

# Set Theory Ontology as an Approach to Gaming's Composite Form

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## INTRODUCTION

This paper will explore the possibilities that mathematical set theory has to offer the scholarly study of videogames. Videogames are highly heterogeneous objects of study, comprising what Linderoth (2015) has called a 'composite form': complex arrangements of material, symbolic and computational capacities. This composite is becoming ever-more heterogeneous, 'recruiting' increasingly volatile bodies and relations as computing resources are newly distributed throughout both built and natural environments to create locative, alternate and virtual realities that have been used by designers in various ways (*Pokemon Go* being only one example).

## BEYOND UNIT OPERATIONS

Composite form is a source of many of the difficulties in analyzing videogames : formal schemas and conceptual frameworks are liable to fall afoul of the rapidly shifting set of materials in which digital play situations arise. Comparisons can be difficult because even the one game can differ markedly between its particular instantiations: *Donkey Kong* is very different when played in an arcade cabinet as opposed to a mobile phone or when emulated on a PC: as Newman (2012) asks, what constitutes the '*Donkey Kong*-ness of *Donkey Kong*'?

And yet while the precise arrangement of elements varies in each actualization, *Donkey Kong* does remain legible across this series of transformations. This is one example of where the constructive approach of set theory can be of use. Arguably, gaming's composite form means that a theory of games cannot rely on a base unit of analysis (Jayemanne, forthcoming). On the one hand, this is because the composite is too complex for such units to be identified (say in the dynamic back-and-forth of a *Street Fighter V* match where each move is enmeshed with the countermoves of another player), or because the pace of change in the videogame form is such that new elements are constantly being introduced (game theory from the early 2000s would be hard to apply to many locative games such as *Ingress*). Through the fundamental relation of inclusion and

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the axioms, on the other hand, set theory enables the generation of an infinite universe of entities without recourse to any basic unit. It thus has the potential to considerably facilitate the discussion of videogames.

The most sustained engagement with the possibilities of set theory for analysis of games is in the work of Ian Bogost, in particular the book *Unit Operations*. Bogost draws on the work of Badiou in order to outline a set-theoretical ontology in which a game is a ‘count-as-one’ which ‘encapsulates’ a lived experience. However, there is notably little actual set theory in Bogost’s books, and furthermore we argue that the potentials for set theoretical notation in discussing games is far more generic than the accounts given in these discussions of Badiou. What then may a more developed engagement with set theory have to offer the study of videogames?

## **SUBSET OVERDRIVE**

Where for Bogost, the ‘count-as-one’ of a videogame encapsulates an experience from real life, we argue further that there is the possibility for set theory to make significant contributions to the *internal* dynamics of a game: that is, new and rigorous ways of talking about videogame structures and aesthetics in light of their composite form. Set theory can also provide notation capable of accounting for how videogames connect digital and analogue elements in new configurations of ‘postdigital’ play (Cramer 2010; Berry & Dieter 2015; Jayemanne et al., 2016) across increasingly diverse mobile interfaces (Farman 2012).

Bogost identifies the advantage of set theory in the ability to count multiples without making assumptions about the elements that constitute them. Set theory ‘begins by saying that one set exists. This particular set is subtracted from the conditions of every other set in set theory: that of having elements. This is the null-set, a multiple of nothing or of the void’ (Feltham & Clemens, 1998). This one existential claim is then supplemented by nine axioms (such as foundation, power-set, extensionality and so on) from which the universe of set theory (in its orthodox Z-F version) arises. The process of constructing around basic relations such as belonging, subsets are generic in nature.

Set theory notation thus provides a method for proceeding in spite of what Berry & Dieter call ‘agnotology’: a need to be mindful that a lack of knowledge, in a ‘messy’ postdigital environment, as to what set of participants may be involved in any given situation. Through either diagrams or notation, the genericity characteristic of set theory can be helpful to scholars in mapping out the schemas of play situations of interest to particular research projects.

## **CONDITIONS**

This paper will open with a brief introduction to Z-F set theory, and illustrate the theory’s utility for critiquing orthodox game design with a schematization of a relatively simple videogame narrative structure (the Virmire mission in the *Mass Effect* series of three games). However, there is an additional issue insofar as there are many aspects of Badiou’s *Being and Event* that Bogost does not draw upon. The related question thus arises as to what a wider look at Badiou’s work might yield?

The second part of this paper will point towards some future avenues for exploring this question by specific reference to Badiou’s notion of politics as one of the four ‘conditions’ of philosophy. Set theory-as-ontology is *subtractive* – it enables a discourse capable of writing the schemas of situations – but additional (meta-ontological) work is

needed to relate the schema to politics. In closing, the relation of politics to games will be examined through a reading of the site-specific installation *Killbox*, which utilizes game technology to generate a critical artwork about US drone warfare in the Middle East.

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