

Tackling the Metaphor-Simulation Dilemma

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ABSTRACT

This paper presents a couple of observations on the use of the concept of metaphor in game studies: Firstly, often when authors use the concept of metaphor this appears in conceptual and textual proximity to simulation. Secondly, the concept of metaphor is often applied to signify seemingly abstract games and to form thereby an opposition to mimetic simulations. Thirdly, definitions applied for simulation as well as for metaphor are strikingly similar. As such this paper discusses in a first step respective examples from the field of game studies in order to develop an understanding how the terms metaphor and simulation are used there. In a second step it presents what is here called the “metaphor-simulation dilemma” which shows that the definitions of both concepts are strikingly similar. From these observations I will derive and demonstrate what I call the metaphor-simulation dilemma. Finally, I will argue based on a narrow understanding of metaphor to consider simulations always already as metonyms and thereby challenge the assumption that especially abstract simulations are metaphors. Furthermore, I will challenge the assumption that simulations required a similarity between the simulating and the simulated with Frasca’s sign-based definition of a simulation and comments on this. And finally I will explore a condition which enables us to speak of a metaphoric simulation.

Keywords

Metaphor, simulation, metonymy, synecdoche, game

INTRODUCTION

In this paper I will present some observations, which I have made, while researching the use of the term “metaphor” in game studies, in order to find out if it is a practicable concept to better understand and analyze games. So far I have focused primarily on the use of the term in game studies.

Reading literature from the field of game studies (Mäyrä 2008, 1–12; Egenfeldt-Nielsen, Smith, and Tosca 2008) the frequent use of the term “metaphor” or one of its tropical relatives such as “allegory” is noticeable (e.g. Aarseth 2000; Pearce 2002; Crawford 2003; Juul 2005; Juul 2007; Rusch 2009; Begy 2010; Bogost 2011). Often this term is used to describe especially semiotically abstract games. Meaning, metaphorical games in this sense do rather feature geometrical objects instead of graphically detailed anthropomorphic characters. Furthermore, the term metaphor is very often used in textual proximity to the term simulation (e.g. Aarseth 2000; Crawford 2003; Juul 2005; Begy 2010; Bogost 2011). One can even get the impression that metaphor itself is often used as

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a metaphor for an abstract and unrealistic simulation. In addition, the definitions for the terms “metaphor” and “simulation” are strikingly similar. This leads to the dilemma that metaphor and simulation actually refer to the same phenomenon and therefore one of the two terms would become superfluous.

In this paper I will demonstrate and problematize the use of the notion of metaphor and simulation in game studies with regard to games. From these observations I will derive and demonstrate what I call the metaphor-simulation dilemma. Finally, I will argue based on a narrow understanding of metaphor to consider simulations always already as metonyms and thereby challenge the assumption that especially abstract simulations are metaphors. Furthermore, I will challenge the assumption that simulations required a similarity between the simulating and the simulated with Frasca’s sign-based definition of a simulation and comments on this. And finally I will explore a condition which enables us to speak of a metaphoric simulation.

The goal of the paper is to test if there is actually a dilemma when discussing specific characteristics of metaphor and simulation, find hidden similarities and differences and thereby hopefully disentangle the dilemma.

METAPHOR AND SIMULATION IN GAME STUDIES

One reason why the term metaphor seems so appealing to describe aspects of games is its belonging to the field of rhetoric. In rhetoric metaphor is known as a means of style and is prototypically associated with the distinction between literal and non-literal speech. Thus, sometimes this distinction is used analogously with regard to simulations. To classify a simulation as very literal means to emphasize its degree of detail and its high fidelity to the simulated. Consequently, it makes sense to speak of non-literal simulations, and thus metaphors, when one refers to a simulation with a low degree of fidelity to their source system.

On the one hand the concept of simulation has been tackled by some authors in the field of game studies (e.g. Myers 2003; Frasca 2003; Aarseth 2004; Juul 2005; Bogost 2006; Gregersen 2008; Crogan 2011) and can be considered a key term in game studies. On the other hand only very few scholars have deliberately addressed metaphor as a concept to understand and/or analyze computer games so far (Bogost 2007; Rusch 2009; Begy 2010; Kromhout 2010).

Metaphor theories

Before I get to metaphor in game studies I will just quickly explain what I understand as metaphor.

Commonly one distinguishes three kinds of metaphor theories, the classical *substitution theory of metaphor*, the *comparison theory of metaphor*, and the modern *interaction theory of metaphor* (Nöth 1995, 129). Admittedly this is a very rough distinction, Eckhard Rolf (2005) distinguishes 25 different metaphor theories and divides them according to their focus into structural, pragmatic, semantic, and functional approaches.

The substitution theory is closely related to the name Aristotle and is sometimes referred to as the classical view on metaphor. In this understanding of metaphor one literal term is substituted by a metaphorical term. The comparison view suggests the essential characteristic of a metaphor is the implicit comparison between the substituted and the substituting term. Both views, substitution and comparison, are sometimes considered

“complementary” (Nöth 1995, 129). The interaction theory of metaphor was founded by Ivor Armstrong Richards (Richards 2001) and named as such by Max Black (Peil 2004, 451). The interaction view emphasizes the necessary interaction between two associated but unrelated domains of meaning which emerge a third meaning, a so called *tertium comparationis*.

Nowadays, the most prominent representative of this view on metaphor is the “cognitive linguistic view of metaphor” (Kövecses 2010, x) by George Lakoff and Mark Johnson who published their theory in their seminal book *Metaphors We Live By* in 1980. According to Lakoff and Johnson metaphor firstly is not a property of words but of concepts. This means that metaphors are rather the result of our cognitive capabilities and therefore not exclusively expressed through language. Metaphor is rather “an inevitable process of human thought and reasoning” (Kövecses 2010, x). However, manifestations of metaphor are the easiest recognized in linguistic expressions. Secondly, the purpose of metaphor is to better understand certain concepts of everyday life and not primarily some artistic or aesthetic function; i.e. metaphor is a phenomenon of the everyday and not reserved to any artistic genius. Lakoff and Johnson’s famous definition says

“The essence of metaphor is understanding and experiencing one kind of thing in terms of another” (Lakoff and Johnson 1980, 5).

In the case of football we speak of “the *attacker*”, “the *shot*”, “to *defend* the goal”, “an *explosive* game” etc. and thus understand football (one kind of thing) in terms of war (another kind of thing). Central in Lakoff and Johnson's theory is the so called CONCEPTUAL METAPHOR. That means “one conceptual domain [is understood] in terms of another conceptual domain”(Kövecses 2010, 4). These two domains are called the SOURCE DOMAIN and the TARGET DOMAIN of meaning which interact with each other in the moment of cognitive processing. For example the conventional language of FOOTBALL (target domain) is mostly verbalized in terms of WAR (source domain). The appropriate conceptual metaphor would be called FOOTBALL IS WAR. Many metaphorical linguistic expressions are not only singularities but belong to a metaphorical framework of the two conceptual domains and thus to a larger more or less coherent construction of metaphors. The empirical evidence of conceptual metaphors is found in so called “metaphorical linguistic expressions” (Kövecses 2010, 4).

In the following I will show how metaphor has been discussed in opposition to simulation in the discourse of game studies so far.

Games as continuum between metaphor and simulation - Crawford (2003)

The game designer and author Chris Crawford explicitly distinguishes between metaphor and simulation. For Crawford simulation and metaphor are two different modes in which games always already refer to reality (a term not further defined by Crawford).

He is convinced that “play is metaphorical” per se and that “all play in some sense represents something from the non-play universe” (Crawford 2003, 29). (Crawford uses the term “play” instead of “game,” which can lead to confusions. In his examples, however, he always refers to game objects. That is why I will understand his utterances as primarily related to games). He claims further that we often misconceive aspects of a game as simulations which are in fact metaphorical (Crawford 2003, 29). Though, games do represent reality by means of simulation. Combat flight simulators such as *Battle of Britain* (TalonSoft 1999) and *Secret Weapons of the Luftwaffe* (Lucasfilm Games 1991)

certainly refer to the real world by mimicking the physical behavior of the airplanes can be considered realistic in an equally physically realistic world. Nevertheless, Crawford subordinates simulations with regard to games to metaphor. Crawford's argument is based on the high degree of detail and realism – a feature often associated with simulation – which would be disturbing for games and make especially the experience of a realistic air combat rather boring.

As opposed to a pure air combat *simulation* “a good air combat *game* will twist reality around to emphasize the emotionally significant parts” – the combat (Crawford 2003, 30, italics by me). Not drawing on any specific theory of metaphor Crawford emphasizes in particular the reductionist aspects of metaphor as opposed to an assumed accuracy of simulation. The metaphorical aspect of this simulation game thus consists of highlighting the combat elements and hiding other elements of aerial warfare.

Opposite to this “metaphorical” simulation Crawford places an idea of a pure metaphor. *Space Invaders* (Midway 1978) is not considered a simulation by Crawford as little monsters marching back and forth in the sky are not plausibly simulating anything from the real world (Crawford 2003, 30). Instead, he declares *Space Invaders* a metaphor for the frustrations of the single individual in society.

All in all, Crawford seems to regard metaphor and simulation actually as the poles of a continuum with a very realistic and detailed simulation on one end and the metaphor, which comprises unrealistic games like *Space Invaders*, on its other end. In between these poles one can find air combat games, which contain realistically simulated elements (e.g. realistically simulated airplane physics) as well as unrealistic reductions, abstractions and condensations (Verdichtungen) (e.g. focus on the pure combat activities). Furthermore, one can read in Crawford's words that games which do seemingly not contain realistic elements like *Space Invaders* necessarily have to be interpreted metaphorically; otherwise they would not represent something from the non-game universe – a fundamental property of games according to Crawford.

One can see from the use of metaphor by Crawford that he applies the distinction literal/non-literal to games by distinguishing quasi-realistic simulations from unrealistic metaphor games. Crawford thereby emphasizes the two different modes of representation of the world, which games are always already part of and which they always already refer to. However, one can ask why does Crawford use the term metaphor instead of simulation? For the case of *Space Invaders* one could say that it simulates the issue of social rules and institutions being directed against the individuals in a society. Couldn't this be the model which the simulation is based on?

A complementary relation between metaphor and simulation – Robinett, Salen and Zimmerman (2004)

According to Salen and Zimmerman (2004) games do always simulate something no matter how abstract they are. As such Chess and *Tic Tac Toe* simulate territorial conflicts and *Tetris* (Pajitnov, Gerasimov, and Pavlovsky 1984) simulates some kind of gravity.

The game designer Warren Robinett is equally convinced computer games were “simulations, models and/or metaphors” (in Salen and Zimmerman 2004, 423). Salen and Zimmerman use Robinett to think of games' representation of reality in terms of simulations and metaphors as well (2004, 423). For Salen and Zimmerman “a *simulation* is a procedural representation of aspects of ‘reality’” (2004, 423 italics in original).

“Procedural” as the authors explain can be considered “a shorthand for all the process-based ways that a game can signify” (Salen and Zimmerman 2004, 427). Those processes emerge from

- a) “the functioning of a computer program’s AI,”
- b) “players following the rules of a game,” as well as
- c) “an expressive core mechanic that references a particular action outside the game” (Salen and Zimmerman 2004, 427).

Salen and Zimmerman demonstrate the relation between simulation and metaphor with *Ace of Aces* (Leonardi 1980), a two player air combat simulation whose game state is represented on the respective page of a paperback book. Depending on the action that a player chooses, a different page represents a different game state. Each player gets a copy and can actualize the game state accordingly.

This simulation is based on a mathematical model of an air combat and therefore represents reality by virtue of its rule set. Simulations also represent aspects of the simulated phenomenon in a metaphorical way. The core game actions consist of a) the decision for a specific game action (e.g. fly a slow 130 degree curve backboard) and of b) opening the book page with the corresponding page number (e.g. opening page 213).

However, as opposed to a flight simulator, which is used for the training of fighter pilots, the game actions (turning the pages) of *Ace of Aces* are strikingly distinct from sitting in a cockpit and piloting an aircraft. For instance, the continuity of space and time is cut into discreet states and because of its turn based nature also the duration of a turn can potentially be indeterminate. This is dissimilar to a quick series of decisions and actions as they were necessary in a real air combat or a real time air combat simulation. Salen and Zimmerman also consider the difference between the core game mechanic (turning pages) and its simulated referent (piloting an aircraft) as a metaphoric difference of two different domains, which interact in the playing of the game with each other. Salen and Zimmerman conclude “as representations, simulations often represent metaphorically, meaning they can create representations in non-literal ways” (Salen and Zimmerman 2004, 427). In the case of *Ace of Aces* especially the experience of playing the game will deviate from the experience of really controlling an aircraft in an air combat.

Whereas Crawford conceptualizes metaphor and simulation as a continuum Salen and Zimmerman support the idea of a complementarity between metaphor and simulation. Aspects which are not literally “simulatable” because of technical or material constraints are simulated in a non-literal way and thus as a metaphor. Both, Crawford and Salen and Zimmerman, apply “metaphor” to signify the less mimetic and more abstract aspects of simulations in order to distinguish these from the more mimetic and less abstract aspects.

Metaphor and simulation in Juul (2005)

Finally, Jesper Juul, the author of *Half-Real* (2005), focuses on metaphor in immediate textual proximity to his discussion of simulation in the mentioned work, too. As is known Juul considers digital games ontologically as consisting of the distinction between two fundamental aspects: rules and fiction. A simulation is, according to Juul, “the implementation of a fictional world into the rules of a game” (2005, 170). Here the audiovisual signs of the game represent the fiction. These signs are supported by the

rules. This support makes *FIFA 2002* (Electronic Arts Canada 2001) appear as a the simulation of association football. One can say the fictional part consists of the representation of a certain real-world process (football) which raises the expectations that it also functions like the respective real-world process. This expectation is then more or less satisfied depending on the degree of fidelity to the source process the simulation has.

Apart from simulation Juul applies additionally the concept of metaphor. As such he analyzes the serve in the tennis simulation game *Top Spin* (Indie Built and Power and Magic Development 2004) which is distinct from the one in real-world tennis. In the game the player has to keep a button on the game controller pushed and release it as soon as an oscillating (up and down) marker is placed in the center of the serve indicator. According to Juul the computer game serve is significantly distinct from the real-world activity. However, both activities also share a significant commonality – both are *difficult* for inexperienced and untalented users. The substitution of the real-world activity by the described computer game activity is the reason for Juul to state that “the video game activity is a metaphor for the tennis activity“ (2005, 173).

He identifies another metaphor in the case of *Puzzle Pirates* (Three Rings Design 2004) in which pirates sometimes engage in duels. However, instead of a simulated sword duel the players have to play a puzzle à la *Bejeweled* (PopCap Games 2000) or *Tetris* (Pajitnov, Gerasimov, and Pavlovsky 1984) against each other. Here the expectation of a simulated sword duel which is raised by the fiction of the pirate world is deliberately not satisfied and substituted by a metaphor instead. This metaphor does primarily share a possible unequal outcome (dividing the participants into winners or losers) with a sword duel (see Juul 2005, 173).

Juul applies the concept of metaphor in terms of the substitution view on metaphor. In *Top Spin* the serve is substituted due to technical limitations by another activity. In the case of *Puzzle Pirates*, however, one could have easily simulated a sword fight which might have better satisfied the expectation raised by the fiction. The decision to simulate a puzzle combat instead might have had other reasons like abandoning all sort of violence due to the target group of especially young players. Depicted and simulated violence would to some degree be part of a sword fight simulation. Another reason to implement a puzzle combat instead of a sword fight could have been the desire for a creative alternative.

Nevertheless, in these two cases as well as in the cases presented by Salen and Zimmerman and Crawford one can legitimately ask: Aren't the phenomena which they call “metaphors” in fact simulations? In the case of Juul's tennis serve one might say that not the whole activity of a tennis serve is simulated but its difficulty, instead. The same goes for the sword fight in terms of a puzzle, as the puzzle simulates the difficulty of a sword fight as well as antagonistic aspects.

Juul himself makes an interesting point against the common view of simulations, which are often (mis-)understood as the most realistic and detailed modeling possible (see e.g. Dormans 2011 who speaks of iconic simulations). On the contrary Juul argues that simulations

- a) can differ strongly from the original depending on their degree of *fidelity*,

- b) they are usually *stylized*, meaning they highlight some aspects of the simulated and conceal others, and
- c) they *simplify* (Juul 2005, 170).

Thus, computer games do never implement a highly realistic simulation of real-world phenomena (discussable exceptions might be *Flight Simulator X* (Microsoft Game Studios 2006) and *Falcon 4.0* (MicroProse Software 1998)) but an always already stylized and simplified model with a higher or lower degree of fidelity to the simulated phenomenon. Salen and Zimmerman point with Robinett at the fact that simulations are abstractions by definition and therefore also limited (Salen and Zimmerman 2004, 439).

THE METAPHOR-SIMULATION DILEMMA

If we regard once again Juul's three characteristics of a simulation (simplification, stylization, and fidelity) one can argue that all described cases of metaphor can be considered simulations as well. Crawford's idea of the game as being always already metaphorical as it reduces, abstracts and condensates aspects of the source system in order to make it a compelling game experience can be considered a natural consequence of Juul's characteristics of simulations. Consequently, a game appears less realistic. Salen and Zimmerman consider with Robinett non-literal representations (e.g. alteration of materiality) metaphorical, which have only very little in common with the simulated. And Juul's examples of metaphor can be considered simulations, too. The sword fight in terms of a puzzle simulates aspects of competition and the serve simulates the difficulty of the real-world tennis serve.

Ian Bogost, who had developed Frasca's notion of simulation further, makes a similar distinction between metaphor and simulation writing: "at a time when videogames focus on realistically simulating experiences, proceduralism offers metaphoric treatments of ideas" (2011, 17). With proceduralism he refers to so called art games like *Passage* (Rohrer 2007), *Braid* (Blow 2008) and *The Marriage* (Humble 2006) which embody a certain style of games that works among others with "abstraction" (Bogost 2011, 13).

Jason Begy has shown that semiotically very abstract games can be considered simulations, too. Consequently, *The Marriage* can be considered a simulation since the game communicates what it is about through several paratextual elements such as its title, the designer's statement and so on (Begy 2010, 29). In other words simulations reduce the simulated to a larger or smaller degree always already by definition. This gets even more evident when we take into consideration that simulations are always based on a model. And models can only be approximation to the modeled phenomenon and sometimes grant the only access to understand it. However, as we have seen simulation applies abstraction, too; given one understands abstraction as "the action of taking something away; or process of withdrawing or removing from a larger quantity or whole" (OED Online 2011). In addition it is impossible to say at which degree of abstraction something stops being a simulation and starts being a metaphor. The border line between the two is very difficult to define. Eventually, abstraction should not be the distinguishing element between simulation and metaphor.

One can conclude so far that the term "metaphor," when applied in proximity of simulation, is itself used as a metaphor for an abstract, reduced, condensed and thus unrealistic *simulation*. In other words the term metaphor is applied when one actually

speaks of a simulation. Thus, the opposition of both terms appears questionable. It seems as if game studies are actually faced with a dilemma - the metaphor-simulation dilemma.

Definitions of metaphor and simulation are similar

Part of the confusion about metaphor and simulation can be their similar definitions like a comparison between those for metaphor and those for simulation shows.

Cognitive metaphor researchers Lakoff and Johnson say for metaphor

“the essence of metaphor is *understanding* and *experiencing* one kind of thing in terms of another” (1980, 5).

The rhetorician Kenneth Burke has a very similar take on metaphor:

“Metaphor is a device for seeing something in terms of something else. It brings out the thisness of a that, or the thatness of a this” (1941, 421–422).

When one adds definitions of simulation, the similarity between metaphor and simulation becomes apparent. For instance the philosopher of science Stephan Hartmann says

“a simulation *imitates* one process by another process“ (2005, 5, 17).

In game studies a similar notion of simulation has been coined by Gonzalo Frasca

“to simulate is to *model* a (source) system through a different system” (2003, 223).

Ian Bogost applies the term “procedural representation” instead of simulation. Given that Salen and Zimmerman define a simulation as “a procedural representation of aspects of 'reality'” (2004, 423) one can understand Bogost's phrase as a definition of simulation, too. So Bogost writes

“procedural representation *explains* processes with other processes” (2007, 9).

Apparently all presented definitions for simulation and metaphor are very similar. Taking John Conway's *Game of Life* as described by Ian Bogost (2006, 95–98) we can say it is one system or process which *imitates*, *models*, or *explains* another system or process but we can as well say it makes us *understand*, *experience*, and *see* something (life) in terms of something else (the simulation). If it is true that there is always a difference between the simulation and the simulated, as is indicated in the definitions of simulations by the deliberate discrimination of the participating entities (*another* process, a *different* system, *other* processes), one can assume that simulation has a certain affinity to metaphor. One can certainly discuss if this assumption is true for the case of material scale models which differ from the simulated merely in terms of size (Black 1976, 220).

Simulations could however also be a subclass of metaphors. That which is “something” in the case of metaphor is called a *process* or a *system* in the case of simulation and is slightly more concrete than “something.” A process, for instance, always implies temporality as it consists of a change of states over time according to certain rules which in turn implies a rule-based *system* whose states can change. Meaning, simulations could

generally be metaphors especially for systemic and procedural things. In this case however, we would use metaphor and simulation interchangeably which implies the dilemma that we would need to decide for either metaphor or simulation.

I suggest three steps of inquiry dealing with the problem at hand. The first will assume that simulations are always already metonyms. The second will challenge the assumption that simulations rely on pre-existing similarity between simulation and simulated applying Frasca's sign-based definition of a simulation. The third will, based on the two aforementioned approaches, explore under which conditions we could speak of a metaphoric simulation.

Simulations as synecdochic/metonymic

According to metaphor theorist Cornelia Müller metaphors are the result of a cognitive activity (Müller 2008, 23). Perceiving of metaphors is related to the Wittgensteinian "seeing-as." Thus, one could say that also a simulation always already requires the user to see it as something else as it is. As such Chess has to be *seen as* a simulation of war to be considered a simulation (Salen and Zimmerman 2004, 439). "Seeing-as" seems to be a necessary requirement to consider something a simulation. In some cases this is easier, in other cases this is more difficult.

However, the "seeing one kind of thing in terms of another" of metaphor is a specific case of "seeing-as" according to Müller. It requires that two concepts are simultaneously activated in somebody's cognition (Müller 2008, 25). If this was the case for simulations, too, it would necessitate that simulations make the user associate two concepts with each other. But are there always two concepts at play in a simulation?

The city simulation *Sim City* (Maxis Software and Wright 1989) (see for this example Salen and Zimmerman 2004, 439) one can say is based on *one* concept, an underlying model of city dynamics, since it has been designed with this purpose. Nevertheless, the user sees one kind thing (the simulation) in terms of something else (the simulated phenomenon). We see the object in question as something which it is not. If one additionally takes into consideration that simulations always already abstract, simplify, stylize and reduce one can even say that a simulation is based on two concepts.

In the case of *Sim City* one has to distinguish a *concept* of urban dynamics from an *implemented concept* of urban dynamics. The game designer Will Wright admitted that he had read Jay Forrester in preparation of *Sim City* (Pearce 2002). Forrester had become known as a specialist for system dynamics and wrote among many others a book called *Urban Dynamics* (Forrester 1999). Forrester's concept of urban dynamics consists thus of the variables that he uses to describe urban dynamics. He claims that a simulation model even if concise and clear "describe[s] only those characteristics of the real system necessary to give the behavior characteristics of interest" (Forrester 1999, 112). Thus, one can assume that a simulation like every system implies a reduction of complexity (cf. Luhmann 1984). For the implemented concept of urban dynamics we can now suppose that it again reduces the complexity described by Forrester's concept of urban dynamics consists of a selection of Forrester's which are finally implemented in the simulation.

Note, the implemented concept does not only depend on the characteristics of the available model but also on its implementability into a simulator. The materiality of the medium which is used to run the simulation does have an effect on the aspects which are implementable and might reduce these elements again.

Concluding, this discussion we can say that in *Sim City* two concepts are at play, Forrester's concept of urban dynamics and the implemented concept of urban dynamics. Forrester's concept of urban dynamics makes it possible to think of urban dynamics in the first place and the implemented concept is a reduction of Forrester's concept of urban dynamics. As such Bogost writes "the simulation represents the real world *in part*, but not in whole" (Bogost 2006, 98, italics in original). Since I believe that there is no direct access to the real world I consider Forrester's concept as the substitute for what Bogost calls real world in this quote. Eventually, we can say that Forrester understands the real world (one kind of thing) in terms of his concept of urban dynamics (another kind of thing). And Will Wright understands Forrester's concept of urban dynamics (one kind of thing) in terms of the implemented concept in *Sim City* (another kind of thing), when taking the latter as a simulation for the former.

The same goes for the user of the simulation, who takes *Sim City* as a simulation of urban dynamics. However, the user does not know the whole implemented concept of urban dynamics but is constructing what some have called a mental model (Frasca 2001, 34–35; Wright in Laurel 2003; Bogost 2006, 104) from its interaction with *Sim City*. Consequently, the user will again only know parts of the implemented concept and thus takes even only these parts for the whole real world contained in Forrester's concept. In fact we could have a line of part-for-whole relationships here – from the real world to Forrester to Wright to the player.

According to the definition of simulation and metaphor both require the interaction of two different concepts. But in the case of *Sim City* one might say that the concepts at play differ in complexity but not in the domain they refer to. All concepts rely on the dynamics of a city. So, although Lakoff and Johnson's definition of taking one kind of thing in terms of another applies to the discussed example, it seems that in the case of a simulation we have to speak first and foremost of a metonym, especially if we refer to aspects of abstraction, reduction, simplification etc. A common characteristic for metonyms is that they are conceptually close and usually belong to the same conceptual domain (Kövecses 2010, 173). More precisely one speaks of a synecdoche which by some is considered "a special case of metonymy" (Lakoff and Johnson 1980, 36). From a semiotic perspective Daniel Chandler considers every representation of reality synecdochic since it necessarily involves a selection and can therefore only represent parts of the whole (Chandler 2007, 133). Representing the whole with a part thus seems to be the most obvious characteristic of simulations as this applies to scale models as well as to other kinds of simulations. Thus, in terms of the tropes simulations are always metonyms.

The initial problem seems to originate in reducing the definition of metaphor to the phrase "understanding one kind of thing in terms of another." This is only a necessary but not a sufficient part of the definition of metaphor. This phrase does also count for metonyms which among others follow the structure PLACE FOR INSTITUTION. In the sentence "*the White House* demands to spend more money on health care" one understands the president of the USA in terms of his residence. The interesting part is that both elements, the president and the white house, belong to the same semantic domain, the government of the USA. It seems as if this definition in fact goes for all kinds of tropes. In the case of an irony we understand something through its opposite, in the case of a synecdoche we understand something through parts of it etc. Thus, this could also be a reason to call simulations metaphor.

Consequently, when focusing on aspects of reduction, abstraction, simplification etc., we have to consider *Battle of Britain*, *Secret Weapons of the Luftwaffe*, *Ace of Aces*, *FIFA 2002*, the fight in *Puzzle Pirates*, and the serve in *Top Spin* as synecdoche, since they primarily reduce the simulated phenomena to sometimes only very few aspects. A reason that these aspects of reduction are often misunderstood as metaphors can lie in the fact that metaphor is known in a broad and in a narrow sense (Lieb in Nöth 1995, 128). In the broad sense it is used to account for “all figures of speech” (Nöth 1995, 128) and only in the narrow sense it means a specific trope. Here we apply the narrow sense.

Simulations as signs

In game studies simulations have so far been understood in terms of Peirce’s semiotic triangle. This perspective takes two elements into consideration often associated with simulations but also with metaphors. These are aspects of similarity (resemblance, iconicity etc.) on the one hand and the interpreter on the other hand, which will have an influence on the usefulness of similarity.

Especially Frasca developed his model of simulation according to Peirce’s sign model. He considers simulations from a semiotic perspective as being a sign, even though a special sign with a modifiable representamen (Frasca 2001, 33). Let us just focus on the sign aspect and not so much on the modifiability of the representamen. According to Peirce’s model one can thus say the simulation is the *sign/representamen* which stands for an *object* (the simulated). In order to function as a simulation the *representamen* has to be recognized as representing the *object* by an interpreter and which results in an *interpretant*. All combined Frasca’s definition goes as follows

“to simulate is to model a (source) system through a different system which maintains (for somebody) some of the behaviours of the original system” (2003, 223).

The source system is the object, the different system is the representamen and somebody is the interpreter. As an important aspect Frasca emphasizes a similarity in behavior between the simulation (*representamen*) and the simulated (*object*). This means that simulations do not only share certain audiovisual similarities with the simulated but is first and foremost similar in terms of a certain behavior. Although, taking the position of an interpreter into consideration, Frasca’s emphasis lies on the simulating object and its relation to its simulated referent via a similarity in behavior. In terms of Peircean semiotics simulations have thus been termed iconic (Dormans 2011; 2012). Dormans regards a simulating which possesses a high degree of realism or fidelity to the simulated as an iconic simulation. Usually an iconic relation exists if a representamen is “similar in possessing some of [...] [the] qualities” of the object (Chandler 2007, 36).

Here we have a similar problem like in the case of abstraction which also seemed to be at the basis of the metaphor-simulation dilemma. Iconicity does not say to which degree something has to be similar to something else in order to be iconic. The definition says “some” of the qualities. As shown in the approaches by Crawford, Salen and Zimmerman, and Juul simulations have rather been understood as having a high degree of similarity and a low level of abstraction whereas metaphors would have a low degree of similarity and a high level of abstraction. The problem again would be the questions: Where exactly is the border between both of them and who decides about this?

Here the interpreter's point of view comes into play. The interpreter is a position which is strengthened by Ian Bogost. Revising Frasca's definition he says:

“A simulation is a representation of a source system via a less complex system that informs the user's understanding of the source system in a subjective way” (Bogost 2006, 98).

According to this definition the user can only consider a simulation as being based on a specific other system as much as he is able to recognize it. This shows how problematic the aspect of similarity is, as there is no objective means to decide this.

For Jason Begy a simulation depends in the first place on authorial intent and the communication of its source system (the simulated) to the user through paratextual means in case of a semiotically very abstract simulation (Begy 2010, 29). Begy's focus on these two aspects contains the consequence that all kinds of procedural objects (phenomena) can be considered simulations due to authorial intent. This only has to be made explicit to an uninvolved interpreter (user).

Andreas Gregersen formulates Begy's approach in a more radical way and claims “that any system can be seen as a simulation from the outside due to its partial fit with a target domain” (Gregersen 2008, 169). Partial fit is a concept which Gregersen derives from the philosopher of science Ronald Giere (2009; in Gregersen 2008, 161) instead of assuming any pre-existing correspondences or similarities between the model and the modeled. For both, Begy and Gregersen, a simulation is not necessarily defined by any objectively pre-existing similarity, fidelity, resemblance etc. but rather by an interpreter who considers something a simulation. Nevertheless a simulation will always imply just parts of the simulated.

Consequently, one could take any procedural phenomenon and declare it simulating something else. The way in which it simulates depends on its specific characteristics (implemented rules/procedures, materiality etc.). As such a simulation does not only have to be one for a potential user but also for its author or designer. In fact, if I take a chess game as a self-contained procedural object to simulate my life, I am simultaneously the author and the designer of this simulation of my life.

The strong emphasis on the interpreter, however, allows thinking of simulations in which something completely arbitrary, though procedural, can become a simulation of something else (cf. Dormans 2011). Thus, any procedural object or phenomenon can simulate another procedural object or phenomenon. In this case the simulation would rather have the character of a symbol and not be an icon. The relation between simulation and simulated could only be accepted by a larger group if it is conventional.

Simulations as metaphors

Although simulations are always already metonymic there might be one way to see simulations as metaphoric. But before, let us briefly get back to the idea of simulation as a synecdoche and a conventional sign.

As a part for whole relation simulations are primarily based on one concept or domain. In addition we say that a simulation is any procedural object primarily related to the simulated due to convention. If we now take chess as an autonomous, self-contained, and procedural object which simulates nothing in the first place, we can use it to *simulate*

everything else (my life, cooking, sex, etc.) according to the discussion from the last section.

Let us now consider the possibility of a metaphorical simulation. If chess was a *traditional simulation of combat*, meaning it would represent combat by convention, and we would use it to simulate something random as the dynamics of a herb garden within the framework of the chess rules we might speak of a *metaphorical simulation*. In this example we combine two concepts, war and the dynamics of a herb garden. Consequently, we would metaphorically simulate the war aspects of a herb garden.

This has consequences for the initial examples by Crawford, Salen and Zimmerman, and Juul. If one takes a self-contained puzzle mechanic primarily designed to simulate a sword fight (see Puzzle Pirates in Juul 2005, 173) one has to speak of a *simulation* since it is based on one concept. The same goes for the serve in *Top Spin* (see Juul 2005), *Battle of Britain* and *Secret Weapons of the Luftwaffe* (see Crawford 2003).

Space Invaders one could see in both ways. Taking it as a self-contained procedural object not simulating anything it can be considered a *simulation* of the frustrations of the single individual in society. This is what Crawford does. In this case Crawford becomes the interpreter who decides to do so. However, if *Space Invaders* is a simulation based on the concept of aliens attacking earth, because it was originally intended by a designer and later accepted as such by convention, Crawford would need to consider it a *metaphorical simulation*. In this case we see the frustrations of the single individual in society (target domain) in terms of aliens attacking earth (source domain).

A counter example to the presented ideas of a metaphoric simulation can be derived from the expression “lawn chess” (German “Rasenschach”). In German this expression is normally used to signify slow paced football matches which are played with rigorous emphasis on tactics and strategy in which the teams rather stalk each other most of the time before they make a decisive move. Therefore, the dynamic of such matches rather resembles chess than football. As a verbal expression we could clearly say that lawn chess is a metaphor.

However, if we take a chess game, declare it being football and start to play we would understand and experience one system (football = target system) in terms of another (chess = source system). We would not consider chess a simulation of war or the like but a self-contained procedural object. In this case I would experience and understand football in terms of chess in order to simulate football with chess. No, question I will be very limited in what of football I can simulate given I strict apply only chess rules. As such for instance the number of game tokens in chess and Football are not compatible. In chess both parties start to play with 16 pieces in football we have only 11 players per team. Also the central game object of football, the ball, finds no equivalent in chess. Furthermore, the capacities of the different chess tokens might not match the capacities of my players. Still, it is possible to simulate parts of football even though very limited. Most likely I will be able to simulate spatial and territorial characteristics of the game as well as, some competitive elements resulting e.g. from the direct opposition of two specific players. The bishop, a striker, could be confronted with the rook, a defender.

Both, the *verbal metaphor* “lawn chess” as well as the *simulation* of football through a chess game create an interaction of both game concepts in cognition. It seems the disentanglement of the metaphor-simulation dilemma will have to be continued...

CONCLUSION

This paper addressed the metaphor-simulation dilemma which derives from the observation that the concept of metaphor in game studies is often used itself as a metaphor for some kind of an abstract, unrealistic and not mimetic simulation. The dilemma is fostered by the strikingly similar definitions of both concepts.

Furthermore, this paper problematized characteristics commonly associated with metaphor like similarity and abstraction which were projected on the idea of simulation in the discourse of game studies. It dismissed the idea that simulations were always defined by a high degree of similarity to and very little abstraction from the simulated. Instead it suggested that simulations are always abstract in different degrees and do not necessarily have to relate to the simulated because of an objectively existing similarity.

According to a wide understanding of metaphor (“seeing one kind of thing in terms of another,” applicable to all tropes) it is possible to see simulations as always already metaphoric. However, when trying to apply a narrow concept of metaphor one has to consider simulations primarily as synecdoche, since they refer to the simulated in a part for whole relationship and they are based on one conceptual domain when being simulations. In a last part it speculated on the possibility of a metaphoric simulation being based on two distinct concepts from different domains.

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