*PR* 237). Each actual entity grasps other and prior entities within its own experience, through a relation Whitehead calls a prehension. A prehension is a piece of actuality, a 'concrete fact of relatedness' (*PR* 22) through which one entity is included in the experience of another, so that past occasions of experience share in the constitution of new occasions.

Prehensions are the smallest units of analysis in Whitehead's scheme. Prehensions are how Whitehead accounts for all types of relatedness, including memory, perception, space, time, causality, intentionality, symbolic reference, subject-object relations, and God-world relations. A prehension never exists on its own. Instead, prehensions occur together as subordinate elements within an actual entity; more precisely, an actual entity is constituted by its prehensions of other entities. Said in another way, prehensions are 'internal relations' of the actual entity. At the same time, for the prehended entity, the prehension is an 'external relation.' In other words, a prehension can be thought of as an asymmetric relation, where one relata is internal and other is external. Auxier and Herstein help to flesh out this description:

[W]e may differentiate the notions of internal and external relatedness by how they reveal/form (the language here is tricky) the nature of identity. For external forms of relatedness, a 'thing's' identity is the first, analytically given fact; for internal forms of relatedness 'identity' is the final, synthetically achieved result. Part/whole relationships are the image of internal relatedness because there is no actual part until the whole is given. Yet by the same token, the whole is itself presupposed, but vague ... until the parts are definite. The identities of part and of whole are thus synthetically correlative to one another and not initially given, independent facts. (Auxier and Herstein 2017, 62-62)

What is useful about this description is the way it helps portrays internal relations as thing that are constructed. I picture this as being a little similar to how, as a silver gelatin

print develops, it starts out blurry and indistinct, but, over time, contrast increases and it becomes sharper until each grain is fully resolved and the picture is complete. This is oversimplifying in the sense that prehensions form a complex multidimensional welter of relations, but it captures the movement from vague to definite as actual entities synthesize their internal relations.

Whitehead describes mechanisms through which the prehensions that arise in an actual entity are selected, ordered, and weighed to produce the terminal datum for the actual entity. Here, Whitehead describes two different kinds of prehensions: positive and negative. Positive prehensions are additive; they are the way an actual entity includes other entities in its functioning. Negative prehensions are used to exclude or eliminate a part of another entity from consideration. Through constellations of additive and eliminative prehensions, an actual entity grasps another actual entity 'under an abstraction' (*PR* 231). Negative prehensions play an important role in 'objectification.' Objectification is a combination of positive and negative prehensions, so as to 'relegate into irrelevance, or into a subordinate relevance, the full constitution of the objectified entity' (*PR* 62). It is how one entity can prehend just a part of another entity, in its own way. This becomes critical in Whitehead's account of mentality.

As with actual entities, prehensions are made to perform double duty, to take a role in physicalist and mentalist life. Once again, Whitehead mixes psychologisms with technical language. An extreme example is his use of the word 'feeling' to mean a 'positive prehension.' The terms 'feel' and 'prehend' are used largely interchangeably by Whitehead. A prehension includes not only *what* is felt but additional information about the feeling—it is not just a single word, 'marvelous,' it retains a 'vector character' that includes factors such as where the feeling came from, what the underlying datum is, and how the data is felt by the entity. 'A feeling bears on itself the scars of its birth' (*PR* 226). Whitehead describes prehensions as sharing many characteristics with actual entities (*PR* 19). That is, a prehension is not simply a logical connector; it is an act that is itself a part of existence.

Whitehead extensively discusses how prehensions are formed during an entity's life, as it perishes, and in its 'transition' to the next generation of actual entities. The discussion includes a set of 'categorial obligations' and 'phases' during the actual entities' lifetime. There is also a non-metrical 'mereotopological' explanation of how

prehensions generate the constraints between actual entities that result in the division of the extensive continuum into actual time and space.

The phases of concrescence described by Whitehead indicate that concrescence is a dynamic layered process. To return to our metaphor of a silver gelatin print, concrescence is more akin to multiple layers that are composited together. Positive prehensions serve to add to the composition, and negative prehensions serving to mask out parts of the composition, to arrive at the final unified result.

Mentality

In the philosophy of organism, Whitehead's aim is to avoid a Cartesian divide between mind and body. However, Whitehead is not anti-dualist tout court. Whitehead doesn't erase the distinctions between mental and physical. Doing so would stymie an account of consciousness. What he rejects is Descartes's variant of human separatist dualism, in which mental and physical are *really* distinct, so that the (human) mind and body are only and wholly intelligible apart from each other as isolate realms.[7] Whitehead seeks to bring these two spheres of activity together. He therefore states that *all* actual entities have two poles, a 'physical pole' and a 'mental pole.'

When Whitehead says all actual entities have a mental pole, he is not suggesting anthropomorphic panpsychism, with atoms having tiny people inside, each with folk human subjectivities. It is not as if stones are having dreams about conceptual art. Although all actual entities are furnished with both physical and mental poles, each actual entity is its own peculiar particularity and for many entities the 'mental' pole may have a negligible role. Through equipping all entities with mentality, the philosophy of organism insists that the terms 'experience' and 'decision' must be recalibrated and broadened in order to locate conscious human thought and judgement as rarely occurring intensities within a vast spectrum of other kinds of decisive experiences.

Whitehead's premise is that, if mentality is to happen at all, the grounds for mentality should be present in the most fundamental units of analysis. The same fundamental units must also be explanatory of extent and temporality. Whitehead's solution is to say each actual entity constructs both mental and physical characteristics

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[7] Anderson Weekes's *The Mind–Body Problem and Whitehead's Non-Reductive Monism* (2012) provides a useful discussion of Whitehead's metaphysics in relation to philosophies of mind and mind-body dualism.

of the world. An actual entity develops conformal (physical) prehensions in its initial phases of concrescence, and spontaneous (conceptual) prehensions in later phases of concrescence. Much the same way that weft and warp together make a piece of fabric, both poles of an entity are necessary. As Crownfield puts it, 'It is not rationalism versus empiricism, but rationalism and empiricism, distinct but inseparable.' (Crownfield 1977, 382).

The physical pole is initially conformal to the actual 'physical' data felt from the past. However, this physical data contains a diversity of possibilities, some compatible, some incompatible. The mental pole experiences these potential relevant alternatives and 'decides' on a novel and, in some cases, non-conformal configuration. In the philosophy of organism, such decisive activity occurs in all entities, from a stone to a fleck of human consciousness.

To give an example, an electron, as an actual occasion, experiences physical feelings of other actual entities (e.g. of the entity providing its charge, of the entity providing it a social existence in an atom, etc). These precede its mental feelings (of potential energy levels it may jump to). The occasion concludes with the entity's decision: jump! The entity then perishes, and through perishing it satisfies what in the ledgers of physics will be recorded as a transition from one quantum shell to another. Only in the next cycle of actual entities will the corresponding electronic entity, as superject, be felt differently.

An actual entity participating in human consciousness carries out a much more elaborate and intensive series of phases of conceptual concrescence, but the difference is one of degree and intensity, not of type. The different categories and phases of concrescence, described in detail in *Process and Reality,* are a plea to see human consciousness and judgement as rare components of experience, coextensive with other kinds of experience. Whitehead writes that 'consciousness presupposes experience, and not experience consciousness' (*PR* 53). He adds:

Consciousness flickers; and even at its brightest, there is a small focal region of clear illumination, and a large penumbral region of experience which tells of intense experience in dim apprehension. The simplicity of clear consciousness is no measure of the complexity of complete experience. Also this character of our experience suggests that consciousness is the crown of experience, only occasionally attained, not its necessary base (PR 267).

For Whitehead, the ancient philosophical preoccupation with human consciousness ignores that conscious experience is frequently eclipsed by 'aesthetic delight' (*PR* 184). We turn to the theme of aesthetics in the next section.

Aesthetics

One way to understand Whitehead's discussion of mental and physical poles is through the role he gives to aesthetic feeling. In this section, I briefly outline Whitehead's approach to aesthetics.

We start to see this introduced in the following passage, in which Whitehead claims to pursue a philosophy that inserts 'feeling' in the place where Kant places reason[8]:

The philosophy of organism aspires to construct a critique of pure feeling, in the philosophical position in which Kant put his Critique of Pure Reason. This should also supersede the remaining Critiques required in the Kantian philosophy. Thus in the organic philosophy Kant's 'Transcendental Aesthetic' becomes a distorted fragment of what should have been his main topic. The datum includes its own interconnections, and the first stage of the process of feeling is the reception into the responsive conformity of feeling whereby the datum, which is mere potentiality, becomes the individualized basis for a complex unity of realization. (PR 113)

Recalling our previous discussion of actual entities and prehensions, we can begin to make some sense of Whitehead's statement above. Whitehead proposes to ground his philosophy on an analysis of prehensions ('feelings') rather than human reason. He signals that Kant's doctrine in the 'Transcendental Aesthetic'—in which Kant proposes that space and time are synthesized by the subject—is a 'main topic,' since, for Whitehead, time and space do not exist as pre-givens but are formed through acts of constructive functioning. Whitehead then reiterates some of the core features of his metaphysics: actual entities include their own interconnections—their internally related prehensions. Experience is a process that moves from responsive conformity, to the realization of potentials for individuation included within conformity, to the satisfaction of the actual entity as a complex unity.

An upshot of such an arrangement is that aesthetics is not installed only as a high-grade or human achievement. Instead, for Whitehead, 'aesthetics' arises at the base of

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[8] Whitehead's claim that his philosophy is an 'inversion' of Kant (*PR* 88) or that he inserts feeling in the place of Kant's reason is hard to evaluate. What precisely Whitehead means by this and whether his assertion reflects a fair interpretation of Kant is a matter of some debate (see Lucas 1989, 77–92).

scheme, in the initial physical 'feeling' phases of concrescence, prior to all other experience of an actual entity as a subject. That is, aesthetics is something all actual entities experience, from starlight to periwinkles to humans. In each actual entity's concrescence, Whitehead writes, 'the first phase is the phase of pure reception of the actual world in its guise of objective datum for aesthetic synthesis ... The second stage is governed by the private ideal, gradually shaped in the process itself; whereby the many feelings, derivatively felt as alien, are transformed into a unity of aesthetic appreciation immediately felt as private' (*PR* 212).

Aesthetics here refers not to aesthetic judgement but instead to a kind of low-level early stage of concrescent 'synthesis' and 'appreciation' through which the 'alien' feelings of other actual entities are transformed and appropriated to become that actual entity's immediate sense of the world.

Aesthetics within this scheme is a quotidian occurrence within all things, but this does not imply that it is mundane. Aesthetics is the evaluation of the 'antecedent settled world' (*PR* 65) as the grounding on which higher grades of experience are possible at all. 'The metaphysical doctrine, here expounded, finds the foundations of the world in aesthetic experience ... All order is therefore aesthetic order' (*RM* 105).

Key to understanding Whitehead's proposals of aesthetic harmony and order are his notions of actuality and potentiality.[9] Similarly to his division of actual entities into two poles, a physical pole and a mental pole, Whitehead describes the cosmos as divided between actuality and potentiality. For any concrescing actual entity, the actual world consists of the atomised settled 'facts' of the past, i.e., superjective objectifications of other actual entities. In these past actual entities are embedded a diversity of potential worlds that may exist in the future. The carriers of this potential diversity are what Whitehead calls 'eternal objects.' Eternal objects are what all actual entities of the past, present, and future have in common. In other words, eternal objects are the 'universals,' 'possibilities,' or 'potencies' in Whitehead's scheme. However, eternal objects 'tell no tales' (*PR* 256) by themselves. An eternal object is a 'pure potential,' a capacity that can be actualised in an infinity of different modes. It is only when an eternal object becomes embedded through 'ingression' into an actual entity that it 'participates' in the actual entity, taking on *one* determinate mode of ingression. Ingression locks down or makes

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[9] Steven Shaviro usefully charts correspondences between Whitehead's distinction of actual and potential and Deleuze's notions of real and virtual (Shaviro 2012, 36). Shaviro also extensively discusses Whitehead's aesthetics, especially in comparison with Kantian aesthetics (Shaviro 2012, passim).

an eternal object stand in a single determinate mode. *How* eternal objects ingress into an actual entity is what gives the actual entity its particular character. An eternal object has the status of a pure potential *any* in the future and of a definite determinate *one* in its ingression in an actual entity in the past.

To give an example, if we think of binary, we may think of '0' and '1,' or perhaps zero or one, or a switch that is either up or down, or a circuit that is charged or discharged. Something connects all these different occasions and allows us to say that in each case we are discussing an arrangement that has the conditions necessary for binary on or off (or yes and no, true and false, black or white…). It is this aloof yet recognizable definiteness that is the quality of what Whitehead calls an 'eternal object.' In each case, we are dealing with the same constellation of eternal objects, manifested in different modes.

Whitehead's eternal objects have shades of Platonic forms.[10] However, Whitehead does not propose that eternal objects exist in their own ideal realm. According to his ontological principle, 'there is nothing which floats into the world from nowhere' (*PR* 244). Everything that is real is part of some actual entity. This means that eternal objects too must exist as part of an actual entity. Whitehead here performs some remarkably deft bookkeeping, erecting an actual entity, God, in whose mind exist the eternal objects. If eternal objects are prehended by God, and God is an actual entity, this retains consistency and preserves the ontological principle without breaking Whitehead's monism. An advantage of this scheme is that Whitehead then has an actual entity on which to pin wider issues in his cosmology. Whitehead's God is the first 'primordial' actual entity, prehended by all other entities, and forever concrescent—an entity whose concrescence is 'the beginning and the end' of our present cosmic epoch (*PR* 344). Whitehead's God, in other words, is a philosophically and technically necessary actual entity, not the God of religion, although this point has been contested. Some process scholars seek to expunge Whitehead's 'God' entirely, without fully considering how this entity is important for Whitehead's account of possibility. Others, such as Charles Hartshorne and members of the 'Claremont School' have stressed the theological traits of Whitehead's God.[11]

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[10] One difference between eternal objects and Platonic forms is that eternal objects are relational entities: They have complex prehensions of other eternal objects, hence my evocation of a 'constellation' of eternal objects here. This term is introduced by Auxier and Herstein (2017, 146).

[11] See the discussion by Auxier and Herstein, who seek to recover a more secular and philosophical interpretation of Whitehead's God (2017, 240-296).

Whitehead defines an eternal object as 'an entity whose *conceptual* recognition does not involve a necessary reference to any definite actual entities of the temporal world' (*PR* 220, emphasis added). Here we can start to see the importance of eternal objects in Whitehead's mental/physical distinction. Physical prehensions operate at the level of what is *actual*, i.e., the settled actual entities of the past. Conceptual prehensions operate at the level of eternal objects discovered in the actual entities of the past. The shift from physical to mental activity therefore corresponds to a shift from actual entities to the eternal objects ingressed in those entities, and their *potential* for entertaining alternative modes of ingression in the current actual entity. The physical world provides a grounding actuality which selects and orders the possibilities that can be entertained in the mental pole of the actual entity, in its 'creative' production of a novel configuration. The potential world is the world of anticipation, of possible future worlds. For Whitehead, aesthetics is central to the discovery of potential novelty in the future.

Whitehead makes this arrangement more explicit by dividing the mental pole into two phases, 'aesthetic supplement' and 'intellectual supplement':

In the aesthetic supplement there is an emotional appreciation of the contrasts and rhythms inherent in the unification of the objective content in the concrescence of one actual occasion. (PR 213)

Put in less technical terms, aesthetic supplement is the phase of an actual entity's existence where mental operations begin. There is an 'influx' of conceptual prehensions, whose purpose is to reveal relevant ordered patterns of 'contrasts' and 'rhythms' in the objectified actual entities of the settled world, combinations that *may* achieve inhibitions or intensifications of prehension. This is the phase that Whitehead calls 'blind feeling' (*PR* 213). It is blind in that this phase is concerned with open-ended discovery of potential 'indetermination' latent within the actual world.

In the 'intellectual' supplement, the indetermination of aesthetic supplement becomes integrated and resolved, as the actual entity selects one mode or another to become a single, decisive, determinate unity. How an actual entity does this depends on the actual entity's 'subjective form,' which shapes the kinds of phases of physical and mental prehension the actual entity uses.

We need to be careful when saying that the aesthetic phase is where mental activity begins and this is followed by an intellectual phase. Whitehead rejects 'a priori' or 'a

posteriori' sequencing of concrescent activity, arguing that concrescent phases take place in a nonlinear fashion in which physical and conceptual prehensions in sub-phases of concrescence 'interfere with each other by intensification or inhibition' (*PR* 213). Aesthetic and intellectual supplementation *together* traverse from the field of might-be's to arrive at the terminal outcome. As Auxier and Herstein note, the narrative structure of the discussion of concrescence in *Process and Reality* 'requires that it be read more in the way of *Finnegans Wake*—especially since the holistic character of the theory of prehensions means that the "end of the story" brings us back to the "beginning of the story" and is already presupposed in it' (Auxier and Herstein 2017, 60). Thus, while Whitehead argues that each actual entity 'receives' the world and then 'responds' to the world, at the same time he argues that an actual entity has a 'subjective aim' from the outset, which is modified over the course of concrescence. There is no easy way to untangle this. There are helpful ways we can understand Whitehead's proposal. In the next section I explore this by developing a notion of 'maculate' conception.

Maculate Conception

In this section, I propose to discuss Whitehead's approach to aesthetics and mental concrescence using the terms 'maculate' and 'immaculate.' These are not terms Whitehead uses; I introduce them here to begin to frame a way to understand concrescence at a higher level. I also use these notions to start to steer our overview of Whitehead back towards thinking about peripheral digital activity, as will become clearer by the end of the section.

For Whitehead, nothing comes into the world from nowhere: There is no 'immaculate conception' of actual entities. Another way of saying this is that each actual entity is 'maculate,' or entangled with the physical facts of the world. The 'mental' phase of experience starts from a collection of past actualities that massively condition the possibilities for any given occasion—this is the first and maculate part: the world is stubbornly conformist. However, it isn't right to say it is *only maculate*. Mental conception involves giving birth to a piece of novelty in the world. It must have the potential to transcend existing concrete actuality. A mental experience may be truly novel, i.e., it is *potentially* immaculate. However, the experience we have of an actual entity's conception is given to us after the actual entity has perished, as a new fact in

the world, as superject. This means we experience conceptual novelty transported to us after the act, and in physical form. What is given to us in conception is the satisfaction of its having occurred. In other words, the mental activity of an actual entity is experienced aesthetically by other entities, maculately again. The mental phases of concrescence have a phantomlike aspect. By the time we know it has happened, we are already dealing with it as a past actuality that now includes a phantomlike thing that occurred a moment ago and changed whatever plans we had for dinner. The consequences of the novelty of experience are felt, after the fact, as the entity perishes, and maculately again.

In this way, at each moment, mental activity and physical activity weave into each other, as with the analogy of warp and weft. For Whitehead, there is no neat antinomy of an 'aesthetic dimension,' no clean separation of thinking from the world that is thought, no separable ideal realm.

This becomes more apparent if we shift from the analogy of maculate/immaculate (spot/spotless) to the related term 'macula.' The macula is the spot in the eye through which we achieve high-resolution colour vision. Through the varying distribution of cones in the central fovea, falling off to the periphery, the macula facilitates the organization of visual sensation. High-acuity vision is a function of both the central and the peripheral regions of the macula together. The macula is not two isolated things, an in-focus acuity and an out-of-focus periphery, separate and apart from each other. Rather, the retina as a whole produces the contrast through which the complex field of entities is separated into varieties of focused and unfocused. Through the macula, the focused acuity and the out-of-focus periphery mutually produce each other. The macula is a composite element that functions to segregate entities according to certain parameters.

This comes closer to capturing the relation between the endless potential of the mental pole and the aesthetic conditioning of the physical pole. It is not that origination belongs to one and material realization to the other; both together create the novelty of experience in which an acuity is detected and a response is taken.

However, we have missed a crucial aspect. The macula isn't simply a part of the retina. When Whitehead mentions the eye, he is quick to bring into discussion the head, hands, body, even the place one stands to get a good view, the sources of photons providing illumination, and the entities whose role it is to deflect those photons. The

macula of the eye is a complex 'corpuscular society,' itself composed of a number of subordinate societies cooperating with other body parts and organs. For Whitehead, a 'society' is any collection of actual entities that share a defining characteristic in a way that is self-sustaining (*PR* 137). Corpuscular societies are part of the context presupposed in the organization of a macula to detect an acuity. The macula depends on these other societies for its function. It is an 'active' system, achieving its operation only by collaborating with the muscles of the eye and the body to shift the point of focus dynamically, to elicit relevant high-acuity attention to different items. We cannot divorce the macula from its embodiment. We should not ignore other characteristics of eyes as embodied organs: eye-strain, alcohol-induced visions, moments of blurry vision, tears, the pain induced by a bright source of light, the phenomenon of blindsight—all at least sometimes modify operations of the macula. Each impact how the eye transmits and supplements what is felt by the antecedent part. While the macula of the eye is dominated by its role in vision, nonetheless, we know that we see *with* the eye (*PR* 81, 118). The optic nerve, the neurons of the cortex and other parts of the brain each transform and supplement. It is a mode of *withness* that ensures each part of the body leaves its mark, however vague that may be in the final conscious experience:

The various actual entities, which compose the body, are so coordinated that the experiences of any part of the body are transmitted to one or more central occasions to be inherited with enhancements accruing upon the way, or finally added by reason of the final integration. The enduring personality is the historic route of living occasions which are severally dominant in the body at successive instants. The human body is thus achieving on a scale of concentrated efficiency a type of social organization, which with every gradation of efficiency constitutes the orderliness whereby a cosmic epoch shelters in itself intensity of satisfaction. (PR 119)

Cognitive scientists investigate the macula, researching ways to develop computational models of vision based on logarithmic sensor arrays.[12] While such cognitivist theories have merit, they treat the macula abstractly as a mechanism of computational efficiency. This ignores the withness of the body, the way the macula is a part of an historically situated activity, so that high-acuity vision is one aspect of an

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[12] Foveal or 'log-polar' representations of mammalian vision have been studied extensively in computational vision and robotics since the late 1970's. For a survey of research, see Traver and Bernardino 2010. The research notes the optimization and efficiency trade-offs made possible by 'log-polar' representations.

advanced achievement of a 'social' organisation that is embodied and environmentally enmeshed.

Whitehead's theorization of actual entities and their organisation into larger 'social' organisms repeatedly emphasizes the ecological importance of the surrounding context in the achievement of any one actual entity. Whitehead is, above all, a thinker who stresses the importance of peripheral activity in any individual's activity. For example, consider how Whitehead positions consciousness in *Process and Reality*:

Each actual occasion contributes to the circumstances of its origin additional formative elements deepening its own peculiar individuality. Consciousness is only the last and greatest of such elements by which the selective character of the individual obscures the external totality from which it originates and which it embodies. An actual individual, of such higher grade, has truck with the totality of things by reason of its sheer actuality; but it has attained its individual depth of being by a selective emphasis limited to its own purposes. The task of philosophy is to recover the totality obscured by the selection. (PR 15)

Consciousness, here, is a high achievement, but it is simultaneously an achievement won by masking the peripheral 'circumstances' (literally that which encircles and stands around) through which selective emphasis and purpose are made possible. Whitehead wishes to undo the 'excess of subjectivity' (PR 15) so as to recover these obscured circumstances.

This is neatly summarised by Judith Jones, in her book *Intensity: An Essay in Whiteheadian Ontology.* The book starts, 'Whitehead's metaphysics could be described as an account of how the "greater world without" an entity "steals in" upon it.' (Jones 1998, 3). Jones's larger project examines Whitehead's metaphysics especially in regard to the higher phases of intellectual activity associated with human experience. Her aim is to understand the agentive relations of Whitehead's metaphysics in more nuanced ways, unpacking how and to what extent one agency contributes to the becoming and valuing of another. She insists that 'the "accidents" or "tricks" of an actuality's insinuation in another remains a real and passional element in the satisfaction of that other entity' (Jones 1998, 3). Her use of the word 'passional' recalls for us Whitehead's technical use of the word 'feeling' for prehension. But it is also laying the groundwork for her to argue, emphatically and poetically, that 'we have no language in which to express a concept of individuation that is not a way of specifying a discrete being … that

is incapable of location in other such individuals.' (ibid., 209). Her work, then, seeks ways of expressing a sense of an individual whose existence is conditioned by a mutual togetherness with other individuals.

Jones's mention of the issue of individuation and the divide between one individual and other individuals returns us full circle to the discussion of the bifurcation of nature with which we began this chapter. The motivation for Whitehead's argument that we must 'recover' the circumstances surrounding individual activity is precisely his drive to overcome the bifurcation of nature. In other words, actual entities, prehensions, concrescence, mental and physical poles, potentiality, and actuality are the metaphysical mechanisms Whitehead proposes in order to properly relate the one and the many without presupposing an impassable barriers.

In this thesis, in Chapters 1 and 2, I began outlining a 'decision procedure' as an event within art. I proposed that this notion was an analogy for thinking about the outcome of what Whitehead calls a 'society of actual occasions' (*PR* 205). In our discussion of actual entities within this chapter, we have started to understand in a little more detail the kind of 'mattering' that takes place within a decision procedure. What I called the choreographing of a decision procedure is understood here as the result of myriad actual entities that are becoming together, conformally and non-conformally. I have pointed out why this arrangement emphasizes the importance of peripheral activity in the becoming of any one actual entity and linked this to Whitehead's critique of the bifurcation of nature.

I here want to repeat Jones's assertion that 'we have no language in which to express a concept of individuation that is not a way of specifying a *discrete* being.' (1998, 209, emphasis added). Jones's use of the word 'discrete' points to where we must turn next. Software systems model the world precisely in terms of discrete binary logics of either 0 or 1. Recall that our research question considers art that takes place in some relation to the digital, in order to locate appropriate strategies and practices in contemporary art to critically investigate and reconfigure the effects of peripheral digital activity. We must therefore consider how such discrete operations might be imbricated within a decision procedure of art. In short, we must pursue a Whitehead-centred theory of the digital. This is the topic of the next chapter.

4. Digital Entities

I began by asking what are appropriate strategies in contemporary art to critically investigate and reconfigure the peripheral digital activity. This question led to an investigation of Whitehead and his philosophy of organism as a theoretical framework (Chapter 1). I proposed that art can be thought of as a kind of decision procedure, which I situated as an analogy for what Whitehead calls an actual entity (Chapter 2). I then discussed the 'mattering' of the decision procedure in terms of processual actual entities (Chapter 3).

In this chapter, I turn to the digital. The question for us now is: How do we understand the digital in relation to Whitehead's notions of the spawning activity of actual entities? What kind of mattering takes place with the digital? In this chapter, I describe a notion of general function and a notion of digital function and explain how, in a decision procedure of art, the digital arises as a situated ordering and patterning of general function. Then, in the next chapter, we turn to contemporary art to locate this notion of situated ordering as a way of developing decision procedures which may promote or critique peripheral digital awareness.

Whitehead and the Digital

I believe Whitehead is relevant in discussions of digital technologies for two primary reasons: (i) his work on *Principia Mathematica* and related mathematical research and (ii) the functional processual paradigm of his philosophy of organism. I introduce these two topics below.

Whitehead collaborated with Bertrand Russell on Volumes I–III of *Principia Mathematica* (*PM*) for ten years. It was a painstaking effort, requiring pages of dense logic written using a notation Whitehead had co-invented with Russell that is now obsolete.

$$*73\cdot8. \quad \vdash: \mathrm{C}'R \subset \beta . \beta \subset \mathrm{D}'R . \kappa = \hat{\alpha}(\alpha \subset \mathrm{D}'R . \beta - \mathrm{C}'R \subset \alpha . \breve{R}"\alpha \subset \alpha) . \supset .$$
$$\mathrm{D}'R \,\epsilon\, \kappa . p'\kappa \subset \mathrm{D}'R$$

Dem.
$$\vdash . *22\cdot42\cdot43\cdot44 . \quad \supset\vdash: \mathrm{Hp} . \supset . \mathrm{D}'R \subset \mathrm{D}'R . \beta - \mathrm{C}'R \subset \mathrm{D}'R \quad (1)$$
$$\vdash . *22\cdot44 . *37\cdot25 . \supset\vdash: \mathrm{Hp} . \supset . \breve{R}"\mathrm{D}'R \subset \mathrm{D}'R \quad (2)$$
$$\vdash . (1) . (2) . \qquad \supset\vdash: \mathrm{Hp} . \supset . \mathrm{D}'R \,\epsilon\, \kappa \quad (3)$$
$$\vdash . (3) . *40\cdot12 . \qquad \supset\vdash . \mathrm{Prop}$$

$$*73\cdot801. \quad \vdash: \mathrm{Hp} *73\cdot8 . \supset . \beta - \mathrm{C}'R \subset p'\kappa$$
Here "Hp *73·8" means "the hypothesis of *73·8."
Dem.
$$\vdash . *20\cdot33 . \supset\vdash:. \mathrm{Hp} . \supset: \alpha \,\epsilon\, \kappa . \supset_{\alpha} . \beta - \mathrm{C}'R \subset \alpha :. \supset\vdash . \mathrm{Prop}$$

$$*73\cdot802. \quad \vdash: \mathrm{Hp} *73\cdot8 . \supset . \breve{R}"p'\kappa \subset p'\kappa$$
Dem.
$$\vdash . *20\cdot33 . \supset\vdash:. \mathrm{Hp} . \supset: \alpha \,\epsilon\, \kappa . \supset_{\alpha} . \breve{R}"\alpha \subset \alpha \quad (1)$$
$$\vdash . (1) . *40\cdot81 . \supset\vdash . \mathrm{Prop}$$

$$*73\cdot81. \quad \vdash: \mathrm{Hp} *73\cdot8 . \supset . p'\kappa \,\epsilon\, \kappa$$
Dem.
$$\vdash . *73\cdot8\cdot801\cdot802 . \supset\vdash: \mathrm{Hp} . \supset . p'\kappa \subset \mathrm{D}'R . \beta - \mathrm{C}'R \subset p'\kappa . \breve{R}"p'\kappa \subset p'\kappa : \supset\vdash . \mathrm{Prop}$$

$$*73\cdot811. \quad \vdash: \mathrm{Hp} *73\cdot8 . \supset . \breve{R}"p'\kappa \subset p'\kappa - (\beta - \mathrm{C}'R)$$
Dem.
$$\vdash . *37\cdot16 . \supset\vdash . \breve{R}"p'\kappa \subset \mathrm{C}'R$$
$$[*22\cdot8] \qquad \subset - (- \mathrm{C}'R)$$
$$[*22\cdot81\cdot43] \qquad \subset - (\beta - \mathrm{C}'R) \quad (1)$$
$$\vdash . (1) . *73\cdot802 . \supset\vdash . \mathrm{Prop}$$

Excerpt showing the logic notation used by Alfred Whitehead and
Bertrand Russell in *Principia Mathematica*, Volume I, 1910.

The scope of *PM* was immense. Russell and Whitehead sought to realize the goal of logicism: to show that all the formal languages of mathematics could be united in expressions within a single notational formalism, logic. They failed in this goal.[13] Nevertheless, they succeeded in launching the field of logical formalism by grafting ancient Greek logic, formerly a branch of Classics, onto modern mathematics.

In *PM*, Russell and Whitehead develop type theory, with a hierarchy of functional and non-functional types. Type theory remains a theoretical cornerstone in today's programming languages. In a very direct way, Whitehead and Russell, through their work on *PM*, became foundational figures in computer science. Whitehead's mathematical research and his mereotopology continues to contribute to computer

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[13] Kurt Gödel famously submitted a formal proof, in 1931, that logic systems such as those used in PM can either be consistent or complete but not complete and consistent. Whitehead acknowledges Gödel's proof in 1938, writing, 'Today, even Logic itself is struggling with the discovery embodied in a formal proof, that every finite set of premises must indicate notions which are excluded from its direct purview' (*MT* 2). He adds that philosophy 'should never start from systematization,' an idea he credits to William James, who 'discovered intuitively the great truth with which modern logic is now wrestling' (*MT* 3). In my view, Whitehead intuited the shortcomings of logical formalisms early on.

science research (for one survey, see Henry 1993) and, more recently, to robotic and computer vision research (Auxier and Herstein 2017, 51–52).

By the start of World War I, Whitehead was working on Volume IV of Principia Mathematica on geometry. Whereas Russell had been the instigator and the most active contributor to earlier volumes, Volume IV was to be Whitehead's own (Lowe 1990, 12–13). However, he abandoned this effort. His drafts have been lost or destroyed. His theory of geometry would emerge much later and in a less formal presentation, in his elaboration of the coordinate division of the extensive continuum in Part IV of *Process and Reality*.

A factor in Whitehead's decision to abandon *PM* was the upheaval taking place in theoretical physics at the time. As Whitehead says, 'By the turn of the century, nothing, absolutely nothing was left that had not been challenged, if not shaken. This I consider to have been one of the supreme facts of my experience' (quoted in Crownfield 1977, 376). Through a series of empirical experiments from 1890 onwards, classical models of physics were proven wrong. Einstein published his special theory of relativity (STR) in 1905, and the Bohr model of the atom was published in 1913. Whitehead's earliest mathematical contributions concerned Maxwell's theories of electricity and magnetism, and he contributed to both the reception and mathematical criticism of Einstein's relativity.[14] After World War I, Whitehead devoted himself to the development of the philosophy of organism, elucidating what the new branches of mathematical logic and physics implied philosophically.

In this philosophy, Whitehead anticipates many of today's software procedural technologies and idioms. It is here that we find a second connection to the digital. In order to make this case, in what follows I focus on an interpretation of Whitehead's philosophy that draws on the notion of the function. Most discussions of Whitehead's philosophy of organism use his own neologisms and terms, including concrescence, prehension, ingression, and eternal objects. In the next section, I aim to highlight Whitehead's closeness to theories of function. I first motivate this approach through a discussion of programming culture and then outline function theory in relation to Whitehead's project. In the concluding section of the chapter, I discuss digital function and general function in terms of what I call the bifurcation of the digital.

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[14] Whitehead wrote a critique of Einstein's non-Euclidean geometry and proposed an alternative non-metrical mathematics (Whitehead 1922). Ronald Desmet traces Whitehead's involvement in relativity theory (Desmet and Weber 2010).

Functional and Object-Oriented Programming

Within today's programming culture, there is a distinction between 'object-oriented' programming languages (OOP) and functional programming languages (FP).

In the 1990s, object-oriented programming languages such as Java became the dominant way of building large software projects. Such languages promote the idea that software entities should be modelled as classes of 'objects,' with properties that are modified in response to messages. For instance, a meeting object might have properties such as time, date, location, and attendees. It could respond to messages such as cancel or reschedule.

In the past decade, there has been a marked increase in the use of another programming paradigm called functional programming.[15] Functional programming is an approach to programming language design first explored in early AI languages such as Lisp in the 1950s and today championed by languages such as Haskel, Scala, and Clojure. In functional languages, programming sequences are organized less in terms of objects responding to events and more as compositional chains of functional units. Note that differences between programming languages are primarily pragmatic, since, according to a widely accepted conjecture known as the Church-Turing thesis (Church 1936), all programming languages are theoretically capable of solving the same computational problems. Task-based functional approaches have become important because they offer practical advantages in software systems that are distributed across multiple computers updated on a continuous basis—a scenario encountered in large internet companies and in finance. Today, teams developing large systems often adopt hybrid 'mixed paradigm' approaches combining functional programming strategies with object-oriented programming strategies, as found, for example in Facebook's React framework (Hunt et al. 2016). Functional programming in such software occurs as an idiom or an outlook, a way of approaching the problem space.

In functional systems that I am familiar with through my work as a software consultant in finance, the software is organised as myriad diverse, short-lived parallel

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[15] Functional programming languages were once considered niche and academic. Today they are increasingly being used in commercial development, as discussed in N. Ford 2014 and Warburton 2016. This is evidenced in studies of language rankings, e.g. by RedMonk and PYPL, as well in listings on job-search websites such as Indeed.com, Dice, and Monster.

tasks that continually feed forward data to the next round. Such systems execute tasks on massive 'compute clouds' containing thousands or tens of thousands of processors. Each task computes its results independently and, on completion, publishes data to a large shared storage structure, before terminating, or 'dying.' Since storage has become relatively cheap, storage structures are increasingly append-only. Data changes are appended to the end of tables with a timestamp, so that prior data is never lost or erased. In such systems, a 'message' does not modify an 'object.' Instead of permanent objects with a mutable state, the model consists of transient functions that exist for a short while, yielding data that continually accumulates. The data for a given timepoint is generated through a composition of multiple contemporaneous transient tasks computing in parallel. While some tasks are straightforward, others can take many hours to complete. Tasks may also be subject to modifications and corrections (e.g., to test a new market idea, or if a programmer notices an error, or when a user enters an amendment). Throughout the day, previous calculations may become out of date, requiring 'recalculating,' redoing prior computations and appending additional rows to the store to integrate the changed data. To perform recalculating consistently, data is modelled 'bi-temporally,' that is, instead of simply storing quantities of a value, the data is stored in a longhand form, such as 'the quantity of A for 11/05 8:15, as known at 11/05 9:15 on agent B.' To manage this process efficiently, rich 'dependency graphs' are maintained, keeping track of which entities feed into other entities to minimise wasted computation.

Functional programmers who have worked on such systems will read Whitehead's *Process and Reality* and experience moments of uncanny recognition and déjà vu. Functional data-flow idioms, developed largely independently of Whitehead's philosophy, have numerous overlaps with the abstractions Whitehead developed in the 1920s, which I introduced in the previous chapter. Software models in which rounds of transient tasks compute contemporaneously, separately, and by accumulating data in a shared store echo features of Whitehead's description of concrescent process; function arguments seem to have bearing on what Whitehead calls ingression; Whitehead's notion of 'propositions' as hybrid entities brings to mind what in functional programming is termed 'partial application'; append-only stores have parallels with Whitehead's notions of objectification as a continual accumulation of facts; bi-temporalism is something Whitehead addresses more generally in terms of

perspectivism; the software 'promise' pattern is structurally similar to what Whitehead calls a 'lure'; dependency graphs share similarities with what Whitehead describes as a 'penumbral welter' of prehensions. These are patterns of similarity only and not conceptual identifications. But the sheer number of such patterns of similarity is noteworthy. The inventor of the Clojure functional programming language, Rich Hickey, affirms this observation:

I am not a proponent of the philosophy or metaphysics of Whitehead and could hardly claim to understand it all. I was putting together a keynote for the JVM language summit and striving to find [programming] language-independent core ideas in the Clojure work. I was reminded of some Whitehead I had studied in college, so opened up a few of his books. Sure enough, he was all over some of the themes of my talk—time, process, immutability, etc. He is quite quotable, so I made him the 'hero' of the talk. But Whitehead was not an inspiration for Clojure—any connections were a serendipitous discovery after the fact. That said, the number of connections was startling. (Hickey and Fogus 2011)

Whitehead's anticipation of functional software patterns used in today's temporally driven systems is remarkable but not coincidental.[16] Whitehead's collaboration with Russell was influenced by Gottlob Frege's pioneering work on functions, together with Giuseppe Peano's logical axioms and notation. These elements later became a common thread in Alonzo Church's development of lambda calculus in the 1930s, a precursor of today's functional languages (Cardone and Hindley 2006). Whitehead's philosophy was born in part from a study of the function, and function theory has remained central in computer science.

What is a function? Consider the function $(x, y) \rightarrow 2x^2 + y$. As a mathematical entity, such a function takes a collection of inputs (in this case x and y) and has a body ('$2x^2 + y$'). The function body determines how those inputs are combined in order to obtain the function's output. A mathematical constraint for well-behaved functions is that a given pattern of inputs always produces the same result, leading to a conception of a function as a many-to-one mapping. This can be represented as an infinite set. The function above, for example, can be represented as a set of tuples $<x, y, z>$ where x and

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[16] Auxier and Herstein also make this observation, arguing that a key connection between Whitehead and computer science is a shared emphasis on empirical modelling, found, for example, in areas such as computer vision: 'Computer science has trumped even our best philosophical intentions, and arrived at a radically empirical formulation of space and cognition ahead of almost everyone, other than Whitehead himself ' (2017, 94).

y encode values from the domain of inputs and *z* the codomain of corresponding outputs, generating the set { <1,1,3>, <1,2,4>, <2,1,9>, <2,2,10> … } etc.

This terminology of inputs, outputs, production, and mapping is a processual and set-theoretic way of understanding functions. Such theorisations were not in place when Frege, Russell, and others began elaborating mathematical function theory. They adopted different terms. We see this in two important papers, Frege's *Function and Concept* (Frege 1997 [1891]) and Russell's *On Denoting* (Russell 1905). In his paper, Frege proposes that for a function like $2x + x^2$, there is an 'argument' part (in this case, the sign *x*) together with an 'expression' part ($2x + x^2$). A function exists where there are one or more places where an argument occurs in an expression, serving as a gap, an empty placeholder meant to be filled up with a value. From this view, '+' itself is a function with two placeholders, of the form (a) + (b). Functions are nested inside other functions, leading to a function language. Frege argues that, whereas a numeric value is an object that is 'saturated,' or complete in itself, functions are ontologically incomplete, or 'unsaturated,' since they require supplementation to arrive at a value for the function. Object and function are in this way fundamentally distinct. Frege further distinguishes between what he calls the *Bedeutung* and *Sinn* of a function, which Russell, in *On Denoting*, translates as the 'meaning' of a function and its 'denotation.' For example, the phrase 'the present queen of England' both has a meaning (the female royal person presently sovereign of England) and denotes an individual, Elizabeth. On the other hand, 'The present king of France is bald' is meaningful but does not denote a value, since there is no king of France.

Frege's and Russell's repeated appeals to examples from human language, rather than terse mathematics, are significant. Both held that functions are not simply mathematical entities but philosophical primitives. Frege defines a 'concept' as a unary function that maps its argument to either the True or the False. Such a concept-function determines which values 'fall under' the concept and which do not. Frege further proposes that a language statement can be broken down into its concepts, converted into functional form. In a similar vein, when Russell critiques Frege's distinction between denotation and meaning, his aim is not simply to produce a more logically complete mathematical theory of propositional functions but to open up a theory of knowledge which explains how one thing can denote another, how 'we know the properties of a thing without having acquaintance with the thing itself, and without, consequently,

knowing any single proposition of which the thing itself is a constituent' (Russell 1905, 493). For Russell and Frege, functions are fundamental features within an analytical paradigm of the philosophy of language and cognition.

General Function

As with Russell and Frege, for Whitehead too the function is crucially important. However, Whitehead takes a starkly different approach to the function in his philosophy of organism.

The mind involved in the materialist theory dissolves into a function of

*organism. (*SMW *194)*

In Whitehead's philosophy of organism, function *in general* is the 'ultimate' entity. His notion of the process of becoming of actual entities, which he calls concrescence, involves a many-to-one constructivist mapping activity. Said another way, what Whitehead calls an actual entity can be conceived of as a function. The actual entity's becoming is the constructive act of function application, whose satisfaction is the 'result' of the function. However, the function in this case is not a purely logical one. Whitehead instead substitutes a speculatively generalized notion of a function, or what I will call a 'general function.' [17] A general function departs from the idea of a logical function as a rigorously contained discrete entity. Whitehead achieves this by generalizing the meaning, domain, and codomain of the function. The function meaning is no longer described through terse mathematical notation in which there are explicit gaps or slots but necessitates a richer natural-language exposition. In place of a rigidly specified set of inputs, Whitehead proposes a general function that receives *all* prior activity as its input. Such a multiplicity of input is not representable as a mathematical set, since it is an ever-expanding complex. The general function is what is called in mathematics a 'functional,' a function whose inputs are themselves functions. As well as a multiplicity of input, in Whitehead's general function, many-to-one mapping activity is not fully constrained by an externally specifiable set of rules defining a correlation between input and output. Although rule-based, according to Whitehead, each particular mapping activity is to a degree *causa sui*, self-explanatory and self-determining. This means any externally provided set of tuples of input to output is insufficient to characterize a particular

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[17] See also Auxier and Herstein's discussion of logical function and operation (2017, 165). They draw a distinction between logical function, as an aspect of concrescence, and operation, which is aligned with what Whitehead calls 'transition.'

instance of mapping activity. A general function cannot be 'explained away' by logical theorems, since general function activity at least sometimes yields novel combinations where factors become incorporated that were hitherto not addressed. This leads away from set-based definitions of function towards an algebraic, and speculative 'imaginative generalization' (*PR* 5) of function, whose aim is to describe mapping activity metaphysically at the widest scope.

I am drawing here on a reading of Whitehead by James Bradley entitled *The Speculative Generalization of the Function: A Key to Whitehead* (Bradley 2002). Bradley asserts that a 'hitherto unrecognized significance of Alfred North Whitehead resides in the fact that he fuses together a speculative philosophy of activity and logical analysis by drastically reinterpreting the nature of the mathematical function and redefining the self-explanatory in terms of the applicability or descriptive adequacy of his functional analysis to the nature of things' (Bradley 2002).

Bradley bases his reading on Whitehead's own discussion of his algebraic method and real variables in Whitehead's final publication of essays (ESP 97–113, 127–131; also Mays 2014, 94). He substitutes Whitehead's neologisms with mathematical terms such as 'function,' 'domain,' and 'codomain,' aligning the concept of general function with that of activity as constructive mapping:

[Whitehead's] claim is that the generalized concept of mapping, as the mapping of order, is distinguishable from any specific order, for it is the process whereby order is generated. Mapping is not any set of ordered pairs [input to output], but the concept of the ordination of order, of the ordering of pairs into sets. It is not any specific relation or rule, but the concept of the configuration of any specific relation or rule. It is not any specific difference or form, but the concept of the differentiation of difference, the formation of forms. In consequence, as the very term suggests, the concept of mapping in general is the concept of an activity. (Bradley 2002, 4)

In short, Whitehead is seeking to understand the grounds in which logical function can take place, without proposing that those grounds are reducible to logical function. Whitehead is conducting 'a meta-functional analysis of the nature and conditions of any function at all' (Bradley 2002, 2).

In my view, Bradley correctly asserts the importance of the link between the development of Whitehead's mathematics and his metaphysics. However, Bradley's paper is far from a complete treatment. A major contribution of Auxier and Herstein's

interpretation of Whitehead is that they elaborate the algebraic features of his work more thoroughly. Not only do they explore the mathematical underpinnings of Whitehead's philosophy across a spectrum of his metaphysics, they explain, in much greater depth, *how* Whitehead fuses a speculative philosophy of the 'whole' with a logical analysis of individual parts.

In my view, what is significant about the concept of general function discussed here is that, by framing Whitehead's actual entities using the analogy of general function, we can more clearly see how the logical function of digital technologies fits within his philosophical scheme. I expand on this further in the next section.

Digital Function and General Function

We have discussed two notions of function: a formal notion of function, found in mathematics, and Whitehead's metaphysically generalized conception of general function.

Digital technologies are programmed in software using formal logical notations that are restricted to the domain of mathematical problems that are 'computable' (Turing 1936). These logical specifications of 'digital function' are abstract specifications. When these specifications of digital function are loaded onto a digital device, the 'mattering' of digital technologies is activated. In this respect, as Whitehead might have put it, the software logical formalisms of digital function are 'construed in terms of habit of thought which find their justification in the theory of a fixed environment' (*SMW* 112). That is, digital function presupposes a well-defined ordering and sequencing of operations of discrete algorithmic software entities (the binary values, variables, conditionals, sequences, and other structures of software) whose mechanics are understood to be fixed in advance. Digital function is a mathematical projection of a discrete model onto a situation that is not itself discrete and discontinuous. In digital circuitry, as Auxier and Herstein point out, 'we know that some energy moves between and through an incomplete circuit, but we discount that energy because it's "nothing" compared to what happens when a circuit is complete. In fact*, if the circuit were not at least potentially completable, there would be no point in describing it at all*.' (2017, 45, emphasis mine). In other words, logical digital function is an idealised discretization of a more complex empirical situation, one that is put to work for certain purposes. We can

frame this by paraphrasing Whitehead, taking one of his comments on consciousness but recasting it to digital function:

*[Digital function is the latest] of such elements by which the selective character of the individual obscures the external totality from which it originates and which it embodies. An actual individual, of such … grade, has truck with the totality of things by reason of its sheer actuality; but it has attained its individual depth of being by a selective emphasis limited to its own purposes. The task of philosophy is to recover the totality obscured by the selection. (*PR *15)*

The point of this comparison is to recall, when discussing digital systems, that when we hear of binary logic and algorithms, these are convenient and incomplete tales we tell to emphasize the consequential 'sheer actuality' of the digital. However, this represents only a narrow and selective aspect, one that affirms the purposes of the digital while obscuring its penumbral totality.

The claim is that digital function is realized through general function, and it is at the level of general function that we begin to see more of the conditions that are obscured in notions of digital function. This is to say that digital function and general function are two different abstractions for understanding the same circumstances, one at a high level of programming sequences and algorithms, the other at a low level of processual mapping activity of swarms of 'actual entities.' To use Whitehead's algrebraic terms, digital function is defined in terms of pure extension, whereas general function includes a combination of extension and intension—intension being any property or mode of composition which is not among those considered in pure logic (*ESP* 316). Whereas digital function is viewed from the perspective of discrete, self-contained entities, digital systems actually operate through general function that is historically situated and conditioned by the outcome of inherited general function activity. This includes contingent intensities of differentiations, contrasts, negations, and exclusions from other agencies that are not reducible to logical assertions. At the level of general function, there is no necessary fixed order to which all things conform. The relations that general functions enter into are not closed, so that, as Bradley puts it, the 'multiple and intrinsically complex routes of inheritance of any occasion of mapping … constitute its genealogical conditions' (Bradley 2002, 8).

In positing digital function as something that takes place through general function (i.e., through the processual activity of actual entities), my assertion is that human activity and digital activity are different modes, orders, and intensities of activity within the same metaphysical ontology. In this view, human-embodied activity and digital activity are interconnected through a dense 'penumbral welter' of connections that is not reducible to an analysis of button clicks or finger swipes within a theory of interaction. Indeed, the very paradigm of interaction is called into question.[18]

This reading of digital function and general function, through Whitehead and Bradley, is essentially similar to Parisi's analysis of metacomputation. However, instead of proposing a new theory of metacomputation, I have transposed the argument to the terms of Whitehead's metaphysics, with the claim that Whitehead's metaphysics (as general function) already generalizes digital function. This is not a critique of Parisi's analysis but an effort to provide an alternative (and less ambitious) companion reading. What interests me about this metaphysical (though not yet metacomputational) interpretation of digital function is that it places digital systems in the same frame as other organisms in Whitehead's scheme. It is when we consider digital function from the perspective of general function that we are more clearly confronted with the issue of the bifurcation of the digital.

The Bifurcation of the Digital

The apparently discrete and self-contained mathematics of digital function lends support to characterizations of the digital as its own world, a 'virtual,' 'immaterial,' or 'dematerialized' 'cyberspace,' cut off from nature. Such characterizations evoke the fantasy of a new bifurcation of nature, one premised on an alternative digital 'real.' In David Berry's words, within such a bifurcation, 'computationality, or some related ontological form, becomes the site of primary qualities or "facts," the site of objectivity, and is foundational, ahistorical, unchanging, and a replacement for nature in modernity …' (Berry 2014, 119). A bifurcation of the digital aligns with two prognoses: dynstopian and utopian. The dystopian prediction is that humans will become lost in a digital realm, like the Matrix, with no way to navigate back to authentic experience for itself. The

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[18] In Whitehead's description, contemporaneous processual entities are independent, they feel past actualities through internal relations, anticipate future potentialities and react. There is no direct interaction between two permanent substances as such. Karen Barad also notes that the concept of 'interaction' presupposes two or more fixed existents. Instead of this model, she proposes the term 'intra-action,' which in some ways is closer to Whitehead's model. For more, see Barad 2007, 139.

utopian view is that the digital realm can merge with the cultural, leading to new forms of activity beyond the limits of a 'natural' human body. In either scenario, our actual embodiments are rendered redundant within an expanding digital horizon.

Nathalie Casemajor, examining such characterizations of the digital in a survey of digital materialism, asks, 'How did the trope of immateriality colonize our imagination to the point where we came to believe computing exists beyond the material world?' (Casemajor 2015). Casemajor identifies a growing body of scholarship since the 1980s that problematizes the notion of a bifurcated digital realm, insisting that digital technologies must be analysed together with their historical and material conditions.

Reading scholars including Jane Bennett (2010), Donna Haraway (2007), Karen Barad (2007), Mark Hansen (2015), and others aligned with what Casemajor calls 'new materialisms,' we began to sense what might be described as a 'buzzing digitalism.' This is an approach to the digital that rejects its bifurcation from other activities and argues that digital processes and networks are thoroughly entangled with human sociotechnical processes.

Although Whitehead was writing before the arrival of digital computers, he anticipates such logic-derived bifurcations, describing them as the outcome of 'erroneous' misconceptions and defective insights rooted in language and literature (*MT* 66). As an example, he points to words and sentences bounded by full stops as suggesting the possibility of entities that are self-contained and disconnected from their environment, promoting 'the understanding of the interconnection of things, each understandable, apart from reference to anything else' (*MT* 66). Whitehead then mentions mathematical types and simple numbers, which have the appearance of being perfectly exact, timeless, and ahistorical truths. However:

*The notion of a sphere of human knowledge characterized by unalloyed truth is the pet delusion of dogmatists, whether they be theologians, scientists, or humanistic scholars. Again, perfection is a notion which haunts human imagination. But its naïve attachment to the realm of forms is entirely without justification. How about the form of mud, and the forms of evil, and other forms of imperfection? (*MT 68–69*)

Whitehead argues that the notion of numbers existing in a perfect vacuum is idiotic (*MT* 69). Instead he suggests that we 'consider the perspectives of the universe for the number three, and for the colour blue, and for any one definite occasion of realized fact' (*MT* 66). The point is that, much as we might be tempted to think that numbers exist

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beyond history, any abstract notion gains its relevance from the concrete entities it relates to, and not the other way around, since without such relations an abstraction is meaningless.

The suggestion here is that Whitehead's critique of the bifurcation of nature can be extended to discussions of the bifurcation of the digital. This in turn means that the techniques he employs to overcome such bifurcations are applicable in discussions of digital function. In the next section, I discuss this issue in broad terms by examining Whitehead's mereology, his approach to whole and part relations. This serves as a preparation for taking up the issue in more specific terms through a discussion of contemporary art in the next chapter.

Mereology

Whitehead's philosophy can be viewed as a repudiation of the mistaken idealism of discrete logic. In Whitehead's view, while logic is an important and relevant instrument, the 'exactness' of logic is a fake (*ESP* 96). In place of fake exactness, as idealised in logical digital function, Whitehead's philosophy aims to leverage mathematics as a study of patterns of relation more generally. One of the ways he does this is to work informally through whole-part relations, or what technically can be described as intuitionistic 'mereology.'

The argument here is that, to properly locate digital peripheral activity as a general *relational* activity, instead of as a bifurcated discrete function, we should think of logic in mereological terms. In the rest of this section, I further unpack this idea.

Auxier and Herstein's new interpretation of Whitehead stresses the importance Whitehead places on his mereology, working between the two extremes of analysis, a coordinate 'whole' at the greatest level of generality, and a 'quantum' unit of explanation at a most concrete level of description. In *Process and Reality*, Whitehead defines the 'whole' as the current cosmic epoch. At the other extreme, the prehension is the smallest and most concrete entity of analysis (Auxier and Herstein 2017, 37). The image of whole-part relations is also present in Whitehead's concept of prehension as an internal relation (ibid., 63). It is a mainstay of Whitehead's meretopological analysis of the division of the extensive continuum into time and space. It is invoked in Whitehead's philosophical categories, such as his category of the ultimate (*PR* 21), in which he asserts that to produce any 'one' individual necessarily presupposes that there

exists a 'many' from which this one can be constituted, just as the notion of a 'many' presupposes a disjunctive plurality of 'ones' that could each potentially be an individual. Whole-part relations are an important feature of Whitehead's 'coordinate' and 'genetic' analysis, briefly mentioned in Chapter 1. There are many other examples in Whitehead's writing where he refuses to parse out conceptual units piecemeal, insisting on the 'interfusion' of the whole as a combination of multiple factors. Consider, for example, how Whitehead responds when asked by Dewey to choose between the 'genetic-functional' description of concrescence in Part III of *Process and Reality* (which we earlier linked to *Finnegan's Wake*) and the more axiomatic mathematical interpretation of the extensive continuum in Part IV:

*John Dewey asks me to decide between the 'genetic-functional' interpretation of first principles and the 'mathematical-formal' interpretation. There is no one from whom one more dislikes to differ, than from Dewey … But I must decline to make this decision. The beauty of philosophy is its many facets. Our present problem is the fusion of the two interpretations. The historic process of the world, which requires the genetic-functional interpretation, also requires for its understanding some insight into those ultimate principles of existence which express the necessary connections within the flux. (*ESP 179)

To grapple with the 'fusing' of multiple interpretations as a mereology, take the following two assertions:

> The world is not logical.
> The world is not illogical.

We can proffer evidence towards either assertion. The world is not logical, since logic provides no explanation of fairies or rubber chickens in baskets or flying spaghetti monsters or nonsense rhymes or poetry or many of the multifarious other things that exist. On the other hand, the world is not illogical, since, if it were, the very statement would be incoherent. Whitehead's mereology calls for us to recognize that these two stanzas do not yield an opposition or sylogism. To put them in opposition is already to presuppose the validity of one stanza against the other, a logical trap. Instead, Whitehead asserts that the whole, such as it is, is able to support the emergence of both logical and illogical experiences: Both must be partial units of analysis within a more complex whole, which is irreducible to either.

We find this style of reasoning deployed when Whitehead argues that logic and aesthetics are more similar than is usually supposed (*MT* 60–63). Recall that, for

Whitehead the physical pole is where aesthetic synthesis takes place, and the mental pole is where reasoning and consciousness arise. Whitehead writes:

*I suggest to you that the analogy between aesthetics and logic is one of the undeveloped topics of philosophy. In the first place, they are both concerned with the enjoyment of a composition, as derived from the interconnections of its factors. There is one whole, arising from the interplay of many details. The importance arises from the vivid grasp of the interdependence of the one and the many. If either side of this antithesis sinks into the background, there is trivialization of experience, logical and aesthetic. The distinction between logic and aesthetics consists in the degree of abstraction involved. Logic concentrates attention upon high abstraction, and aesthetics keeps as close to the concrete as the necessities of finite understanding permit. Thus logic and aesthetics are at the two extremes of the dilemma of the finite mentality in its partial penetration of the infinite. (*MT *61)*

Whitehead here asserts that, whereas aesthetics begins from a whole and proceeds to the appreciation of the many details, logic begins from construing individual details whose combination leads to a synthesized whole. Both involve creating a unity through an interplay of the interconnection of many factors. The difference between logic and aesthetics is not of one in opposition to the other. It is rather the intermixing of degrees and manners of selection and attenuation, in which both logic and aesthetics have a role. This is an example of an application of Whitehead's mereology to identify a whole arising from an interfusion of many interconnected details. He argues that if either side is too dominant—if there is too much emphasis on the whole or to the part—there is a 'trivialization' of experience, in aesthetical or logical experiences.

Auxier and Herstein identify the importance of mereology as a mode of thought underlying Whitehead's approach. Yet their own interpretation is sometimes perhaps not mereological enough. For example, they suggest that some Whitehead scholars are 'working with ideas *they* believe to be Whitehead's, but are not Whitehead's … Putting Whitehead's name to those ideas can be misleading.' (Auxier and Herstein 2017, 20, emphasis theirs). I agree that there is a great deal of misinterpretation. It is also the case that Whitehead has more in mind for his project than the correct arrangement and attribution of ideas. Consider a remark of Whitehead's on why he uses the term 'feeling' to mean a positive prehension. He observes that epistemological theories tend to use technical terms which are 'far from the concrete facts of experience,' whereas 'the word

"feeling" has the advantage of preserving this double significance of subjective form and the apprehension of an object. It avoids the *disjecta membra* provided by abstraction' (*AI* 233, emphasis in original). Whitehead is here reminding us that he seeks to avoid narrow-band specialist thinking that leads to a *disjecta membra*. We should recall Whitehead's statement that philosophy is a 'welding of imagination and common sense' (*PR* 17). A valid interpretation of Whitehead's remark on his use of emotive words is that he aims not only to operate at the level of ideas but also to intervene at the level of language. He views philosophy as something which uses language as a tool that 'redesigns language' (*PR* 11). Just as numbers do not exist in a vacuum, Whitehead is aware that he is not writing in a vacuum. His hope is not merely to adequately describe ideas about a cosmos, it is also the hope that philosophy will shape common language and transmute language. His coining of the term 'creativity' is one such example of a word that escaped the confines of his philosophy into wider usage (see Halewood 2013, 35–38). Auxier and Herstein prioritize Whitehead's 'mathematical mind,' so as to arrive at their conclusion that Whitehead is, above all, a radical empiricist (2017, 82). Others, including Stengers and Jones, attend more to the poetic and linguistic features of Whitehead's project and arrive at a more activist stance that champions the spirit of speculative adventure (Stengers 2011, 14–15).

I have picked these interpretations not to level one against the other but to argue that Whitehead doesn't simply employ mereological thinking as an instrument; he recognizes that thought is part of the wider whole. It coexists with language, aesthetics, politics, ethics, and norms. Redesigning and reforming language within philosophy impacts this penumbral totality.

To illustrate this, recall Whitehead's statement that 'most of the muddles of philosophy are, I think, due to using a language which is developed from one point of view to express a doctrine based upon entirely alien concepts' (*ESP* 117). One way of reading the word 'muddle' is negatively, as an ethnographic caution regarding the hazards of cross-contamination between sites of study. But it can also be read positively, as an acceptance that philosophy yields muddles because it must draw on inherited language to express new or alien ideas. Hartshorne gives us an anecdote of Whitehead introducing Bertrand Russell at a lecture: 'Bertie says that I am muddle-headed. But I think that he is simple minded' (Hartshorne 1990, 311). Hartshorne continues, 'There are those who would be clear (and even neat and witty) at almost any cost, including

that of vastly oversimplifying things. There are those who above all would be adequate to the richness and many-sidedness of reality, even if they cannot always be neat and clear in their account of it' (ibid., 311).

It is this second line of interpretation that Judith Jones commits to, and takes further, in a section of her book on Whitehead titled 'The Metaphysics of Muddle.' Jones writes, 'Muddledness is the experience of competing forms of value in a situation in which it appears to be impossible to realize all competitors; it is an experiential rendering of what may theoretically be conceived [of] as moral conflict' (Jones 1998, 179). 'Muddle,' here, is a poetic way of expressing the kinds of conflicts and contrasts that arise in the intermixing of logic and aesthetics. Jones describes these conflicts as moral because such discord requires that we make value-balancing decisions. Our models 'keep breaking' (ibid., 179) and this leads to genuine and inescapable disruption.

Jones points us towards a view of digital function not as an ideal and fake exactness, but as a 'muddled' (and so political) experience of general function, in which logic and aesthetics are imperfectly balanced. Here again we are reminded of Thorne's issue of metaphysical levelling that I discussed in Chapter 2. It is not sufficient to propose an abstract metaphysical system. We must interrogate the proposed abstractions by engaging in analogical question asking at a high level, while iterating and testing from the 'ground of particular observation.'

What I propose now is that art provides one opportunity for examining and testing alternative valuations. In the next chapter I suggest that art practice may constitute new kinds of decision procedures that locate the digital not as an ideal and falsely exact logic but as a fully relational peripheral activity. This provides a testing ground for the 'value-balancing' acts that Jones mentions. However, such value-balancing acts cannot take place in the abstract or on the basis of a general theory. Recalling that general function is conditioned historically and genealogically, our inquiry must take place *Sitz im Leben*, or, to use Massumi's term, in the middling (Massumi 2013, 1). In the next chapter, we turn to the art practice of Tino Sehgal in order to examine his constructed situations. At the conclusion of the chapter, I will argue that Sehgal's constructed procedures investigate models of permutation and systems of logic, establishing a critical relation to peripheral digital activity.

5. Tino's Handshake

This chapter turns to contemporary art and examines the constructed situations of contemporary artist Tino Sehgal. The chapter begins by describing Sehgal's practice. I argue that Sehgal's acquisition process requires that we examine his work more systemically, and not only in terms of the individual artistic encounters. I examine readings of participatory art and conceptual art applicable to Sehgal's practice. Tracing systems art in conceptualism, I discuss connections between systems art and Whitehead's systematic philosophy. The chapter then returns to the notion of 'decision procedures,' comparing Sol LeWitt's and Adrian Piper's conceptualism and decision procedures with the kinds of unfolding, participatory activity in Sehgal's constructed situations. I propose that Sehgal's decision procedures are monist and model 'general function.' The chapter concludes with a return to the discussion of peripheral digital activity. Here I argue that constructed situations offer an example of one strategy for critically investigating and reconfiguring the effects of peripheral digital activity.

Artologies

How might art critically investigate the phenomenon of peripheral digital activity? Before attempting to answer this, one must ask, What does it mean to situate art as a critical investigation? If we have presupposed that the investigation centres on the digital, doesn't this subordinate art to an instrumental or illustrative role, neutering its critical potency as a mode of engaged activity? Isn't this risk is exacerbated if we cast art as research, limiting art to practice-based research? What ontology and epistemology are being proposed for art as research? What hermeneutic criteria are relevant?

Let us accept the analytic conceit of art as a 'whole' and art in its particular occurrences. The issue then becomes one of identifying the proposals, justifications, and specifications available for navigating between the general notion of art and its particulars. It is in these navigations that art obtains its ontology, epistemology, and hermeneutics, as well as definitions of art, artwork, artist, and art world. The issue being raised has parallels with the issue of research methodology discussed in Chapter 2, this time is recast in connection with art. I refer to the unsettled tension at the heart of this issue as the problem of *artology*—i.e., what formation of art/artist/art world is being subscribed to, if at all?

Here it is helpful to take as an example Grant Kester's proposal for art in The *One and the Many* (Kester 2011)*.* Kester suggests that, within recent participatory practices, there is a paradigm shift from 'textual' to 'dialogical' art. Kester asserts that dialogical art practices 'complicate conventional notions of aesthetic autonomy. These practices mark a (cyclical) renegotiation of aesthetic autonomy via the permeability that exists between art production and other, adjacent, forms of cultural production and activism' (Kester 2011, 9). Kester does not suggest that textual and dialogical art are hard-and-fast categories. They are tendencies, or 'predispositions,' varying from artist to artist and in each artwork. He also does not propose that one type of art supersedes the other. Both types of art are different articulations of art more generally, which Kester defines as 'the ability of aesthetic experience to transform our perceptions of difference and to open space for forms of knowledge that challenge cognitive, social, or political conventions' (2011, 11).

Kester defines 'textual' art in terms of a partitioned model of production, in which the artist authors a work that is then interpreted by viewers and critics. Kester associates this model of production with hegemonic, normative, and canonical conventions or traditions in the anglophone art world. He suggests this model of art emphasises shock-based tactics of reception, transgressive a-rational somatic experience, an appeal to the 'avant-garde,' and continental and postcolonial theory (2011, 54). In contrast, suggests Kester, 'dialogical' practices are conversational, with porous divisions between making and interpreting. This implies that dialogical models of art have different ontological, hermeneutic, and evaluative criteria in their proposals for aesthetics and ethics. One implication of dialogical art, for example, is that art historians and critics must employ analysis techniques more typically used in social sciences, such as field research and interviews (2011, 10). Kester describes dialogical art as an 'intellectual baroque,' since it is a category that is not defined through extrinsic criteria but one in which, in each project, the creative or critical procedure 'takes on a life of its own' (2011, 13).

One way of reading Kester's discussion of textual and dialogical art is as an identification of multiple art worlds, with different ways of organizing the movement from art as a generality to its particularities. As we found with Manning and in our discussion of methodologies in Chapter 2, Kester identifies a dominant critical tradition and proposes an alternative nascent model which is based upon a procedure that takes

on a 'life of its own.' He describes these two organizations of art as predispositions, or as modes. There is a textual and a dialogical manner of art.

Regardless of whether there is a paradigm shift in art, Kester's careful analysis demonstrates that there are multiple possible movements from general notions of art to particular instances. These multiple movements can also take place simultaneously. For example, in the art practice of the Dialogue art collective Kester examines, there are at least three ways art is configured by the Dialogue collective in their installations: for Adivasi tribal villagers at the 'interstices of modernity and tradition' (2011, 78); for the Mumbai contemporary artist Navjot Altaf, who has 'a level of access to national and international art circuits' (Kester 2011, 94); and for Kester himself, as a faculty member of a visual arts department in California engaged in field research.

The suggestion is that art may enlist multiple artologies, according to individual conditions and purposes of reception and activation of the art at each moment. A corollary of this multiplicity is the implication that any single artology captures only a partial account of art. Furthermore, if different kinds of relations to art take place simultaneously, the various artologies are not static but interfere with each other, as receptions and engagements with art transmute each other over time.

This raises a secondary issue: How do we identify artologies in their relations to other kinds of non-art phenomena?

Consider the proposal of art advanced by Nicolas Bourriaud in his book *Relational Aesthetics.* Bourriaud starts his book by outlining an artology. He identifies that 'artistic activity is a game, whose forms, patterns and functions develop and evolve according to periods and social context; it is not an immutable essence' (Bourriaud 1998, 11). He continues, 'Art was intended to prepare and announce a future world: today it is modelling possible universes' (1998, 13). Whereas in Chapter 2 we saw Whitehead discussing art's selection and enjoyment of values in general, Bourriaud stresses art as specific kinds of processual activity that introduce relations, games, and models of possible universes. In his analysis, he links the emergence of this artology to digital technologies. He argues that the artists he examines emphasize artistic activity, rather than conventions of object making, partly in response to the increasing use of digital modes of production and sociality.

Bourriaud here invokes what he names the Law of Relocation, asserting that fruitful thinking arises when we consider the possibilities of technology obliquely, rather than

by illustrating those possibilities directly *as* technique. 'Art only exercises its critical duty with regard to technology from the moment when it shifts its challenges. So the main effects of the computer revolution are visible today among artists who do not use computers' (1998, 67). Bourriaud claims that artists in the 1990s who showed an increased attentiveness to social togetherness were 'ushered in' (1998, 72) by digital communications and image-production technologies, even if those artists did not explicitly use those technologies in their practices. Such artists, according to Bourriaud, sought to inhabit the relations established through computer technologies differently, so that, 'these days, it is no longer a question of depicting from without the conditions of production, but of introducing the gestural, and deciphering the social relations bought on by them' (1998, 68). The Law of Relocation suggests that there is no preordained art/non-art divide, and indeed, within certain artologies, oblique strategies may be more fruitful than direct strategies.

From the discussion above, it is apparent that appropriate strategies and practices in contemporary art to critically investigate and reconfigure the effects of peripheral digital activity cannot be disclosed in any determinate manner. But if no determinate answer is available, we can inquire into *possible* strategies. In this chapter, I do this through a sustained analysis of one artist, rather than through a synoptic survey. I examine the contemporary artist Tino Sehgal. At the end of the chapter, working through notions of conceptualism, I will argue that Sehgal is an artist whose non-object stance results in a decision procedure that is monist. It intertwines with the digital, and avoids a bifurcation of the digital.

In selecting Sehgal, it is not my intention to isolate his art as an exemplar of a movement or theory or to elevate Sehgal's art above others. The goal is to further elaborate the notion of a decision procedure that I have been developing over the course of this thesis.

Sehgal may seem like an unlikely artist to focus on within a discussion of the digital. Sehgal has been characterised as an anti-object artist. He is known to refuse to carry a mobile phone. He stresses person-to-person contact in his artworks. He has attempted to ban people from using digital devices in his installations.

At the same time, Sehgal's art installations require hiring, training, and organizing hundreds of part-time paid workers to perform scripted sequences and permutations that run continuously throughout the duration of the exhibition. Such an arrangement

of delegated labour *presupposes* today's efficient labour practices, through which pools of workers are organized and coordinated using networked communications infrastructures that streamline the administration of payroll and scheduling. While Sehgal does not produce objects, he assumes the availability of communication technologies in his practice. In my view, Sehgal's practice operates the way that it does because of enabling factors of the internet. At the same time, his practice serves to interrogate models of rules and permutations, as a kind of living software. This is what draws me to consider Sehgal's practice in relation to notions of digital activity. Such a reading resonates with descriptions of 'post-internet' art, in the sense of the term as used by Marisa Olson since around 2008 and taken up by many others. Olson draws attention to artists, like herself, whose practice presupposes the internet in some way, even if the artworks produced are not recognizably internet artworks. For Olson, the post-internet 'encapsulates and transports network conditions and their critical awareness as such, even so far as to transcend the internet' (Olson 2011, 60). A worry I have with the term is that there is so much leeway in what might count as post-internet art that the term loses its critical purchase (see Droitcour 2014 for a discussion of this issue). One area of future research is to further examine peripheral digital activity in its relation to other post-internet art. In what follows, I primarily focus on Sehgal's constructed situations.

Tino Sehgal

In a visit to the Guggenheim, my first guide, who was a child, announced to me, 'This is a piece by Tino Sehgal.' After brief introductions, the guide popped the question 'What is progress?' I knew the question was coming. I couldn't avoid the impression that I was at a busy restaurant with overworked wait staff who received moderate tips, and I had just been told the name of the chef and what was on the menu. 'Warm food' came my reply. I was ushered up Frank Lloyd Wright's spiralling ziggurat ramp. My guide tactfully handed me over to a second, older guide. By the end of my sojourn at the top of the ramp, I had had four different conversations with guides of increasing age. Food remained a connecting thematic. I had 'solved' Sehgal's menu problem by inventing my menu à la carte, and when the final interpreter informed me, 'The piece is called *This Progress*,' my dialogue was over and I was suddenly hungry. I left for the bright

outdoors, contemplating *This Progress,* by British-German artist Tino Sehgal, presented at the Guggenheim in New York in 2010.

At Sehgal's *This Variation* in Huguenot House at Documenta XIII, Kassel, Germany in 2012, I entered a pitch-black, muggy room. Slowly my eyes adjusted and I was able to make out shadowy bodies slinking around. There was a troupe in full swing—more than a dozen figures swaying, moving, and sitting. I found a wall to lean against and stayed for two cycles of the performance, more than half an hour. 'Ah ha, ah ha, du dum, du dum…' At some moments, the interpreters worked as a chorus, but there were also one-on-one interactions between interpreters and visitors. Beatboxing, chanting, singing, slow movement, dancing, clapping, rhythmic humming, short sentences, whispers, crescendo, fading, louder, quieter, a pulsating swirl. When I left, the dank smell of *This Variation* seemed to linger with me for an hour.

Sehgal contests the notion that art requires making tangible material objects. He hires 'interpreters' to stage what he calls 'constructed situations.' These constructed situations follow scripted moments and choreographed movements that Sehgal conveys to interpreters during rehearsals. The interpreters enact these scripts in shifts throughout the duration of the exhibition. Sehgal occasionally uses museum guards as interpreters, calling attention to their institutional role. For *This Is So Contemporary*, shown at the Venice Biennale in 2005, a group of guards chants, 'Ooooh. This is so contemporary!' Sehgal also hires dancers or singers or enlists members of the public, according to the needs of the piece. His earlier works tended to be more balletic. After around 2006, he started making more interactive demands on viewers and requiring more improvisation on the part of the interpreters. More recent works have moved away from walking-and-talking to an omnibus of varied types of sequences, as with *This Variation*, described above.

Sehgal distances his practice from the conventions of performance, removing the props and architectural devices (such as stages or theatrical lighting) that might divide audience from artwork in a sphere of absorption. He emphasizes that his works are to be experienced body to-body as first-person encounters. For Sehgal, the works are intended to be understood as visual conceptual art, though he is less concerned with whether his work is an autonomous artwork—what he calls the 'if' question—than with the 'how' questions: 'How I am relating to you now?' (Serpentine Galleries 2016, 08:15).

An unauthorized photo taken of Tino Sehgal's *The Kiss* at Guggenheim Museum (2010), taken on an iPhone shows and printed in the New York Times (Cotter 2010).

Tino Sehgal forbids formal written documentation of his works. For *This Variation*, the Documenta guidebook mentions Sehgal on the contents page, but the page about Sehgal is omitted. Sehgal attempts to prevent photography and video of the works. When the New York Times printed an iPhone photo of *The Kiss* in 2010, Sehgal described this as 'ungentlemanly, very crass' (Collins 2012). Claire Bishop describes this denouncement of documentation as the desire to couple production with deproduction, as if Sehgal aspired to simultaneously be making and not making something (Bishop 2005).

Sehgal's works mandate a variety of institutional demands. They typically must be presented for six weeks or more and run continuously during the institution's full opening hours. The exhibition environment may also need to be prepared and emptied of signage, maps, benches, booths or other objects, with planters changed and windows covered or uncovered. At the Guggenheim, for example, Sehgal instructed that the tarp covering of the 'oculus' above Wright's ramp be remove, to allow natural light into the space.

Sehgal's works also require numerous preparatory steps. Asad Raza helped produce both *This Progress* at the Guggenheim and *These Associations* in the Tate Modern's Turbine Hall in 2012 (Morgan and Raza 2012). He describes Sehgal as the author or conceptualizer of the works, whereas his own tasks were more those of producer and collaborator, although these roles overlap. For the Guggenheim and the Tate pieces, it took a year to find and train interpreters, including holding multiple meetings, organizing intensive group sessions, and finding time for individual one-on-one reviews

of each interpreter. Raza mentions that they selected interpreters with a certain kind of sensitivity, people with a 'zone of measured and profound' or certain 'addressal' qualities. For the Tate's Turbine Hall piece, the sequences and elements were also changed during the running, and some interpreters left or new interpreters were hired. The result was a daily collective decision-making, a 'culture' of reproduction for the piece that involved several hundred interpreters, with between sixty and one hundred interpreters in the Turbine Hall at a time. It is a relentless slog to keep Sehgal's pieces running.

Sehgal has discussed his work in terms of bringing back 'aristocratic sensibility,' 'refinement,' 'court etiquette,' or 'ritual' (Serpentine Galleries 2016, 13:30). Hans Ulrich Obrist, borrowing a term from the artists Gilbert & George, has designated Sehgal's works as living sculpture. As a performance staged for the more than one million visitors at the Turbine Hall, Sehgal's works could also be described as living monuments.

Such framings invite us to scrutinize his art by zooming in, as an art ethnographer, to focus on unique individual encounters between interpreters and visitors to explore how the pieces 'work.' Certainly, a comprehensive account of Sehgal's practice must include analyses of these short-lived phosphorescent moments. But there is also a zoomed-out perspective examining the programmatic factors at work in the institutional staging of the art as event. In this framing, we encounter Tino's handshake.

Tino's Handshake

Sehgal carefully scripts how his works are acquired by institutions and collectors. In contemporary art, social conventions normally separate discussions of business details from the art itself.[19] In Sehgal's case, the mention of his business handshake is an ever-present refrain in discussions of his practice.

Lesley Johnstone, a curator for an exhibition of Sehgal's work at the Musée d'art contemporain de Montréal, writes:

In keeping with Sehgal's strict opposition to manufacturing objects, the process of acquiring one of his works consists in a purely oral transaction involving the artist or one of his representatives, the director, curators and registrar of the museum, and a lawyer. The conditions of acquisition and installation are recited and committed to memory by

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[19] Art's purchase scripts, its 'front-room' and 'back-room' operations, and the social conventions of separating discussions of business and art are examined from a sociological perspective in Olav Velthuis's *Talking Prices* (Velthuis 2005).

all present, the price is discussed and when both parties are in agreement, there is a
handshake. No paper documentation accompanies the acquisition. Conditions of
presentation include the remuneration of all players and a strict refusal of video or
photographic documentation, printed press releases, catalogues, labels or didactic
panels. (Johnstone 2013)

Sehgal's scripted handshake deal is said to be 'in keeping' with his choices as an artist; it is 'a great metaphor' for the collecting and exchange of art. Handshake deals fit with Sehgal's interest in courtly etiquette and ritual. In early feudal rituals, the ceremony of a mixing of hands signalled a religious fusion of two persons, the lord and vassal.[20] Today the handshake itself is legally redundant. Oral contracts are just that— they require the agreement of terms, intention, and consideration, given orally (Gillies 2004). Sehgal's handshake is therefore a choreographed ritual, not a legal obligation. It is performed as part of his business operations even though oral contracts are not typically accepted by large institutions. Jessica Morgan has described Sehgal as a highly unsuccessful artist because of the challenges of acquiring his works. Yasmil Raymond reports that when the Walker Art Center acquired a Sehgal work, it was a protracted process and 'the only time someone on the acquisitions committee voted against an acquisition. There was a small insurrection' (Collins 2012). Klaus Biesenbach, then chief curator of the Museum of Modern Art's Department of Media, described the process: 'There was an orally communicated contract. As a curator you have to remember it—I was very happy I wasn't alone because I was afraid I was going to forget everything— and you have to follow the instructions. We had 12 people around the table, including a lawyer, a notary, gallerists, curators and members of the conservation and registration departments. The meeting went on for hours' (quoted in Degen 2009).

Why make the acquisition process so hard? Why insist on choreographing it to the point where the handshake, a formality, becomes foregrounded? One answer is that this choreographing of the business boardroom attempts to blur the conventions that separate the artistic encounter from the business operations of art, treating the practice as a whole as an exercise in brand management.[21] Sehgal affirms this view, arguing that

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[20] Handshakes as rituals may have started with early feudal ceremonies of vassalage, in which the vassal offered oaths of fealty and 'mixed hands' (*immixtio manuum*) with the lord. Nitzan and Bichler describe how this feudal ritual became embedded in the 'social contract' of capitalism (2009, 283–87).
[21] This follows a notion from Velthuis, who writes that Jeff Koons, Takashi Murakami, Richard Prince, Maurizio Cattelan, and Damien Hirst are 'brand managers whose main occupation is the production and diffusion of commercial propaganda' (Velthuis and Lind 2012, 33).

it is meaningless to try to separate art and commodity form. From this perspective, the visitors, buyers, interpreters, and critics are *all* are complicit in manifesting and communicating Sehgal's practice. Bishop has called Sehgal's practice 'delegated performance' (Bishop 2012, 224), noting that it is not only the interpreters that Sehgal delegates to. As she points out in one review, 'The present article, far from being the weakest link in Sehgal's conceptual fortress, may indeed be immanent to the work: a production that stands for and encircles the objective of his practice' (Bishop 2005).

Sehgal's acquisition process calls attention to the proximity of business operations and art operations. We are invited to consider the contractual *immixtio manuum* as a constructed situation: These Purchases. Within such an artology, the relevant factors that define the work include not only the individual encounter with the artwork, but also the surrounding business operations. We are being invited to consider both the 'front room' art encounter and the 'back room' together, not as one in support of the production of the other but rather as equally immanent to his practice *as art*. Sehgal's art is both inseparably experiential and programmatic, fusing the operations of two paradigms at once. One paradigm centres on the individual encounter a visitor has with the artwork in its exhibition setting, where Sehgal's pieces take up the role of art as participatory experience within circulations of performances, objects, gestures, and propositions in phenomenal discussions of art. Another paradigm proposes art as constituted through certain arrangements of rules and activities, which include the institutional rules of circulation, business operations, and wider communication systems. I read Tino's handshake as propelling the view that both are important aspects within the proposed artology. If a constructed situation is purchased but not staged, it remains a work of art that can be resold.[22] But if it is staged, then the myriad details (houseplants, lighting, selection and training of interpreters) are also aspects of the work.

Organizing two hundred contracted workers to continually staff an event that runs for six months requires substantive concrete machinations and dense informational exchanges. And when Sehgal orders different houseplants for the Guggenheim, this is reminiscent of the way that, to install a Dan Flavin exhibition, museums will re-create wall heights and electrical wiring to exacting specifications: Empty architectural space is

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[22] This echoes Lawrence Weiner's *Statement of Intent* (1968) which claimed that the idea of a work 'may be fabricated' but 'need not to be built'. The ontology of the work was held to be its potential material realisation (Skrebowski 2009, 162).

never laissez-faire but has a material price tag. Then there are the many documents, emails, and non-ephemeral counterparts necessary to stage a large-scale event. Such factors are an aspect of Sehgal's art as an operation, as a *way* of art. It is only when we examine the two paradigms of his artistic practice together that we can observe the paper trail of objects and materials necessary to his 'objectless' art experiences.
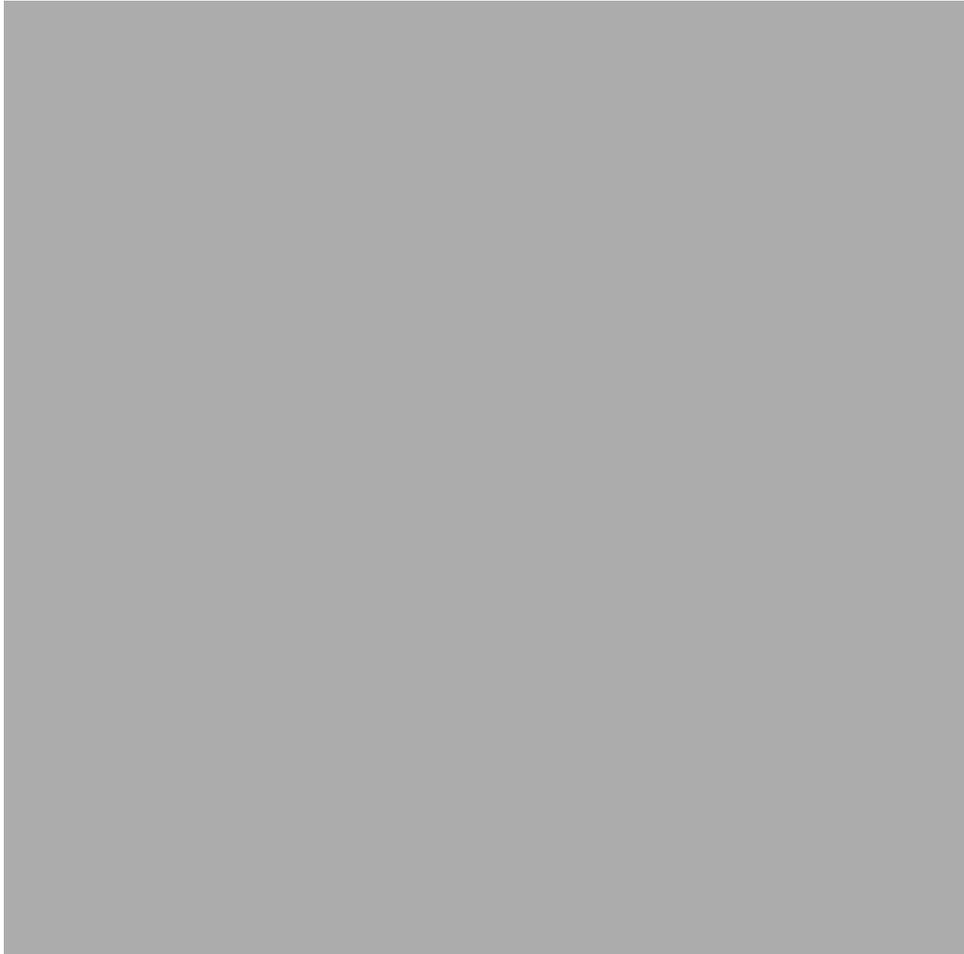
A paper flyer for the Guggenheim exhibition of Sehgal's undocumented 'objectless' practice, $7.25/hr. Photograph posted on Twitter by Lindsay Pollock, http://twitpic.com/j2y0d.

In order to give this claim salience, it is first necessary to examine existing readings relevant to Sehgal's practice. For the remainder of this chapter, I take up Sehgal's practice in its relation to discussions of relational, social and participatory art, and conceptual art. In this discussion, I relay some substance-philosophical positions taken up by Sehgal's practice and conclude the chapter with a discussion of systems theory and algorithms.

Participatory Art

Sehgal describes his artworks as 'interactive.' The works are conducted within exhibition spaces, and they try to set in motion human-to-human activity. In this respect, his work appears to fit the model of relational art proposed by Bourriaud twenty years ago. One approach to Sehgal's constructed situations is therefore to consider them through the history of relational aesthetics and participatory art.

Bourriaud defines relational art as art that adheres to an 'aesthetic theory consisting in judging artworks on the basis of the inter-human relations which they represent, produce or prompt' (1998, 112). Bourriaud's book of essays on relational aesthetics is an important reference point, though many other writers since, including Bishop (2012) and Kester (2011) have considerably widened the terms of the conversation, linking relational art to a broader territory of debates stemming from attempts in art in the 1960s and 1970s to transcend objecthood—including Michael Fried's 1967 essay *Art and Objecthood* (1998); Lucy Lippard's *Dematerialization of the Art Object from 1966 to 1972* (1997); the various movements of conceptual art; neoconceptualism; performance and body art; installation art; experimental dance; and artists such as Yvonne Rainer, Dan Graham, Yves Klein, Gordon Matta Clark, Fluxus, and Allan Kaprow.

Bishop's well-known essay *Antagonism and Relational Aesthetics* gives this incisive commentary: 'If relational art produces human relations, then the next logical question to ask is what types of relations are being produced, for whom, and why?' (2004, 65). Bishop points out that imaginative models of interaction are nothing new, hardly utopian, and short on critical evaluative criteria. Bourriaud's notions of the value of sociability and conviviality in art are no guarantees of democratizing change. In *Artificial Hells—Participatory Art and the Politics of Spectatorship* (2012), Bishop traces the evolution of participatory art and theatre from early-20th-century Italy and Russia to the present day. She argues that participatory art should not be reduced to collectivism and good intentions or positivist measures of impact. She draws on the aesthetic philosophy of Jacques Rancière to argue that art critique must allow for notions of distance, autonomy, or unreadability to be included as criteria used to evaluate art's capacity for social change.

Kester starts with many of the same questions that Bishop raises regarding relational aesthetics but arrives at different conclusions (see Heartney 2012). He too critiques Bourriaud's relational aesthetics for equating sociability with democracy. In Kester's

book *The One and the Many* (2011)*,* he uses the term 'dialogical practice' to describe art that is collaborative, politically engaged, and combines community activism with artistic production. Kester promotes artists who produce participatory work on international sites in conjunction with local populations. For instance, he describes the art collective Dialogue in Kopaweda, India, which designed and built public water pumps in several Adivasi tribal villages. According to Kester (2011, 65), the reparative collaboration produced by Dialogue emphasizes durational exchanges between site and audience, problematizes the authorial status of the artist, and contests aesthetic autonomy. Kester contrasts this with relational aesthetics in the work of artists Santiago Sierra and Francis Alÿs. He argues that these artists do not seek to remodel collective exchange or produce lasting relationships with the sites they inhabit. Rather, they reinscribe the 'shock' pioneered by the historical avant-garde. In doing so, relational aesthetics is committed to the hegemonic influence of continental critical theory developed in the wake of the events of May '68, since it privileges spontaneous encounters over active engagement with the systems of global capital. For Kester, such practices have 'foreclosed the possibility that social interaction or political engagement itself might transform subjectivity or produce its own forms of insight' (2011, 59).

Three writers—Bourriaud, Bishop and Kester—provide three different voices, each part critic, part historian, part ethnographer, each offering alternate perspectives on participatory art. Each presents alternate mythologies of compulsion, violence, persuasion, agency, and aspiration. Without offering a full characterisation of these accounts, what is pertinent here is the way that each capture different partial aspects of Sehgal's practice.

Bourriaud's model of relational art, for instance, highlights the importance of museums as sites that provide an opportunity for unexpected meetings and dialogs—a position Sehgal shares. However, Bourriaud's notion of relational art is materialist and utopic. He argues that artists should use the ready materials of the day to promote conviviality, to offer visitors a moment of escape from utilitarian life. A quintessential example of Bourriaud's relational aesthetics is Rirkrit Tiravanija's 1992 exhibition entitled *Untitled (Free)* at 303 Gallery in New York, in which the artist converted the gallery into a kitchen serving free Thai curry. Contra to a 'free lunch' utopia, Sehgal affirms his art's commodity status. His instruction-driven scripts and flashmob choreography have a utilitarian and pragmatic character.

Bishop (2012, 232) stresses the economic and durational circumstances of Sehgal's works, which she describes as delegated performance situated within affluent Western art institutions. She also identifies the differing registers in Sehgal's pieces, including what she calls 'gallery time,' the all-day-long, always-running mode of performance as an army of industrialised shift workers are paid and accrue costs, and the individual brief flashes of 'interaction time' between visitors and interpreters, in which value is placed on liveness. For Bishop, Sehgal is one artist of many in a much larger historical narrative for which she simultaneously asserts that art evades normative criteria. While I find Sehgal's slow choreography at times arresting, it is hard to see Sehgal as much of a proponent of Bishop's notions of unreadability, in which art resists co-option.

Kester's more practical conception of dialogical art seems closer to Sehgal's concerns. Kester is open to art that includes utilitarian ends, if it foregrounds the importance of participatory dialogues. For Sehgal, the ultimate success of a work is the way it accompanies a visitor and mingles with their own thoughts, a point on which Kester and Sehgal might agree. Dialogical art seems to fit Sehgal's Socratic tendency, his 'If I can set someone in motion …' proposition, which appeals to the individual's small but relevant agency. However, Sehgal rejects explicit political activism as well as long-term engagements with communities outside the institutional franchises of art, both central requirements of Kester's notion of dialogical art.

These three theorizations bring into focus three different aspects of Sehgal's practice, in each case highlighting what amounts to a partial fit. What I propose to do next is turn to Sehgal's own identification with conceptual art in order to consider another avenue within his practice, which I relay in terms of a notion of 'cleaner' conceptualism.

Cleaner Conceptualism

Sehgal's anti-object practice involves a single consistent manner of presentation in all his works. This runs counter to the participatory art discussed by Bourriaud, Kester, and Bishop, who recognize a diversity of different kinds of artistic practice and resist anything that hints at 'purity' in the sense that Clement Greenberg assigned to modern art, i.e., as a critical art in which the task is 'to eliminate from the effects of each art any and every effect that might conceivably be borrowed from or by the medium of any other art' (Greenberg 1995, 111–12 [1963]). Is Sehgal's zealous anti-object stance some

kind of return to a purist pursuit for art? How does this relate to conceptualism and its repudiated rejection of Greenbergian medium-specificity? To respond to this, in this section we examine the legacy of conceptual art in relation to Sehgal's practice.

Sehgal self-describes his practice in reference to conceptual art:

I'm trying to be cleaner than performance art. Although I'm actually not so interested in performance art; it's not even really a reference for me. I'm especially trying to be cleaner than conceptual art in the sense that if we want to dematerialise the object, let's really dematerialise it. I'm still producing objects not in the material sense of the word but in the product sense of the word. … What conceptual art was doing was dematerialising the art object into language, which they thought meant writing something on paper. They are from the tradition of painting and sculpture somehow, so what do they do, they write on paper. (Obrist and Sehgal 2003)

The question I want to take up in this section is how we interpret 'cleaner' conceptualism. In what follows, I will argue that Sehgal's statement aligns with a 'systems' attitude towards conceptual art.

The legacies of conceptual art from the late 1960s and early 1970s are varied and contested. As John Chilver (2005, 47–49) observes of artists in the period from 1965 to 1975, during which conceptualism is said to be active, Sol LeWitt, Vito Acconci, Robert Morris, Lawrence Weiner, and Robert Smithson rejected the term 'conceptualism'. They all pursued practices that were committed to the particularities of making stuff and responding to material situations. Conceptualism is an underspecified historicization of practices that were multiple, complex, dynamic, and not reducible to straightforward definitions. There was never a single kind of conceptual art, and the artists now labelled as conceptualists formed an unruly, factional community.[23] The polemics surrounding the term 'conceptual art' at times overwhelm what was a complex tapestry of activity, even as the lasting effects of conceptual art are still influential in art today, as evidenced by Sehgal's statement.

A recent thesis by Luke Skrebowski (2009) examines the role of 'systems art' in conceptual art. Skrebowski taxonomically inserts systems art between minimalism and conceptual art. He does so with deliberate awkwardness, since he does not propose to construct a movement-based or category-based history of systems art. Instead, he presents systems art as a set of artistic problems, strategies, or responses within

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[23] This is a point well charted by Peter Osborne. See Osborne 2013.

complex shifting forces of art. He reads the work of the critic Jack Burnham from 1968 and 1970, noting that 'Burnham pointed to the way in which the ideal systems of logical, mathematical, and spatio-temporal relations that characterised early post-minimalist work were expanded in character to include physical, biological and, crucially, social systems' (2009, 52). Skrebowski observes that Burnham foreshadows Bourriaud when Burnham argues that 'art does not reside in material entities but in relations between people and between people and the components of their environment' (2009, 53). As with Bourriaud, Burnham links the importance of a systems approach in art to the wider technical changes in society, in which art was held to be resistant to the logic of technological rationality that it nonetheless mimics (2009, 55); Burnham doesn't fully elaborate the status of 'aesthetics' within his account, and he has been criticized for utopianism (2009, 77) and for flattening the different tendencies within conceptual art (2009, 78).

A strength of Skrebowski's research is his historical analysis of systems art. Examining deployments of systems thinking among the artists Hans Haacke, Victor Burgin, Mel Bochner, Douglas Huebler, Hanne Darboven, Adrian Piper, Mary Kelly, and Mierle Laderman Ukeles, Skrebowski traces a shift from the use of systems to generate permutations in individual artworks to a broader, more nebulous, and self-reflexive adoption of systems thinking, or what Skrebowski describes as a systematic mode of conceptual art in which art and its institutions are examined as systems within the totality of the capitalist system (2009, 52). In tracing this history, Skrebowski emphasizes the links between conceptual art and tech art, pop art and kinetic art. As an example, Skrebowski mentions Haacke's *Photo-Electric View-Controlled Coordinate System* (1968), installed at the Howard Wise Gallery. This installation converted the gallery into a system with an invisible grid of motion sensors that trigger light bulbs mounted on the walls above each sensor. 'Lured by promises of free interaction … participation amounted to no more than the choreography of a routinised existence' (2009, 128). Haacke said in 1970 that his aim was 'to think in terms of systems; of the production of systems, the interference with, and the exposure of systems … Systems can be physical, biological, or social; they can be man-made, naturally existing, or a combination of any of the above' (Haacke, quoted in Skrebowski 2009, 129). Skrebowski argues that Haacke's statement reflects a systems-based attitude not tied to any single field or discipline and widely disseminated within natural and social sciences as well as the

anglophone art world in the late 1960s and early 1970s. This resulted in a diffuse and 'ambiguous character' of systems discourse (2009, 137). Skrebowski seeks to provide a corrective by carefully tracing ways that certain Western artists used, thought about, discussed, and wrote about systems in the late 1960s and early 1970s. He also argues that this reclaimed narration of conceptual art is relevant when examining contemporary art.

What is pertinent in Skrebowski's study for this thesis is the reading it makes available on Sehgal's statement on cleaner conceptualism. One way to interpret Sehgal's cleaner conceptualism is as a claim that, by avoiding physical objects, Sehgal has succeeded in 'dematerializing' the art object and so produced better conceptualism. The adequacy of this argument is quickly dispatched. As with the conceptual performance works of Adrian Piper in the 1970s, such as *Catalysis IV* (1970–71), Sehgal has not dematerialized the art object so much as displaced its materialization onto the bodies of interpreters. In other words, he has not eliminated the 'aesthetic dimension' of the artwork or overcome the rift between conceptual and physical.

In my view, Skrebowski offers an alternative, and stronger, way to read Sehgal's statement on cleaner conceptualism: Sehgal is rejecting a dominant linguistic analytic formulation of conceptual art and reengaging with a systems-oriented perspective. Cleaner conceptualism is not dematerialized because it has no physical objects but because it pursues an alternative ontology of art. This ontology is not based on 'physical' objects contra 'mental' objects but on which objects are thought of as systems or processes in relation to other systems or processes. The word 'cleaner,' in this case, is a holistic pragmatic criterion regarding the selection of the kinds of systems that are deployed (i.e., those avoiding resource-extractive systems).

I have used the phrase 'systems or processes' in the previous paragraph in part to stress the generic and ambiguous character of the word 'system,' which Skrebowski also points out. Using 'systems' as a unifying key activates a fragmentary and shifting spectrum of theoretical lineages. Skrebowski mentions Ludwig von Bertalanffy's general systems theory, Norbert Wiener and Ross W. Ashby's cybernetics, Claude Shannon's information theory, and Talcott Parsons's sociology. Such a list merges contrasting and contradicting notions of 'system.' Holistic theories such as GST are organismic, open, relational, and non-reductive, whereas information theory and cybernetics are geared towards reductive reification of technical systems. To add to the confusion, Bertalanffy's

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general systems theory advocates a holistic and open approach to systems and opposes what he viewed as the mechanistic devaluing of technical systems, but Bertalanffy also uses the term 'system' in multiple ways, and also identified GST with the wider development of systems approaches across other fields, as Debora Hammond points out (Hammond 2010, 126–31). Hammond also highlights that there were trenchant critiques of systems thinking. The systems communities responded to these critiques (2010, 34–35). The resulting ambiguities, shifts, and controversies suggest there is work ahead in further developing Skrebowski's proposal for a genealogy of a 'systematic' mode of conceptual art, in order to further clarify how different notions of systems were articulated by and between artists and artworks. It also indicates that there remains an opportunity to think through the notion of 'system' in multiple ways.

Here I want to point to the strong affinities between Whitehead's philosophy of organism and the systems lineage. Whitehead's philosophy of organism was developed contemporaneously with Bertalanffy's earliest publications on general systems theory. Whitehead employs concepts of 'system' or 'systematic,' describing, for example, the 'system of the universe' (*PR* 3) and the 'systematic character' of societies (*PR* 84). A further deep point of connection is in the use of organismic thought by Whitehead and the systems communities. Members of the systems community such as Ervin Laszlo and James Grier Miller and were influenced by Whitehead. Laszlo, in his book *Introduction to Systems Philosophy,* mentions his indebtedness to Whitehead, even as he proposes to leave behind Whitehead's philosophical categories and theism, saying Whitehead's principles are debatable and permit alternative solutions (Laszlo 1972, vii). Miller studied directly with Whitehead at Harvard. There are multiple crossovers between Whitehead's philosophy of organism and systems theorization (see Haraway 1976, 33–63).

This opens a third, more conjectural, reading of Sehgal's statement on cleaner conceptualism. If we are already in the business of transforming the ontology of objects and embracing a more holistic and ecological perspective, let us consider cleaner conceptualism as a notion in Whitehead-centred terms. To carry this forward, and to loop us back to notions of the digital, in the next section I turn to software as one way of thinking about systems.

Art as Decision Procedure (revisited)

In the previous section, I noted the connections between conceptualism and systems thinking. In this section, I carry this forward by discussing software systems and how they relate to LeWitt's and Sehgal's notions of artistic decision procedures.

Software is one of the important ways artists have considered and approached notions of systems. Bainbridge and Hurrell's *Hardware* show at the Architectural Association, London in 1967 was quickly followed by *Cybernetic Serendipity,* curated by Jasia Reichardt and shown at the Institute of Contemporary Arts in London in 1968. Kynaston McShine's *Information* exhibition was presented at the Museum of Modern Art in 1969. Burnham's exhibition *Software, Information Technology: Its New Meaning for Art* was shown at the Jewish Museum in 1970. These exhibitions introduced larger audiences to questions of the parallels between mind and software. Skrebowski suggests that a premise of Burnham's show, and of conceptual art more broadly, can be understood as an analogy for a transition in art from 'hardware' to 'software' (2009, 89). Burnham placed computing technology alongside artworks in the *Software* exhibition on the basis that artistic decisions and software decisions were becoming fused, so that existing divisions between art and non-art no longer made sense (2009, 156). While this was an extreme position, other artists also began to use the notion of software as an analogy for thought processes. For example, Victor Burgin likened certain artworks to software in 1969, since the art deployed sets of conditions through which concepts could be generated (2009, 167).

We keep this context in mind as we read LeWitt's discussion of 'idea' in art from the same period. LeWitt's well known Artforum article, 'Paragraphs on Conceptual Art' (1967) asserts that the idea is a 'machine' to make art. LeWitt's proposal is based on a dualist cognitive model, with a hierarchical distinction between concept and percept. We see this when LeWitt argues that idea conception takes place 'prefact,' whereas perception takes place 'postfact.' The implication is that to make an artwork that is conceptual rather than perceptual, as much as possible of the artistic activity must be moved to the 'prefact' stage. Such an arrangement requires that 'all of the planning and decisions are made beforehand, and the execution is perfunctory' (LeWitt, 1967, 80). This way, the subjective decision-making during execution is minimized, so that 'caprice, taste, and other whimsies would be eliminated from the making of the art' (ibid.).

In LeWitt's schema, the artist is an individual with the capacity to 'discover' ideas through what he terms 'mystic' intuition. One reading of this is that, as industrial machines became capable of executing more complex software decision procedures, artists such as LeWitt sought to secure a role for art (as something different from both software and hardware) by locating it in the invention of new decision procedures. Successful art is then art in which the role of the artist, as an inventor of novel decision procedures, is 'implicit in the work' as it is finally manifested, though how precisely this is done is left vague.

Piper expands LeWitt's notion of an idea as a kind of decision procedure, writing:

By using the permutation of selected formal properties of an object—its sides, dimensions, or geometrical shape—as a decision procedure for generating the final form of the work as a permutational system, LeWitt moved that system itself, and the idea of that system, into the foreground of the work as its self-reflexive subject matter. Here it is not only the object as a unique particular that has primacy, but that object as the locus and origin of the conceptual system it self-reflexively generates (quoted in Skrebowsk 2009, 162).

Sol LeWitt. *Wall Drawing 56*. A square is divided horizontally and vertically into four equal parts, each with lines in four directions superimposed progressively. Black pencil. August 1970.

In LeWitt's and Piper's early work and in other permutation-based works at that time, the artists held that it was important to 'exhaust' the possibilities of the decision-making procedure in the work, to run through all the permutations, so as to 'complete' the object as the locus and origin of the idea. Running through all the permutations served to highlight the distinction between finite idea-machine decision procedures and

the human capacity to invent decision procedures. The 'more-than' of art was contrasted with the decision procedure as merely repetitive technical operation. Art, as intuitive discovery, offered a path for the human to escape 'the system.'

In this way, LeWitt located the artwork as a conceptual ideal. One outcome of this arrangement is that the material manifestations of the idea take on a complex status. For example, LeWitt's wall drawings are often executed by teams who use pencils to create hand-drawn lines. The individual variations and decisions by multiple actors are part of the production of the work but not, according to LeWitt, part of the art, since for him art is the invention of the decision procedure, not its execution. The 'code' or software for the work was held to be distinct from the 'hardware' used to execute it, though the paradoxes that this raised were left unaddressed.[24]

LeWitt's and Piper's 'decision procedures' are pertinent for us here because they provide a comparison with Tino Sehgal's constructed situations. In Sehgal's works, his 'decision procedures' are collectively distributed between Sehgal and the multiple interpreters and participants in his pieces. Instead of creating a program for art as a kind of algorithm and then exhausting its permutations to manifest the artwork prior to exhibition, Sehgal's decision procedures are constructed with unsaturated 'gaps' that are left partial and incomplete until the moments of spontaneous encounter between participants and interpreters. The 'idea' of the work, in its description as given in the oral contract during a purchase, requires that the buyers re-involve Sehgal or his assistants each time the work is exhibited. Sehgal and his team are active in all stages of production, monitoring and modifying works throughout the exhibition period, so that the script of the work, i.e. the description of the decision procedure, is also modified as part of the production of the work. Additionally, activity where possible, is body-to-body, and not through other mediating devices. In this arrangement, there is no easy split between the idea/script and its execution, since the script is modified during the execution. With the emphasis on body-to-body activity, there is also no easy identification of a split between the work of a human and a machine. And as a participatory practice that choreographs movement together with spontaneous

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[24] LeWitt's vagueness regarding the connection between the idea and its manifestation has led some scholars to label LeWitt's approach to Conceptualism as transitional or weak. Peter Osborne writes 'LeWitt is not really thinking ontologically about art's object-hood here at all; even if we consider the object intentionalistically, as an idea. Rather, more simply, he is concerned to valorize the intellectual element of the process of its production, which he associates, psychologistically, with the workings of the artist's mind' (Osborne 2013, 54). The systems-based account presented here and by Skrebowski opens another avenue for assessing LeWitt's importance.

elements, there is no straightforward hierarchy between percept and concept, that is, between the work as idea and the work as embodied activity.

Furthermore, when Sehgal stages the acquisition process of the work as an oral contract, the acquisition is likened to a constructed situation itself. This raises a question regarding the division between the business operations of the work and the artistic operations of the work, as we discussed in terms of Tino's handshake earlier. The Tate curator Jessica Morgan has spoken about how some of these shifts altered her role as curator. She notes that the usual curatorial cycle of selecting, presenting, documenting, and educating is largely an interpretive role. In the Sehgal's installations this is replaced with one of hiring, managing, and carrying out the mechanics of the piece. The interpretive role is instead internalized in the work and self-interpreted by the interpreters of and participants in the piece. Morgan herself trained as an interpreter in the piece (Morgan and Raza 2012, 38:30)

I summarise some of the key differences of the two approaches as they pertain to notions of a 'decision procedure' in the table below:

LeWitt's Paragraphs	Sehgal's Constructed Situations
Procedure is a machine.	Only human actors. No machines.
Procedure is distinct from its material activation context (hardware/software split).	Procedure is situated in an ecology. No clear hardware/software binary.
Procedure is finite and must be 'exhausted' to produce the work.	Procedure has 'gaps' that are filled spontaneously in moments of activation.
Interpretation takes place after procedure execution is complete, i.e., extrinsic to procedure.	The human 'interpreters' are intrinsic to the procedure.
Procedure creation takes place prior to execution.	The procedure and its execution are mutually modifying during execution.
Procedure creation occurs in concept, 'prefact,' which is hierarchically separated from percept, 'postfact.'	Procedure creation occurs in collectively distributed shared embodied activities and memories of multiple actors.
Procedure eliminates individual caprice, taste, whimsy.	Procedure elicits individual caprice, taste, whimsy.

One of LeWitt's preoccupations is with a decision procedure understood in terms of 'machine' logical function. He investigates how art can take place through a division between two orders of becoming—the creative capacity of 'mystical' human intuition versus the operative functioning of idea-machines. Said another way, within his conceptualism, there is a concern with distinguishing between human and logical orders of experience. Logical idea-machines merely follow decisions procedure, whereas human conceptual art is engaged in the discovery of idea-machines. Such a division advances a dualist critique of technological rationality. It promotes a bifurcation of the digital in which logical function and human experience are fundamentally different.

Sehgal's notion of decision procedure has a far more ambivalent attitude regarding this division. In focusing on human actors and stressing an open, distributive, and embodied model of activity, Sehgal's notion of function has little to say about logical function. It bears a much stronger resemblance to what, in Chapter 4, I described as 'general function,' as a kind of mapping activity.

In particular, Sehgal's decision procedures are unsaturated, incomplete, or open. They contain 'conformal' requirements. Sehgal sets out many such requirements in the scripted elements within his work, including prompts that the interpreters must give and the instructions on the coordination of time schedules and opening hours. At the same time, they also explicitly introduce non-conformal or spontaneous parameters, selected by the interpreters, participants, and administrators, so that, at different levels, there are degrees of leeway. In such a model, the information ('in-formation') is what is formed through the combinations of con-formation and non-conformation which arise. It is this folding of fixed requirements and free aspects together that is able to 'express the concurrence of mathematical-formal principles with accidental factors' (*ESP* 128).

Sehgal's ambivalence does not exclude digital function. As I have argued, Sehgal presupposes the availability of digital technologies to produce his works. In my view, his refusal to incorporate media technologies within the presentation of his works is not an ideological rejection of the digital as an alien 'other' but a pragmatic technique to focus attention on a model of activity. The tacit assertion is that, if the digital is a pervasive and peripheral condition, then, rather than fixating on the digital as a mythic 'other,' we must search for systems of art that properly locate the digital on the peripheral horizon. The digital then becomes one aspect in the intense complex patterning of our finite

resources of attention in the works, which layer conformal and non-conformal patterns onto many other conditioning patterns.

If we accept this view of constructed situations as a way to model general function, this suggests Sehgal's cleaner conceptualism and anti-object stance are not purism but monism. That is, he is not fixated on body-based activity in the pursuit of the media-specificity of dance, for example. Instead, the narrow focus on embodied activity is a way to arrange situations that model certain kinds of non-dualistic decision procedures in art. These decision procedures investigate a general function that is open, distributive, self-interpreting, and, at all levels, patterned by both conformal and non-conformal urges.

In short, my claim is that, as artology, Sehgal's cleaner conceptualism can be usefully thought in Whiteheadian terms.

Conclusion

In the previous section, I suggested that Sehgal's constructed situations can be interpreted as staging a monist approach to art. Such a practice represents *one* way for exploring, intervening with and recomposing operations of general function. More specifically, Sehgal's practice embodies a way of investigating permutations of pattern and conformance, always presupposing a digitally networked social order. In this respect, his art practice is a kind of existence proof or prototype. It is one strategy employed today to critically investigate what I have called peripheral digital activity—that is, activity concerning the unplanned or unexpected effects that arise in conjunction with the use of digital networked technologies.

The ramifications of Sehgal's project are far from complete. Yet as I write that, I also am compelled to attend to a second movement. It is a movement intrinsic to this thesis. It is a movement that began a decade ago with *One mile long line*, shown on the first page of the Preface. Tracing this arc, as it is expressed in the body of the text, we see that in each chapter, I have described modifications to what I call a 'decision procedure.' In Chapter 1, I first outline a decision procedure's base characteristics. In subsequent chapters, I have further described the decision procedure, incorporating notions of analogy, material, mental, and logical relations, and finally discussing it in terms of Sehgal's artistic practice and arriving at this conclusion. It is a view of the thesis as its own subject, not an explanation of Sehgal's practice but instead as its own kind of

decision procedure, the final satisfaction of which is its explanation of the concrete experience of *One mile long line*. From this view, we can observe that each chapter includes a commentary on part-whole relations—in the discussion of decision procedures in Chapter 1, analogies in Chapter 2, maculate conception in Chapter 3, muddling in Chapter 4, and finally this concluding remark. Each chapter is also the outcome of modulations, contestations, and reappraisals as I have encountered a large community of texts and artworks.

My contention here is that the entire thesis, in its way, examines and reconfigures the peripheral activity that took place within the event of *One mile long line*. The unprovable (since subjective) claim is that practice-based research, with its interweaving of extrinsic and intrinsic activity, provides a second performative strategy for critically investigating peripheral digital activity.

The proposal, in short, is that there are a plurality of different modes or manners of decision procedures, related to different material conditions. The hope is that, through art's spirit of investigation and adventure, we may discover decision procedures that elicit an expanded peripheral digital awareness.

Coda: Anonymous Painting

In this coda, I turn to the painter Laura Owens. My claim in what follows is that Owens's proposal of 'anonymous gesture' can be read in Whiteheadian terms as another approach for interrogating peripheral digital activity. I do not here attempt a detailed Whitehead-centred analysis in terms of the decision procedures of art. Instead, my aim is to internalize Whitehead's proposals and then adopt a more open analysis, pointing more conjecturally towards future research directions.

Laura Owens

Pavement Karaoke / Alphabet by Californian painter Laura Owens is an exhibition of seven large-scale paintings shown at Sadie Coles HQ in London in 2012, together with a number of smaller works. One of the series, *Untitled* (2012), recently was exhibited in the *Painting after Technology* room of the permanent collection of the Tate Modern, curated by Mark Godfrey.

The title of Owens's series refers to the American indie band Pavement, as well as to karaoke bars. Large-scale letters spelling out the word 'karaoke' spread across seven canvases, creating a visual element that unifies the individual paintings as part of a larger ordered sequence. Each painting is hung at a distance from the others, resulting in a series of discrete but connected works.

The paintings contain many elements, executed using a jumble of effects and materials. These include the use of masking tape, layering, freehand drawing, silkscreening of news classifieds, collage, impasto brushstrokes, grids, lattices, trompe l'oeil drop shadows, and letterforms. The images are executed in oil, acrylic, Flashe vinyl paint, resin and bits of pumice stone glued to the canvas.

The paintings feature oversize scrawls. Some scrawls were produced first as drawings or paintings that are captured as digital images. Other scrawls were created by 'drawing' or 'erasing' with a computer mouse or graphics tablet. The resulting digital images are projected on the canvas and then painted. In this way, mark-making by hand becomes intermixed with other kinds of technical operations, including the use of digital devices, software, projectors, and digital cameras, screen printing, collage, etc.
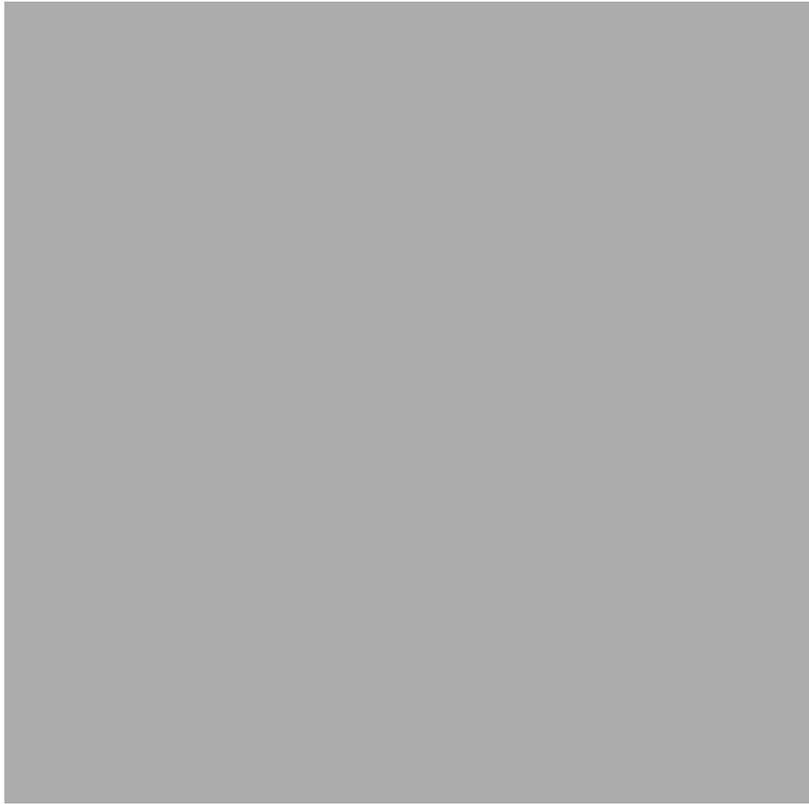
Laura Owens, *Untitled 2012* from *Pavement Karaoke / Alphabet.*
Oil paint, acrylic paint, acrylic resin, fabric and pumice on
canvas. 2745 x 2134 x 41 mm

Laura Owens and Ooga Booga #2, *12 Paintings*, 356 South
Mission Rd., 2013

The resulting images are reminiscent of the compositional layering and windowing found on computer screens. Owens asserts that Photoshop imagery is linked to the traditions of printmaking, in that CMYK prints and Photoshop images are compositions from multiple layers. Like etching or silkscreening, she says, Photoshop is 'a natural, conceptual extension of printmaking.' This made it 'feel like a natural part of painting that shouldn't be avoided or, on the other hand, given too much meaning, because it just comes out of hundreds of years of printmaking, as the newest version of it' (Lehrer-Graiwer and Owens 2013, 235).

In addition to their mixed and layered mode of production, the paintings are also striking for the way they combine experiments with different manners of technical production and multiple art-historical references. They are a bricolage of cross-cultural references: a Mary Heilmann slapdash pink, a gingham fabric, Miró-esque lines, a Photoshop effect, a Roy Lichtenstein graphic element, Frank Stella graph paper, newspaper clippings, an Agnes Martin grid. All compete for attention within the same composition. There are also many self-references to Owen'ss previous works, such as her use of textile patterns from Peru and India.

Owens follows an approach of composing and producing using a grab bag of disparate resources—diverse elements that are rehearsed and practiced, co-mingled and recombined. The grab bag might include something that has just occurred or an appropriated historical event. It could be something that happened directly to Owens, or it might be a story, technique, or reference from an assistant.

Impasto shapes in Owens's works are further accentuated by their painted drop shadows. Looking at one of Owens's paintings, you can easily become fixated on one of the chunks of thick impasto pigment. If your eye drifts, a flip-flop occurs when you encounter an area of illusory trompe l'oeil drop shadow. This kind of flip-flopping, given the large scale of the paintings and the overlapping of actual shadows and drop shadows at different angles and in different styles, makes it impossible to construct a sense of temporal consistency. There is no way of knowing which marks were created in which order. The paintings are not built up a layer at a time but present an incongruous disparity of shifting registers. To see the large graphic forms spanning multiple canvases, one has to move back and stand at a distance. From this perspective, the connecting themes between canvases become apparent, but the details become vague. Visitors who seek to integrate these elements must move around the exhibition space, so, in a

certain way, their movements become one more disparate element coordinated by Owens.

In 2013 Owens secured the *356* South Mission Road, a large industrial space in Los Angeles that was a former lithographic workshop. With support from gallerist Gavin Brown, Owens used the space as a studio to create a new series of works, called *12 Paintings* (Fiduccia 2014). After completing them, she installed the paintings as a six-month-long exhibition.

Each painting was hung as a discrete entity, so that each painting stood for itself. But with some forms spanning multiple paintings, the impression is that there was some shared or underlying whole. This interest in part-whole relations is a long-standing concern for Owens. As she writes of a painting of animals she created in 2000:

It was a single painting, but the multiplicity of marks and animals creates internal moments that talk to one another and gel into one whole thing. There is an idea of painting within a painting that runs throughout the history of art, whether it is a Matisse window painting, a Chinese scroll, or Baldessari's A Painting That is Its Own Documentation *[1966–68]. This is not only a formal device but also a way of including disparate pieces of paint, techniques, spaces, and concepts within one painting so that the work requires a participatory viewer. For me, it was a way of addressing the space within the painting not unlike the space of a room or an installation. (Lehrer-Graiwer and Owens 2013, 232)*

Owens argues that 'painting *does things*, and why wouldn't you want to use all the things that it does?' (Lehrer-Graiwer and Owens 2013, 232). The 'doing' that she associates with painting is more than simply the reproduction of signs. For some artists, she suggests, painting is deployed without much attention to painterly technique, so that it becomes merely an index of 'and-I-do-this-painting-thing-too.' For Owens, the aim is to create internal 'pressure' through painting. For example, when deciding on the paintings for South Mission Road, Owens toyed with the idea of making really small paintings or making paintings that were part of architectural wall partitions. In the end, she chose a rectangular size that she felt was 'called for' by the exhibition space. By eliminating ironic tricks or gimmicks with the painting's size or hanging, she sought to increase the emphasis on what each painting must hold within its frame.

Owens's emphasis on artistic production is coupled with open-ended collaboration with others, including organizing events, running a bookshop, and hosting other

activities such as screenings and talks. In conjunction with the show *Pavement Karaoke*, the press release from Sadie Coles HQ announces that a karaoke party would be part of the exhibition. At South Mission Road, Owens invited the Los Angeles bookshop Ooga Booga to open an outlet in the entrance. Owens organized a series of screenings, talks, readings, and performances. The site was subsequently used as an exhibition space for invited artists. In Owens's curation of her spaces and events, and in her collaborations with assistants in and around her artistic production, her practice appears to move in multiple directions. Yet Owens consistently seeks to return the attention to her painting, insisting that her work is about pushing what painting can be. Owens does not view painting as a dead end or as a nostalgic conservative form for art. She insists that in painting there is always the possibility of doing something else.

Owens discusses her works in terms of the gesture. She aims to 'emphatically try to inhabit the gesture. The gesture is simultaneously the mark inside of painting, the act of painting, and the decision to rent the space and make the exhibition' (2013, 236). Owens distinguishes two models of gesture. One model is what she describes as the signature, male, instantaneous gesture, akin to a male orgasm or a DNA imprint that replicates itself over and over, similar to the way language is repeated and reinforced. The other model she relates to female production:

The female orgasm has no use, no mark, no locatability. It can't even be located in time. There's no moment when ejaculate comes out, really. I want to think about how that can be the model for a new gesture. What is that gesture in art, or in painting? … I'm specifically locating production that's telegraphing itself, which feels very old-fashioned. (2013, 236)

Owens contrasts this model with the artists Maurizio Cattelan and Richard Prince, who, according to Owens, make many different kinds of things while also emphasizing their own narratives and biographies as part of the practice. She critiques works that cultivate a 'clever' narrative around what gestures happened when, noting that Damien Hirst's spot paintings 'exist as discourse before anything' (2013, 239). Instead, Owens aims to emphasize the particular circumstances of a single show, space, exhibition, object, and time. By making *12 paintings* onsite, Owens suggests, the paintings are not shown in a space that is 'foreign' to their activities of making. She mentions Mike Kelley and Jason Rhoades as two Los Angeles artists whose installations influenced her approach, adding, 'When you privilege the artist's overarching narrative, you're saying

he's *the* one, he's the one who makes, he's the one who owns the gesture. When everyone makes a painting, the gesture becomes more anonymous' (2013, 239).

Two Responses: Atemporality and Flux

In this section, I look at the responses of Laura Hoptman and David Joselit in order to outline two distinct attitudes towards the digital that have been linked to Laura Owens's practice: one is based on the notion of atemporality, the other on a notion of flux.

In *The Forever Now* at the Museum of Modern Art, the curator Laura Hoptman staged an important exhibition of contemporary painters, including Owens.[25] Acknowledging the huge variety of different techniques and evocations found in the paintings she selected, Hoptman described the heterogeneous 'anything goes' approach through a notion of 'atemporality.' According to Hoptman, Owens belongs to a generation of post-internet painters for whom referencing a technique or history of imagery is as easy as clicking on a link. It is, says Hoptman, 'the era of the remix, the mash-up, and the sample. The rise of a "plus/and" rather than an "either/or" culture of instantaneous creativity …' (Hoptman 2014, 47). Works by painters such as Owens, according to Hoptman, presuppose the internet and smartphone culture in which data is accessible non-hierarchically and instantly (Hoptman 2014, 16). Digital technologies have enabled us to 'access data contemporaneously … and non-hierarchically, erasing time-honored indicators of significance and value. One result of this is the enormous, international expansion of the contemporary art discourse' (2014, 16). She quotes Jörg Heiser's description of a cultural landscape existing as a 'computational aggregate,' permutations of multiple influences and sources (2014, 18). Within this landscape, when Hoptman turns to the 'problem' of why we should continue to look at paintings, her response is that paintings resonate now precisely because they are objects with limitless art-historical baggage. She offers the analogy of zombies. Like zombies, paintings can be reanimated in new permutations, bringing back to life what was thought to be done and dusted.

Hoptman takes the term 'atemporality' from the cyberfiction author William Gibson, who describes it as 'a new and strange state of the world in which, courtesy of the

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[25] Owens was one of seventeen artists in the exhibition *The Forever Now* curated by Hoptman for the exhibition, which ran December 14, 2014 to April 5, 2015. The other artists were Richard Aldrich, Joe Bradley, Kerstin Brätsch, Matt Connors, Michaela Eichwald, Nicole Eisenman, Mark Grotjahn, Charline von Heyl, Rashid Johnson, Julie Mehretu, Dianna Molzan, Oscar Murillo, Amy Sillman, Josh Smith, Mary Weatherford and Michael Williams.

internet, all eras seem to exist at once.' (2014, 13). Hoptman also links the notion to St. Augustine's idea of the eternal present—a doctrine in which the past, present, and future are fully known and so available simultaneously. If atemporal painters allow that a painting may potentially go anywhere, or include anything, the dizzying array of different techniques and historical references of Owens's paintings means that viewers cannot locate her painting within any tradition of painting. For Hoptman, the result is not painting *about* painting, about the strategies or gestures that contribute to a *res gesta*, where one painting communicates with another. Instead, she asserts, 'they *are* paintings, period' (2014, 14).

This notion of atemporality proposes that information encodes a network of possibilities that stretches across time periods, recycling and flattening historical conventions and so refuting the possibility of chronological classification. It understands information to be transmissible and exchangeable. A bit is a bit. If a JPEG image is held on two different servers through digital replication of information, it contains the identical bit pattern—it is the same image.

If atemporality is one pole, there is a second pole embedded within Hoptman's account. She mentions the art historian David Joselit, who proposes that we consider a contemporary painting not as an 'object' but instead as a broadcast medium. In a series of texts (Joselit 2009, 2011, 2016; Hochdörfer, Joselit, and Ammer 2015; Graw and Lajer-Burcharth 2016), Joselit explores this idea, tracing it to Martin Kippenberger in the 1990s. He argues that contemporary painting is held within a network and acts as a kind of transmitter or broadcaster of information.

Hoptman is intrigued but not convinced. She writes, 'The notion that a painting—or at least the information that it carries—is perpetually in motion is invigorating … However, rechristening an object as an activity is, in the end, a rhetorical magic trick. It doesn't make the obsolescent thingness of painting (its awkward but crucial relationship to the world of digital information notwithstanding) disappear.' (2014, 23).

Although Hoptman does not pursue Joselit's notion further, by including his notion in her text she acknowledges a tacit opportunity. If rhetoric does perform magic, if we are already contemplating the rhetorical magic tricks of zombies and eternities, if painting can go anywhere, and if we are in the era of 'plus/and' rather than 'either/or,' then logically we should pursue the notion of a painting as a verb rather than a noun.

Let us click on the link that converts paintings from atemporal informational objects into fluxing activities.

We are now taking up a more processual perspective and contemplating a painting as an embodied, local, affective, perceptual transmitter. It is here that we note that, while Owens includes many different sources and techniques into her paintings, she also treats digital technology mundanely and practically, as one more tool in the collection of tools used to make marks. She insists that digital tools shouldn't be avoided or given too much meaning. Digital tools are simply the latest iteration in the history of how we produce. They are nothing more than 'a natural, conceptual extension of printmaking,' sets of operations and functions, always with histories and legacies, capable of impacting and modifying what gestures we can do here, at this location, in this time, with these materials.

This is less of an informational approach to the digital, where information is conceived of as a timeless substance. It is more a recognition that digital tools are processes enfolded and intermingled with other tools and processes. A digital bit doesn't occur in a vacuum; it arises somewhere, in some particular circumstance, in relation to other circumstances or activities. In this immanent attitude towards the digital, a JPEG image, held on two different servers, is unquestionably two distinct JPEG images. The two images may share a similar patterning of data—both are recognizably the same species, if you like—but they are individual specimens, their own vibratory collections of electromagnetic impulses. There is a potential that one may become corrupted or lost while the other endures. Bits participate in different histories and reside at different electronic 'addresses.' Within this immanent empiricist attitude, each bit on the planet is its own unique entity. To say two bits of information are the same is already to have abstracted from the nature of bits as concrete hunks of factuality. It is to presume certain habits and expectations regarding how bits ought to behave, presuming a cosmic piece of radiation doesn't interfere. Once we adopt this immanent attitude, we look at Owens's paintings not as atemporal information but as material conglomerations which continue to be shaped by active processes.

It is important to stress that neither attitude—atemporality or flux—by itself is adequate. Joselit recognizes this. He argues that contemporary painting cannot be reduced to one state or another. Rather painting denotes an unstable and perceptual

circulation between registers (Hochdörfer, Joselit, and Ammer 2015, 177), so that network painting exists paradoxically as both 'picture' and 'passage.' Joselit:

The painterly mark of our time embodies a paradox: between touch as an index of affect, and touch as the automatic transcription of information. It carries a new kind of artificial intelligence. (Joselit 2016)

My view is that there is no paradoxical relation between the atemporal 'picture' aspects and fluxing 'passage' aspects of one of Owens's paintings. Rather, these notions together are constitutive of information. I see this in Whiteheadian terms. For Whitehead, 'atemporality' corresponds to what he calls the infinity of *potentiality*, whereas flux is marked by the sequences of 'cuts' that divide potentiality into atomic facts of *actuality.* 'Passage,' then, marks the transition from potentiality to the actuality. In each moment, we contend with both aspects, one of potentiality and one of stubborn actuality. If there were only atemporality, there would be no notion of a passage of time. If there were only flux, with indivisible 'cuts' where potentiality is made to stand still, there could be no experience of difference. Like a coin with two sides, both are necessarily a part of experience.

Yes, when I stare at Owens's painting, I notice the newsprint screen-printed on one corner, with the date 21 April 1947. I wonder how that date was selected, and I am soon lost in the infinite play of 'what could be' of potential meanings. Yes, as I walk in the exhibition, my foot scuffs on the floor, I notice a few granules under my shoe, perhaps a piece of pumice stone, and I note that the painting is not atemporal, but concrete matter that is slowly undergoing change. Whitehead's demand is that we think both notions together.

Anonymity

In this section, I wish to further expand on Owens's question of how a mark might be produced as an 'anonymous gesture' in painting.

In the model of production Owens pursues, while there are sequences of marks held internally within the painting, the layered approach to construction obscures the connections between maker and mark. The question of temporality—the issue of 'who' did 'what' and 'when'—becomes vague. A viewer might scrutinize the painting at multiple scales and from different perspectives, attempting to ascertain whether a discernible feature is a handmade pigmented mark, a piece of glued-on pumice, or the

result of some chain of technical operations. Such scrutiny may fail to yield an answer, leading the viewer to doubt the intelligibility of the task.

Owens asks, in a space of male imprimatur, 'Is it even possible for a woman artist to be the one who marks? … At the same time, in 2013, does anyone at all have this ability, or is it an antiquated and sentimental idea?' (2013, 236). This is what is at stake when Owens introduces the notion of an 'anonymous gesture.' What counts as gesture now? How is a gesture named or associated with one individual or another? What are the possibilities that anonymity and masking might open up? Can anonymity be used to free up hypostatized notions of the subject, authorship, and language?

In what follows, I bracket these issues, in order to further highlight a dimension introduced by digital technologies.

When Owens uses Photoshop in her paintings, one or more individuals co-create marks in collaboration with digital sensors, projectors, and computational algorithms. This yields marks that are not the result of an individual's expressive gestures or the result of automated processes but a hybrid of both. Digital tools offer opportunities to ambiguate, overlay, decenter, or mask the relations between an individual's gestural activity and the corresponding marks. Is that squiggle there one that Owens produced spontaneously, with a brush, in a moment, perhaps in solidarity with the gestural painters of the 1950s, which Hochdörfer calls 'the last remaining bastion of artistic license from which the integrity of individual expression might be defended' (Hochdörfer, Joselit, and Ammer 2015, 15)? Or no, is it a digital image of someone else's mark that has been projected and studiously rendered by an assistant? Such slippage is, according to Owens, part of what she seeks to produce in her paintings.

There is another way think of the strategies of appropriation and masking and decentring taking place in Owens's paintings. Within the widely deployed sensory arrays of the digital, and through reverse engineering, spyware, industrial partnerships, or the intersection of these techniques, digital technologies can be made to function in reverse. They can 'unmask,' exposing relations between an individual and their activities even when they were thought to be hidden. To produce an anonymous gesture, in a digital epoch, one must consider marking/unmarking in terms of a complex play of techniques of masking/unmasking.

This is illustrated by the story of Reality Winner, an American intelligence specialist and NSA contractor who was arrested in June 2017 and charged with leaking an

intelligence report to The Intercept. Online images of a leaked report were published by The Intercept. It later transpired that the images were snapshots of a document that had originally been printed by a model of colour printer that included a microdot pattern in its output. The pattern is imperceptible to the naked eye but visible through software analysis. FBI agents were able to analyse the online images, decode the microdot pattern, and discover that the printer involved had model number 54, serial number 29535218 and had printed the document on 9 May 2017 at 6:20 (Hawkins 2017). An internal audit revealed the individuals who had printed out materials on that date and printer, one of them being Reality Winner. Investigators searched Winner's work computer and found that she had emailed The Intercept from a personal account, using what appeared to be a coded message. When Winner was confronted with this evidence, she admitted to having leaked the document.

This story shows how digital production technologies embed codes into non-digital objects that, in conjunction with an intersection of multiple sensor techniques, support unmasking individual actions. New sensor technologies have increased the range of available technical analysis and unmasking options. An analyst may retrieve the DNA fingerprints of all those who have touched the painting's surface. Not to mention X-ray, wide-spectrum, 3-D scanners, ultrasonic, or many other kinds of sensing technologies within the nascent field of the computational analysis of art.

Although such computational analysis may not be currently widely deployed (our mobile phones do not *yet* include DNA scanners), we already experience a version of this kind of analysis.

It is not uncommon, while one is standing in front of an artwork, to reach for a smartphone to look up the artwork on the internet, perhaps to affirm or reject a proposition or learn of related works. This mode of technical 'looking' is a way of expanding a 'microdot,' that is, of unpacking the digital traces that are interwoven with a painting and its caption.

It is here that a pivot occurs. For when we 'look' at a painting with the aid of a digital technology, the painting ceases to be a broadcast mechanism and turns into a capture mechanism. Joselit observes that people take photos of art in museums with their smartphones, storing the art for later, since, he argues, there are so many artworks it is impossible to spend the time to appreciate them all. But storage is only one of the functions being invoked. Today's visitors take selfies with art, literally pivoting their

bodies to take a photograph, leading to the odd spectre of a group of viewers with their back to a painting. The aim is less to secure an image of the work and more to rebroadcast a new image, one showing the co-presence of the individual beside the work.

Viewers taking selfies in front of the Mona Lisa. Video still from online video (Nikkhah 2015).

Even if a viewer does not explicitly take a selfie in front of an artwork, their smartphone registers its location in its audit trail, using a timestamp and a GPS coordinate. A person does not need to carry a smartphone for such a digital registration to arise. Paintings are in many cases geospatially stable, mounted, secured objects in habitats with access controls, accompanying surveillance cameras, and other digital sensors. Paintings function as effective 'fiducial' markers. They are low-maintenance data-gathering sites providing for the capture of a continual stream of digital traces about individuals. These can be analysed computationally and fed into data-mining algorithms, generating further patterns and preference profiles while supporting the task of unmasking.

Functional Augmentation

The line of thinking I am pursuing—in which a painting pivots from an emitter into a sensor—is an approach I would describe in terms of functional augmentation. To explain this, I return to the debates between functional and object-oriented programmers.

Purist OOP developers advocate object-based programming languages on the basis that they model thing-like behaviour, which is well understood and has an established

history. FP programmers stress the mathematical elegance of well-behaved pure functions. Such functions have no 'side effects' (i.e., the entire outcome of the function is encapsulated in its result). These functions can be composed and overlaid in flexible ways. Functionalist idioms are being introduced as *add-on* libraries in object-oriented frameworks, rather than as wholesale replacements of OOP approaches, resulting in object-functional systems combining both models at once. (N. Ford 2014).

I mention this because a similar trend can be seen in a shift towards augmentative digital techniques more broadly. Virtual-reality headsets may have been a symbol of the digital, promoting the narrative that digital technology might replace or overtake sensory inputs. But there is a broader digital transformation taking place.

To gain a sense of the scale of change, consider this remark by George Perec in 1974:

There are few events which don't leave a written trace at least. At one time or another, almost everything passes through a sheet of paper, the page of a notebook, or of a diary, or some other chance support (a Metro ticket, the margin of a newspaper, a cigarette packet, the back of an envelope etc.) on which, at varying speeds and by different technique depending on the place, time or mood, one or another of the miscellaneous elements that comprise the everydayness of life comes to be inscribed (Perec 2008, 12 [1974]).

Notably, all of the chance supports listed by Perec have been supplemented by digital technologies. We now write notes and read news using smartphones, shop with our tablets, send instant messages electronically, and sign for our food delivers by smudging a finger across a screen. Perec's model of inscription as a written trace on a chance support is increasingly being augmented by a digital trace generated by embodied activity and transmitted for analysis and further manipulation by algorithms. Where Perec scrupulously recorded the infra-ordinary by writing lists with his MontBlanc pen, now we snapchat, tweet, post, and gram. Perec approached his world and language through the texture of the written trace. Today, there are few events that don't leave a digital trace at least.

E-cigarettes are an example of the 'augmented' approach being pursued by the digital industry. In such augmented approaches, digital functionalities are added to and overlaid on existing objects and habits. When we vape, our lungs ingest reactive chemicals, changing our affective body states, fulfilling a similar role to tobacco cigarettes. In parallel, computational mechanisms monitor the vaping process, and, in

some devices, wirelessly share vape data with mobile phones. Vaping is the productization of nicotine-producing cigarettes overlaid or augmented with digital functions that track vaping patterns. Similar augmentative strategies are being pursued in many other arenas—such as contactless travel cards, electronic toothbrushes, car keys, telephones, pens, thermostats, and even the London congestion-charge zone (based on number-plate readers). Augmentation is a driving logic for the internet of things. A frying pan with a built-in digital sensor can be sold for more than a frying pan, while also providing additional data flows back to the manufacturer, conveying household frying signals that can be linked to other marketing patterns.

Functional augmentation strategies are redirections, placing less emphasis on extending or replacing a thing or body, and more on delivering add-on functions. Data flows are layered in parallel onto or beside an existing thing or habit, minimally invasively. The aim is to provide a way of up-channelling data to multiple other individuals, aggregators or agents, so that sensing and emitting can be coupled with logging, auditing, monitoring, or verifying. When a garden furniture manufacturer prints a URL on the back of a chair, this allows people to access the company's website to purchase similar items. At the same time, it provides a back-channel of data to the company about those browsers, their locality, which device they are using, and so on.

Augmentative strategies can be deployed in stages. For example, in 2007 the BBC launched its iPlayer, allowing viewers to watch broadcast TV on computer screens. In recent months, iPlayer was modified to require users to register and 'sign in' to the iPlayer. Viewers can watch TV programs online, as before, with the added 'convenience' that the iPlayer remembers what they have watched. Simultaneously, through functional augmentation, iPlayer can transmit data on individual channel-surfing patterns to the BBC for aggregation and analysis.

As another example, in the photo booths being installed in airport customs halls, individuals are required to stand in front of a camera, scan their passport, and then have their photo taken. This is advertised as a feature to improve passenger transit efficiency. An unannounced functional augmentation is that digital full-face portraits, captured under controlled lighting, in the presence of a passport ID barcode, can be forwarded to national facial-recognition databases used to automate CCTV tracking technology.

Functional augmentation therefore corresponds to the tendency to create data flows in multiple directions at once. Within a highly interconnected digital context,

invoking a digital function enables the function to open a channel to record how it has been invoked. But such functional augmentation is not an ahistorical or a universalizing concept. It is a strategy applied locally, parasitically, modifying highly particular objects and habits, in some cases targeting a single object or system. One of my colleagues attached an alerting device he created to his elderly father's walking stick in case his father became lost. Another individual proudly had me touch the place on his chest where a Wi-Fi pacemaker modulates his heart. In addition, it transmits statistics wirelessly, over the internet, to physicians who will call him by phone if the signal shows any anomalies.

Augmentation occurs at industrial scales. When Apple renamed 'applications' as 'apps' on its iPhones, the suggestion was that they are like mini-applications. But unlike applications, apps are premised on the notion that they cannot take over primary system functions that Apple integrates into the device, including its phone functions. Apps are quarantined, or 'sandboxed.' This corresponds to an augmentative mindset—it is part of Apple's strategy to distinguish the device, which it owns and controls, from the apps that are 'add-ons' to augment the device.

Functional augmentation presupposes an entity on which function is hoisted, the attachment point that provides the capacities for sensing, powering, computing, and emitting. However, such functioning can also result in unanticipated functional side-effects.

Painting as Diagnostic

Discussions of functional augmentation seem foreign to the phenomenal discourse of the specificity of Owens's paintings as objects. Then again, simply by contemplating a painting in terms of its specificity, you have already begun the process of engaging filtering and selectivity functions through which rectangles on a wall, positioned at certain heights, are joined with the use of the word 'specificity' in an email, unmasking you in a data stream as someone with a 'specificity' attitude towards a painting's function. Which is to say that, from a data analyst's perspective, functional augmentation, as an add-on feature of the digital, is conducted beside and parallel to other phenomenal object-based strategies and discourses. Put another way, to inhabit an anonymous gesture in painting today is to be concerned with more than the mark, the act of painting, and the decision to rent space and exhibit works. It is also to attend

to the digital gestures the painting elicits as a fiducial marker—considering ways that a painting functions to mask or unmask its viewers. Owens seeks to produce anonymous gesture through a plurality of different motifs and techniques in paint. She presents the paintings in an exhibition space she controls, and then observes viewers observing her paintings. This can be interpreted not only as the production of an atemporal picture with its embedded flux and passage, but also as a way of performing a kind of diagnostic.

Consider Joselit's discussion of painting as a part of a network involved in passage. He writes:

'Painting as model' is how Bois once put it; in the case of much recent abstraction, it is a model of how information travels and a method for measuring the distance—geographic, temporal, social, and psychic—between enunciations of the same picture. In painting, the space of transmission can itself be, as Rosenberg contended with regard to Abstract Expressionism, 'an arena in which to act.' (Joselit 2011)

Joselit is identifying how a painting, transformed into a tweet or Instagram post, becomes a broadcaster within in a 'space of transmission,' as a node in a network. I agree and would go further. When an entity is placed in a network, it is not a broadcast-only transmission. Paintings are not only models in a static sense. The paintings become a part of the circuit through which data flows occur in all directions. Owens's anonymous gesture can be understood as a strategy for tracing and intervening in these peripheral digital data flows.

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