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The Physical and Social Reality of Virtual Worlds

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1. Introduction: A Question of Ontology

It is a common belief that objects in virtual environments are not real but are mere imitations or simulations of real objects. A virtual apple, for example, has the appearance of an apple but by no means qualifies as real. A real apple has weight, mass, a physical location in space, and physical and chemical capabilities by which it can interact with objects in the real world. These are the kinds of properties by which we hold it to actually exist, instead of just being imagined or represented. A virtual apple, in contrast, has no such properties. Instead, it seems to be a make-belief object, a mere visual projection that responds to computer inputs but not to anything else. But if virtual objects are not real, physical objects, then what kinds of objects are they? Are they nonphysical objects or are they still reducible to something physical? And could it be the case that some virtual objects are real after all? Isn't a virtual chess game that allows one to play chess with an opponent, also in a way a real chess game? Cannot virtual money qualify as real money, if it can be exchanged for dollars or other currencies, as is the case for virtual money in certain virtual worlds like Second Life? Aren't virtual insults real insults, if they intended and taken personally by users of a virtual world?

These kinds of questions have been central to philosophical and social studies of virtual reality since its early beginnings (Rheingold, 1991; Heim, 1993; Zhai, 1998). They belong to the field of *ontology*, the study of being, which is a branch of philosophy concerned with the question of what kinds of entities exist and how different kinds of existing things relate to each other. Ontology asks questions like: What is a physical object? Are there objects that are nonphysical? What is a property and how do properties relate to objects? How do we distinguish essential from contingent properties of objects? Are there different kinds of existence or being for objects? What is the mode of existence of a number? Of a set? Of an event? Of a fictional object? And so forth.¹

In this essay, I will perform an ontological analysis of virtual objects, actions and events. My focus will be on two ontological questions: (1) What is the mode of existence of virtual objects, actions and events? (2) Can any virtual objects, actions or events be claimed to be part of the real world as opposed to be unreal, a merely simulated reality, and if so, how does this fact problematize the distinction between reality and virtuality? Currently, there is widespread ontological confusion about virtual reality and its relation to the real world, which contributes to a flawed understanding of virtual reality and its potential. A better understanding of the ontology of the virtual can contribute to a better design and use of virtual environments and virtual reality systems.

¹ Philosophical ontology is not to be confused with ontology in computer science, or computational ontology, which is a formal description of basic categories and relations between them that is used to model a knowledge domain or discourse. In this essay, I will not be concerned with ontologies in this sense.

In the next section of this paper, section two, I aim to give an answer to the first of these two questions. I will study how virtual objects relate ontologically to physical objects, and will attempt to determine their ontological status. In the third section, I will focus on the second question, and will study under which circumstances virtual object may qualify as real. This will move me into the domain of social ontology. In the fourth section, my focus will be on virtual actions, which are ontologically different from virtual objects and require a separate analysis. In the fifth section, I will investigate the various ways in which virtual entities create ontological confusion or uncertainty, and hence muddy the distinction between reality and fiction. In a concluding section, I summarize my findings and briefly discuss their significance.

2. General Ontology of Virtual Reality

This section is devoted to answering the first question of this essay, concerning the mode of existence of virtual objects (and actions and events). We have already seen that many, if not all, virtual objects do not have real existence. That is, they are not part of the real world. But is this to say that virtual objects have no existence at all? This seems clearly false. Virtual objects do exist, and populate the virtual environments used by millions of users all over the world. But how can we then say that something exists, and is at the same time not real?

By speaking about virtual objects (not) existing or being (un)real, we get confused by our language. So let us try to be more precise in our use of it. It true that virtual apples exist, or a real, *as virtual apples*. However, it is false that virtual apples exist, or are real, *as real apples*. This is the confusion: virtual apples simulate or imitate real apples. To say that they are not real is ambiguous between saying that they are not real apples and that they do not exist (not even as virtual apples). But they do exist as virtual apples, just like imitation apples made out of clay or plastic exist as imitation apples but not as real apples. A virtual apple is a real entity, just not a real apple. It is, as Dilworth (2010) calls it, a concrete model, just like a physical imitation apple.

At this point, an objection may be in order. While it is true that fake apples are real (physical) objects, can we genuinely say that virtual apples are real objects? Isn't it a necessary condition for something to be a real object that it and exists in space and time in the physical world and has mass and weight? Virtual objects, it would seem, are immaterial and usually are not clearly located in the physical world. In short, they seem to have no physical existence, and therefore do not really exist, not even as virtual objects.

In reply to this objection, it may be pointed out that virtual objects do have an underlying physical basis, and that they resemble physical objects in significant ways. To see this, some more detail is in order on how they are generated by computers and what properties they have. Virtual objects are generated by computer systems. Computer systems devices that are characterized by their ability to perform logical operations over *symbolical representations*, or symbol structures, or symbols in short. The software that runs on a computer and the data structures used by software programs consists of strings of symbols that ultimately are represented in the form of bits and bytes. Many of these symbols remain invisible to users, as they are 'machine code' that is interpreted by the machine. Larger symbolical structures, that rely on these lower-level symbols, may however be made accessible to users as objects that they can manipulate. They are usually made visible on the screen, where they are represented by an icon (e.g., one that depicts a folder) or a symbol string (e.g., 'prog.exe' representing a program). Such symbolical structures I will call *digital objects*.

Although digital objects do not appear to have an identifiable mass and region in physical space, unlike (ordinary) physical objects, they have other features in virtue of which they may be defined as an object of some sort. Digital objects qualify as objects because they are persistent,

unified, stable structures with attributes and relations to other objects, and agents can use and interact with them. It appears that computers can generate complex phenomena that imitate real objects, offer possibilities for interaction and manifest themselves in an object-like manner. Because of their object-like behavior we may pragmatically define them as objects of some sort. Their unity and behavioral consistency is guaranteed by the underlying hardware and software.

A *virtual object* is a digital object that is represented graphically as an object or region in a two- or threedimensional space and that can be interacted with or used through a computer interface. Virtual objects are digital objects that appear to us as physical objects and that we interact with in a way similar to physical objects. An example of a virtual object is a folder on the desktop of a PC. Such a folder looks like a real folder and functions and behaves in many ways like a real folder: it can be opened, documents or items can be put into it or removed from it, we can label it, move it, discard it, and so forth.

In addition to being physical phenomena that have a physical basis, virtual objects are also *artifacts*, designed by human beings to serve particular functions in a virtual world or environment. Thus, they usually have a specific functionality and specific (scripted) interactive possibilities tailored to the aim of the application. Moreover, virtual objects have features in common with *fictional objects*: objects and characters that appear in products of the imagination, such as novels and movies, and which do not have real existence. Virtual objects resemble fictional objects in requiring a suspension of disbelief: just like immersing oneself in a movie or novel requires one to experience or perceive depicted events as if they are actually happening, immersion in a virtual world requires one to act as if it is real. In addition, just like fictional objects, virtual objects depend on authorship, and this sometimes implies that facts concerning virtual objects are made true by fiat of their creator, in the interest of a narrative of which these objects are a part. For instance, a building in a virtual environment may be introduced as being very old, made of granite, being formerly owned by a wealthy family, etc., without there being an independent way within the context of the simulation to verify these claims: they are made true, as with fictional objects, by fiat of the author or narrator.

3. The Social Ontology of Virtual Reality

Let us now turn to our second question, whether virtual objects, events or actions can ever be said to be real rather than merely simulated. We have already seen that virtual objects are real *as* virtual objects, but this is obviously not the kind of answer we are looking for. So let us rephrase it to clarify what we are after. We want to know whether a virtual *X* (apple, rock, automobile, etc.) can in some cases be an instance of a real *X*. By a real *X*, I mean an *X* that actually exists or occurs, instead of merely being supposed, imagined or represented. Let us say that when a virtual *X* merely succeeds in imitating a real *X*, but is not a real *X* itself, it is a (computer) *simulation*. A virtual apple, for example, is a simulation of a real apple. When a virtual *X* instead manages to qualify as a real *X*, it will be called an *ontological reproduction* (Brey, 2003). Ontological reproductions are actual members of the class that they simulate. They share essential properties with a physical *X* in the real world by which they themselves qualify as a real *X*.

So are there any virtual *X* that can qualify as real *X*? Let us first consider ordinary physical objects, like apples, rocks, and trees. I claim that virtual versions of ordinary physical objects can never qualify as real instances of these objects. The reason is that their having physical mass as well as a certain physical composition is an essential part of their definition of a real object. Virtual objects do not have mass, nor do they have a physical composition and therefore ordinary physical objects cannot be ontologically reproduced in virtual environment.

While physical *objects* cannot be ontologically reproduced in virtual environments, some physical *phenomena* can be. A phenomenon is an observable event or pattern, like a thunder flash or a repeating high-pitched sound. While computers do not have the causal power to produce physical objects, they do have the causal powers to produce certain types of physical phenomena, specifically phenomena that are composed of light or sound. They can do so because computer systems equipped with adequate output devices (monitors and speakers) have the causal powers of producing a wide variety of visual and auditory phenomena. Hence, they are able to ontologically reproduce certain 'weightless' physical entities like images, sounds, shapes, and colors. Consequently, when in a virtual environment an orchestra plays Bach's Toccata and Fugue in D minor, a real performance of Toccata and Fugue in D minor is actually produced. Similarly, when in a virtual environment a circle is drawn, the result is a real circle, since a circle is mathematically defined as a phenomenon consisting of points in a plane, and is not by definition a physical object with weight and mass.

Computers are also capable of ontologically reproducing *Xs* that normally exist as physical objects but that do not *essentially* exist in physical form. Money, for example, traditionally exists in the form of physical coins and bills. But that it exists as such is mere convention. And conventions are changing. More and more, money exists as digital objects. A smart money card contains a code (a series of zeroes and ones) that defines how much money is present on the card. Money here has become a digital object. Money, it seems, does not essentially exist in physical form but may exist in digital or virtual form as well. Money is hence not essentially but only contingently physical.

John Searle (1995) has developed an ontological theory that can answer in a principled way which kinds of objects, actions and events are essentially physical and which ones are only contingently so. I have used his theory to analyze which kinds of things can be ontologically reproduced in virtual form (Brey, 2003). Searle holds that within what we call reality, a fundamental distinction can be made between physical and social reality. *Physical reality* consists of entities and facts that are genuinely objective and that exist independently of our representations of them. *Social reality* consists of all those entities and facts that are not genuinely objective but are the outcome of a process of social interpretation or construction.

Physical facts include such truths as that there are snow and ice near the summit of Mt. Everest, that apples grow on apple trees, and that there is electric lighting in many houses on the Western hemisphere. Searle is willing to admit that the *concepts* used in expressing physical facts are socially constructed. Yet, Searle denies that their *referents* are also socially constructed. Rather, they are held to exist independently of our representations of them. Even if no humans existed would there be snow and ice near the summit of Mt. Everest. In contrast, *social facts* are also themselves socially constructed. The class of social facts includes such facts as that Barack Obama is a married man, that a bar of gold is worth a lot of money, that Harvard university offers a graduate degree program in physics, and that the curved object in my kitchen drawer is a corkscrew. These facts, Searle claims, seem to be objective in that there is (near-)universal agreement on them. Yet, Searle argues, social these facts and entities seem to be dependent on human representation or intentionality in a way that physical facts and entities are not. There is nothing intrinsic about the green paper bills that are used as money that determines their nature as money. Only when people start representing (intentionally using, accepting, believing in) such bills as money, intuitively, does it become a fact that these bills are money.

Searle argues that social facts come into existence through the *collective imposition of a function* on some object, event or action. For instance, it is now a fact that the Dutch Delta works constitute a barrier against floods, because this function has in the past been collectively imposed on them in Dutch society. Searle claims that the collective imposition of function is a *collective*

intentional act, which is an act that is intentionally performed by a collective (e.g., Dutch society). Searle distinguishes between two kinds of collectively imposed functions, which give rise to two different kinds of social facts. The first kind, consisting of ordinary collectively imposed functions, leads to *ordinary social facts*, which seem to apply mainly to (*material artifacts*). Examples of such facts include the fact that devices of a certain form are screwdrivers, or the fact that the Delta works are a barrier against floods. The second kind, called *status functions*, leads to *institutional facts* that constitute *institutional reality*. Such facts are normally created within the context of previously created human institutions, like marriage, higher education and the economy. Examples include the fact that Bill Clinton is married, that dollar bills exist, that some people possess real estate and that Paul McCartney is a former member of the Beatles.

An important difference between ordinary social facts and institutional facts is that the creation of institutional facts does not require any (physical) capabilities in objects, whereas the creation of ordinary social facts requires objects to be able to perform a physical function. For an object to be a screwdriver, it must be physically capable of driving screws. However, for an object to function as money, the only requirement is that people start *treating* it as money. The imposition of a status function brings with it an agreement to consider or treat this entity *as if* it had inherent causal powers to perform this function. Such agreement, Searle claims, takes the form of a *constitutive rule*, which has the form “X counts as Y (in C),” where X defines the class of objects which qualify to be assigned a status, Y defines the status that is assigned, and C is any context which must be present for this status to hold. Thus, for example, undergoing the marriage ceremony (C) has made Barack Obama (X) into a married man (Y). That this happened is because in American society, this constitutive rule exists by collective agreement.

Many entities in the real world are institutional in nature. They include people (e.g., janitors, professors), physical objects (e.g., dollar bills, wedding rings, contracts, chess games), properties (e.g., being licensed, being under probation), events (weddings, parties, elections), and actions (trespassing, scoring, prohibiting). Importantly, language is also an institutional phenomenon. The marks that read “tree” can only refer to trees because it is collectively accepted that these marks have this meaning. Nonlinguistic symbols similarly derive their meaning from a collective imposition of a symbolizing function to them.

Interestingly, the distinction between physical, ordinary social and institutional reality corresponds in large part with the previously made distinction between simulation and ontological reproduction in virtual environments. Physical reality and ordinary social reality can usually only be *simulated* in virtual environments, whereas institutional reality can in large part be *ontologically reproduced* in virtual environments. For example, rocks and trees (physical objects) and screwdrivers and chairs (ordinary social objects) can only be simulated in virtual reality. The reason is that their simulations are not capable of reproducing the actual physical capabilities of physical and ordinary social objects. On the other hand, money and private property (institutional objects) can literally exist in virtual reality. This is possible because institutional entities are ontologically constituted through the assignment of a status function, of the form “X counts as Y (in context C”).

In principle, any status function can be assigned to anything, if only there is the collective will to do it. For example, it is possible in principle to collectively grant telephones the right to marry, which means there can be married telephones. Therefore, if an institutional entity can exist in the real world, it can also exist in a virtual environment. In practice, of course, status functions are only assigned to entities that have certain features that make it sensible to assign the status function to them. As it turns out, many virtual entities lend themselves well for the meaningful assignment of status functions. The consequence is that a large part of institutional reality is

currently being reproduced in virtual environments, where real institutional activities are taking place like buying, selling, voting, owning, chatting, playing chess, gambling, stealing, trespassing, taking a test, and joining a club, and one can find corresponding objects like contracts, money, letters, and chess pieces. This is not to say that a virtual institutional object or action is always real. On the contrary, many of them only exist within the context of the simulation. For virtual institutional objects and actions to be real, they must be part of an institution in the real world, rather than a simulated one. For example, virtual money is only real money if it can be transferred to one's bank account or be used to make real purchases.

Institutional entities in virtual environments come into existence in ways similar to institutional entities in the real world. They are assigned a status function either by some recognized authority who is held to assign this status, or because this status has been proposed in a nonauthoritative way and members of the community of users have come to accept it as useful. For example, a virtual room may become a women-only chat room either because a provider has labeled it that way from the beginning and is granted this authority by its customers, or because this status has gradually emerged and come to be accepted within the collective of users. For virtual environments, relevant authorities will usually be producers, providers, system operators, moderators or certifying agencies. However, users frequently reject impositions of status functions on virtual entities by authorities and often come to assign their own status functions.

Because a large part of our reality is institutional in nature, it is possible in principle to transfer large parts of our institutions and social life to the digital and virtual realm (Mitchell, 1995; Brey, 1998). This is already occurring. Banking, trading and selling, for example, more and more take place in the digital realm. So do communicating, playing, working, learning, teaching, and organizing. Only a small part of the institutional reality in the digital realm is realized in graphical, interactive environments. But most of it involves virtual objects like graphically represented folders and files, and all of it is virtual in a wider sense, in that it is defined over mass-less digital objects and events in cyberspace. Yet, even in 3D virtual environments one can find real institutional objects, actions and events. For example, the societies in virtual worlds like *Second Life*, and in massively multiplayer online role-playing games (MMORPGs) like *Entropia Universe* and *World of Warcraft*, have economies that are not merely simulated but real, in that money is used that can be exchanged for real dollars or euros, and users set up businesses in which virtual objects and services are sold for money (cf. Brey, 2008). In addition, real friendships sometimes develop in these worlds, and real conflicts occur.

4. The Ontology of Virtual Actions

Actions in virtual environments have ontological properties that are different from that of virtual objects, and are for this reason discussed separately in this section. The question I aim to investigate is under which circumstances, if any, actions performed in virtual environments qualify as actions in the real world. Actions are intentional behaviors by persons (Davidson, 1980). A person performing an action is called an agent. Actions frequently involve, next to the agent, other persons or objects over which they are defined. Most importantly, many actions have one or more *patients*, which are objects or persons upon which an action is carried out (e.g., "Mary laughed at John," "Luis took the book"). Actions may, however, also lack a patient (E.g., "John waved").

We can define a *virtual action* as an action initiated by a user within a virtual environment and is defined over objects and persons within the virtual environment. In virtual environments, users are normally represented by *avatars*, which are graphical representation of the user or the user's character. The avatar is then the means by which an agent performs virtual actions. Virtual

actions may involve as their patients virtual objects, simulated persons (so-called non-player characters or bots), and the avatars of other human users. Examples of virtual actions are lifting a crate, killing a zombie, or lecturing to students in a virtual environment.

Virtual actions have, by definition, effects within the virtual world in which they are performed. For example, a crate is lifted or a zombie is killed. Such effects within the virtual realm are called *intravirtual effects* by Søraker (2010). A virtual action is defined over virtual objects and intravirtual effects should not be understood as really occurring. When a user kills a character in a virtual world, for example, no real act of killing has occurred. Virtual actions may however also have *extravirtual effects*, as Soraker calls them. These are effects on the real world outside the simulation. I wish to argue that a virtual act, *described in reference to its extravirtual effects*, qualifies as a real act.

Virtual actions, I claim, can have two types of extravirtual consequences: institutional and physical ones. Thus, there are two ways in which virtual actions may qualify as real actions. The first applies when virtual actions have an institutional status or significance in the real world. Killing a zombie in a computer game may *count as* winning an online game tournament. The tournament is an institutional object in the real world, and winning it is a real institutional action. Similarly, acquiring gold coins in a virtual simulation may *count as* putting real dollars into one's real bank account. Making a promise to another user of a virtual world *counts as* making a real promise. And taking virtual objects away that are in someone's possession in a virtual world may *count as* stealing in the real world.

A second way in which virtual actions may qualify as real actions is by causing extravirtual physical effects on persons and things. I use the term "physical" broadly, as does Searle, to mean "physical and mental"; physical effects, as defined here, hence include effect on physical objects and effects on the bodily and mental states and behaviors of persons. Virtual actions are capable of causing extravirtual physical effects on things and human bodies because they may cause output devices to transmit real light, sound and force (through force-feedback devices). For example, lighting a virtual flashlight in a virtual environment may cause an actual room to light up because of the additional light coming from the screen. Thus, the virtual action of switching on a virtual flashlight corresponds to a real action of lighting up a room. More importantly, virtual actions by a user may cause mental and physiological responses in other users. They may cause real feelings, emotions, sensory impressions, beliefs, desires, bodily states and behaviors. A sudden action in a virtual world may cause another user to blink or move backwards. A kind gesture may make another user smile and feel good. Disgusting behavior may cause repulsion and anger in another user.

While some physical actions therefore can be performed by means of virtual actions, most cannot be. Actions that cannot be performed as such include any action that essentially requires physical contact between the agent and a real object or person. For example, it is not possible to hug or hit a real person through a virtual act. Also excluded are actions necessarily mediated by real physical objects and tools, like carving and baking. However, some actions that are currently impossible may become possible as input and output devices of computer systems become more sophisticated. Virtual environments may receive user input through motion detection and may include haptic devices, which uses tactile feedback to apply forces, vibrations or motions to users. In such immersive environments, it may be literally possible to kiss or hit another user, since the physical behavior that is performed and the effect it has on others (and on the agent herself) will be essentially the same as they are in their nonvirtual version.

5. Ontological Uncertainty in Virtual Environments

It is a characteristic feature of virtuality that it causes puzzlement regarding its relation to reality. We have seen that virtual objects and actions imitate real object and actions, but they sometimes also constitute real objects and actions. The objects and actions constituted by them are sometimes the objects and actions that they imitate, but are at other times different from them. Virtual objects, actions and events are the subject of what I call *ontological uncertainty*: uncertainty regarding their mode of existence and their relation to reality. In this section I analyze different ways in which ontological uncertainty may emerge in relation to the virtual.

For virtual physical objects and artifacts like apples, rocks, screwdrivers and automobiles, it is usually clear that they do not have real existence because it is obvious that their causal powers and functional properties are only simulated and have no impact outside the simulation. For virtual physical actions, like kicking and eating, it is also usually evident that they are not real, because they do not involve the appropriate physical motions of the body and have no effects on real persons or objects. However, virtual physical actions may have extravirtual physical or institutional effects, in which case they may also qualify as real actions *under the appropriate description*. This description is usually different from its description in the virtual realm (e.g., the virtual act of killing John's avatar can correspond with the real act of angering John or of winning the game).

For some physical actions, it is unclear whether they can be performed through virtual actions because there is a *semantic uncertainty* (ambiguity or vagueness) whether they necessarily involve physical contact between the agent and an object or other person. Such uncertainty particularly applies to actions performed in relation to another person. Consider, for example, the acts of assault and sexual assault. On most definitions, assault need not involve physical harm, but may also result from verbal abuse and threats. Thus, on most definitions, assault can literally occur in the virtual realm. Sexual assault, however, is usually defined as involving sexual acts that are performed without consent. Verbal sexual abuse or threats of unwanted sexual acts usually do not qualify as sexual assault. It therefore seems that sexual assault cannot be performed by virtual means because it necessarily involves sex acts. However, do sex acts necessarily require physical contact between real bodies? Or could a virtual sex act performed on someone else's avatar also qualify as a kind of sexual activity with that person, just like phone sex is sometimes seen as sexual activity?

This is just one example of many in which different opinions may exist on how far language may be stretched that describes actions that normally involve physical contact or co-presence to include acts that do not involve it. Language itself, as Searle argues, is an institution, and the meanings of words are defined through constitutive rules which may differ from person to person and which may be altered and stretched for pragmatic reasons when people try to use existing words to describe new phenomena.²

For institutional objects and actions, ontological uncertainty arises when it is not clear whether they have a status within real institutions (including institutions that regulate online behavior). Such uncertainty may arise in several ways. First, it may be an instance of what I call *constitutive uncertainty*, which is uncertainty regarding the existence of a constitutive rule (of the form *X counts as Y in C*) or regarding the conditions under which it applies (which depends on the interpretations given to the *X* and *C* terms). Different opinions on the existence or applicability of constitutive rules may occur because there are different beliefs on whether a constitutive rule has been instituted, on whether those who instituted it had the authority to do so,

² To add to ontological uncertainty, certain terms, like "assault", have both an everyday meaning and an institutional meaning, in this case within the context of law. These different meanings may result in different ontological readings of virtual actions and objects.

or whether instituting it was the right thing to do. Disagreement may also concern the proper scope of *X* or the proper definition of *C*. The opinion whether a constitutive rule should be instituted normally depends on whether *X*s are seen as a good candidate for fulfilling the role of *Y*, and whether giving *X*s the status of *Y*s would bring benefits. As a result of constitutive uncertainty, it can be unclear whether a certain virtual entity has a particular institutional status. For instance, some users of a virtual environment may hold that a certain room counts as a classroom, while others hold it is a party room, because they disagree about the relevant constitutive rules. Similarly, some users may hold that certain virtual objects qualify as individual property, whereas others hold it to be communal property.

Constitutive uncertainty can occur in relation to any type of institutional object or action, both virtual and nonvirtual. A specific type of constitutive uncertainty, which I call *existential uncertainty*, applies exclusively to virtual institutional items. This uncertainty applied to virtual items for which it is clear that they have an institutional status in the virtual world but unclear whether this institutional status also carries over to the real world. It may be unclear, for example, whether a dollar bill in a virtual world is also worth a dollar in the real world, or whether theft of virtual objects should also qualify as theft in the real world. Thus, existential uncertainty arises when it is unclear whether only the rule *X* counts as *Y* in *V* applies (where *X* is a virtual object, *Y* in an institutional status and *V* is (an institution in) the virtual world) or whether in addition the rule applies that *X* counts as *Y* in *R*, where *R* is (an institution in) the real world.³

Another type is *epistemic uncertainty*, which results from a lack of information about the object to which a constitutive rule is believed to apply or the context in which it is to be applied, so that it cannot be properly determined whether the object or context meet the criteria specified by the constitutive rule. The problem here is not with the constitutive rules themselves, but with the information needed for their proper application. For example, it may be agreed within a society that real marriages may be contracted online if officiated by a real priest or state official. In a certain circumstance, it may however be unclear whether the person who officiated the wedding was in fact authorized to do so (and hence contributes to the appropriate context *C*), and hence it is unclear whether the two persons (*X*) who wished to marry now qualify as married (*Y*).

Institutional role uncertainty is yet another type of ontological uncertainty that may occur in virtual environments. It concerns uncertainty about what a particular institutional status means. In this kind of uncertainty, there is agreement that *X* counts as *Y* in *C*, and that *X* occurs in *C*, and therefore that *Y* occurs, but it is unclear what it means to be a *Y*. Specifically, there is uncertainty about the institutional role of a *Y*, including what Searle calls the deontic powers conferred by an institutional role: the powers or potentialities something or someone acquires in virtue of fulfilling this role. For example, a person (*X*) may appointed as associate director (*Y*) within a firm (*C*), but it may be unclear what the role of an associate director is within the organization. It may be argued that institutional role uncertainty is not a type of ontological uncertainty, since there is agreement that a *Y* exists. However, if there are substantially different opinions on what “*Y*” means, it could be argued that different parties are in fact referring to different institutional objects, thus creating ontological uncertainty.

6. Conclusion

³ One factor that sometimes contributes to existential uncertainty in virtual worlds is that different interpretations exist of their seriousness: some see virtual interactions as a kind of role-playing that does not involve real interactions and therefore no real harms, whereas others perceive it more like real interactions between real persons in which real psychological and emotional harms can result.

In this essay, I have performed an ontological investigation of two ontological questions: what the mode of existence is of virtual objects, actions and events, and whether any of them can be claimed to be part of the real world rather than of a simulated reality. My answer to the first question has been that virtual objects are a special class of digital objects that are represented graphically as objects and can be interacted with through a computer interface. They are complex, systematically generated physical phenomena that imitate real objects and can do so successfully in virtue of the underlying computer hardware. Virtual actions are actions initiated by human agents that are defined over virtual objects. Virtual events can likewise be defined as events defined over virtual objects.

In answer to the second question, I have argued that certain types of virtual objects, actions and events qualify as real, in the sense that they do not just simulate but ontologically reproduce the entity that they are an imitation of. Virtual objects can ontologically reproduce those phenomena that computer systems and their output devices have the causal powers to reproduce, such as light, sound, and resulting structures like images and tunes. More importantly, virtual objects and actions can ontologically reproduce institutional objects and actions, objects like money and chess games and actions like selling and promising. In addition, virtual actions often have extravirtual (physical) effects next to intravirtual ones, by which they qualify as actions in the real world under the appropriate description.

I also considered a variety of ways in which virtual entities can be the object of ontological uncertainty, which is uncertainty regarding their ontological status. Virtual environments, and the digital realm more generally, create ontological confusion and challenge us to draw and redraw the boundaries between reality and fiction, and truth and falsehood. Understanding the sources of our ontological confusion, and the ways in which it can be overcome, can help us better understand the potential and pitfalls of virtual worlds, and of digital realities in general. It can ultimately help us to design better virtual worlds and to interpret and use them in better ways.

References

- Brey, P. (1998). "Space-Shaping Technologies and the Geographical Disembedding of Place," *Philosophy & Geography* vol. III: *Philosophies of Place*. Eds. Andrew Light & Jonathan B. Smith. New York and London: Rowman & Littlefield, p. 239-263.
- Brey, P. (2003). "The Social Ontology of Virtual Environments," *American Journal of Economics and Sociology* 62:1, 269-282.
- Brey, P. (2008). "Virtual Reality and Computer Simulation," Ed. Himma, K. and Tavani, H., *Handbook of Information and Computer Ethics*, John Wiley & Sons.
- Davidson, D. (1980). *Essays on Actions and Events*. Oxford University Press.
- Dilworth, J. (2010). "Realistic Virtual Reality and Perception," *Philosophical Psychology* 23, 23-42.
- Heim, M. (1993). *The Metaphysics of Virtual Reality*. New York: Oxford University Press.
- Mitchell, W. (1995). *City of Bits. Space, Place, and the Infobahn*. Cambridge, MA: MIT Press, 1995.
- Rheingold, H. (1991). *Virtual Reality*. New York: Touchstone.
- Searle, J. (1995). *The Construction of Social Reality*. Cambridge, MA: MIT Press.
- Søraker, J. (2010): *The Value of Virtual Worlds and Entities – A Philosophical Analysis of Virtual Worlds and Their Potential Impact on Well-Being*. Dissertation. Ipskamp: Enschede.
- Zhai, P. (1998). *Get Real. A Philosophical Adventure in Virtual Reality*. Lanham, MD: Roman & Littlefield.