Play-Things and the Origins of Online Networks: Virtual material culture in multiplayer games

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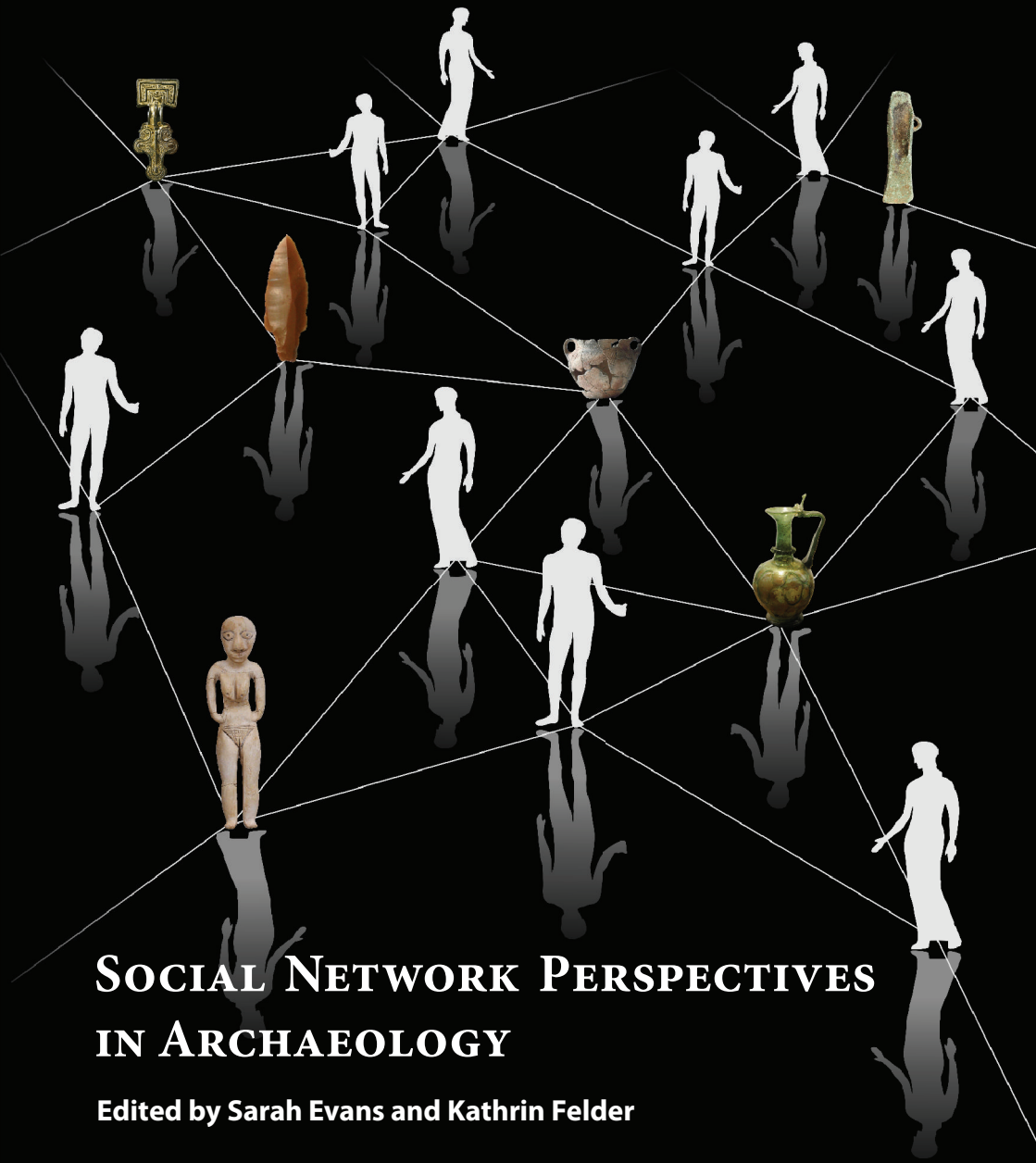

Social Network Perspectives in Archaeology

Edited by Sarah Evans and Kathrin Felder

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Play-things and the origins of online networks: Virtual material culture in multiplayer games

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This paper is a case study of three online multiplayer games: *Lord of the Rings Online*, *DayZ* and *Diablo III*. Based on participatory observation of production and exchange practices in these games, it will provide a reflection on the 'socio-material' dynamics of online social networks and discuss how this can contribute to archaeological and other material culture disciplines that study the role of things in social networks. The discipline is just beginning to apply insights, models and analyses from the (social) network sciences on a broader scale (Brughmans 2013; Knappett 2011; Terrell 2008). Yet the application of network theory and methods in archaeology is far from straightforward, particularly in relation to social network theories. Although the types of networks that many archaeologists aim to reconstruct are social networks, the data-sets that archaeologists generally use to construct networks are not directly representative of the phenomenon they seek to explore. This is actually a common problem in network sciences. While many studies claim to model and analyze social networks, the network data they use is, in fact, not abstracted from sources of information gained by studying social interactions, but is rather only indicative of social relations by proxy (Brandes *et al.* 2013).

While the ties that give rise to emergences and transformations in archaeological data can be conceptualized as 'social'—originally being part of flows of goods, services, respect, leadership, alliances, conflicts, marriage partners, friendship, information and advice *et cetera* (*e.g.* Borgatti *et al.* 2009; Prell 2011; Scott 2012)—archaeologists base their network interpretations on the relationships between artifacts, sites and other archaeological features in time and space. When we directly conceptualize these kinds of 'material networks' as social networks we thus run the risk of perceiving 'pots as people', without taking into account how 'pots' and 'people' are actually related.[1] On the other hand, gaining insight into the ebb and flow of social networks through time by studying relations in material culture assemblages is one of the central interests of archaeological study. In other words, what is needed for social network archaeology to be successful is a specific understanding of networks that is not *only* social or material, but rather sees them as 'entanglements' (Hodder 2012), or, more in line with a network frame of reference, as interdependent factors in a system.

Understanding how societies and material cultures are interdependent systems is not only of interest for archaeological interpretations of past 'socio-material' networks, but also for explaining the dynamics of new types of social interactions that have emerged only recently. One example is the new way in which people interact with each other virtually, through online gaming. As I will discuss below, in many of these online games, acquiring and exchanging virtual items is one of the central game mechanics that is used to get people to play together. The option to exchange virtual objects is present in many of today's online social networks; Facebook, for example, has a service that allows users to give virtual gifts to their Facebook friends (Facebook 2007). The reader may also be familiar with games like Farmville or Candy Crush Saga, two hugely popular 'casual' games of the last few years, and the way they actively encourage players to seek help from their friends and family in order to acquire new items that can be used during play (Facebook 2009, 2012). The difference between the so-called 'hardcore' games discussed below and more 'casual' games like Farmville or Candy Crush is that the latter use existing social networks and material incentives to make the game easier and draw new players in.[2] In many online games, on the other hand, the

[1] This particular critique was voiced by Ian Hodder as discussant in the symposium 'The Connected Past: Critical and Innovative Approaches to Networks in Archaeology', held at SAA, Honolulu, Hawaii, on 4 April 2013.

[2] It has to be noted that in 'casual' games items gained from other players also have a huge draw. This can even cause players to seek new Facebook friends from around the world whom they do not know and will likely never meet in real life.

player does not need a pre-existing social network to interact with others. Instead the game attempts to bring people who have often never met face to face with each other in cooperative and competitive play. This facilitates the formation of new, online social networks.

Past and present socio-material network theories

At the heart of this paper is the idea that the types of networks one can find in multi-player games are, like the networks archaeologists aim to reconstruct, not just one type of network, but rather consist of multiple, interdependent systems. Such network interdependencies emerge when one network acts on another and *vice versa*, thereby changing the structures and dynamics of both networks (Padgett and Powell 2012). The idea of interdependency has deep roots in network science (Brandes *et al.* 2013). An analogous theoretical concept involving material culture has recently been put forward by Ian Hodder (2012), who speaks of entanglements (see also Knappett [2011] and Latour [2005] for comparable perspectives).

There have been many other recent contributions in archaeological and material culture theory that seek to develop a new type of understanding of social and material systems. For instance, recent cognitive archaeological and palaeoanthropological studies emphasize how the 'social brain' has developed as a 'distributed mind' that can extend from the human body into the realm of objects. These provide a deep historical perspective on the way humans use material culture to build social networks (Coward 2010; Dunbar *et al.* 2010; Malafouris 2010). In his book *The Archaeology of Interaction*, Knappett (2011) has also put forward an archaeological network approach that seeks to integrate materiality with sociality. Object perspectivism, developed on the basis of lowland South American ethnographic studies of objects as subjects, provides another pathway to understanding the reality of socio-material networks in non-Western ontologies (Henare *et al.* 2007; Santos-Granero 2009). These works are all important contributions that attempt to bridge the interfaces between social and material networks. More importantly, they all agree on the fact that material culture is a basic constituent—'scaffolding', as Knappett (2011: 65–67) calls it—of how human beings relate to one another and the world around them.

Essentially, ideas relating to the way in which societies are founded upon the interdependencies between humans and objects were already present in the works of 'Axial Age' philosophers (Graeber 2011a). These earlier views developed into a specifically European school of thought that

focused on how producing, owning and circulating material culture formed one of the constituents of society—most notably seen in influential works on economy, morality and society by thinkers such as Karl Marx and Adam Smith (Graeber 2001, 2011b; Weiner 1992). Even if it has been argued that a large range of these more traditional social theories has often failed to connect explicitly social and material practices (Olsen 2010), there is still merit in using them, both to re-explore their hypotheses using new case studies and as a basis for new conceptualizations. For this paper, I will focus in particular on the theories of the political and moral philosopher Thomas Hobbes. The reason for this is that part of the argument that Hobbes develops in his famous work *Leviathan* (1929 [1651]) can, to some extent, be used as an analogy for the types and dynamics of the socio-material networks that form in online multiplayer games.

In *Leviathan*, Hobbes (1929 [1651]) devises a theory which regards society as the result of a social contract enforced by an autocratic ruler. It was Hobbes's premise that humans living in a 'state of nature', as opposed to those living in '(civil) society', led "solitary, poor, brutish, and short" lives (Hobbes 1929 [1651]: 99). This is because, in Hobbes's opinion, humans, in this 'state of nature', have a lack of all things, as they have a "right to every thing" (Hobbes 1929 [1651]: 110). As a result of this scarcity of resources, eternal conflict exists between all human beings—Hobbes refers to this as the "Warre of every one against every one" (Hobbes 1929 [1651]: 90). In other words, in *Leviathan,* Hobbes outlines why humans need 'social contracts', enforced by a (head of) state, to be able to live together. To prove the necessity of social contracts, he presents a view of what human society would have been like in a 'state of nature': without a wider web of social relations and a material culture.

Interestingly, as I shall discuss in more detail below, his theories thus identify 'having things', an inevitably cooperative endeavour, as a driving factor for the constitution of human society.[3] Although it has long been clear that Hobbes's ideas of pre-state society do not correlate with any human societies that ever existed, they have remained quite influential in anthropology (Sykes 2005: 19–37).[4] For the purpose of this paper it is of particular interest how his ideas on 'social contracts' have been connected to

[3] As Hobbes (1929 [1651]: 96) states: "The Passions that encline men to Peace, are Feare of Death; Desire of such things as are necessary to commodious living ; and a Hope by their Industry to obtain them."

[4] In particular, Hobbes's theories are central to the discussion on the propensity for war-like versus peaceful human behaviour, a debate which has left deep marks in the social sciences, including archaeology (*e.g.* Fry 2006; Keeley 1996; Pinker 2011; Sahlins 1972; Sykes 2005).

Maussian theories of the gift (*e.g.* Corbey 2006; Mauss 1990; Sahlins 1972). In Hobbes's stateless, primordial society, the (in)alienability of property was not safeguarded by a code of laws and a strong ruler. However, in societies without central leadership and (written) laws, the social contract instead can take on a different form: that of gift giving.

This idea has its roots in the famous *Essai sur le don* written by the sociologist and anthropologist Marcel Mauss (1990), who sets out to study the roots of "contractual law and the system of total economic services operating between […] subgroups that make up so-called primitive societies" (Mauss 1990: 3). In the essay, Mauss discusses how in some societies gift giving can be found in all aspects of life (religion, economy, politics) and thus plays a significant role in the constitution of society. How the exchange of objects is constitutive of society is implicitly part of many anthropological studies on the gift (*e.g.* Godbout and Caillé 1998; Graeber 2001; Gregory 1982; Schrift 1997; Sykes 2005). Because the essay emphasizes the active role gifts play in social relations, it is often featured centrally in archaeological theories of 'object agency' (*e.g.* Fowler 2004; Gell 1998; Henare *et al.* 2007; Hodder 2012; Mol 2007).[5] Furthermore, how Mauss's essay can be connected to Hobbes's ideas on the 'origins of society' has been explicitly analyzed in works by Corbey (2006) and Sahlins (1972: 149–184).[6] As an extension of these previous Maussian insights on offline social life, I will argue here that the way inter-personal ties are created in online gaming networks is largely based on balancing 'Hobbesian' social universes and resource economies with the 'Maussian' socio-material dynamics of acquiring and exchanging virtual material culture.

Massively Multiplayer Online games: Virtual socio-material networks

In our connected world, online social networks are a tangible part of many people's daily lives. In these networks, many have more 'friends', 'followers' or other types of (often fleeting) social contacts over a far wider geographical landscape than ever before (Dunbar 1988; Miller 2011). Therefore the networks of today are often considered to be qualitatively

[5] Mauss (1990: 16) famously suggested that the reason a gift was returned was because there was a "spirit" in a thing that was given, saying that it is "not inactive. Invested with life, often possessing individuality, it seeks to return to […] 'its place of origin' or to produce […] an equivalent to replace it."

[6] As Mauss (1990: 17) says: "To refuse to give, […] just as to refuse to accept, is tantamount to declaring war; it is to reject the bond of alliance and commonality."

different from those in the past, with the transmission of goods, people and information being of a completely different order (Castells 2011). This assumption is, of course, largely justified. The connected phenomena of globalization and Information and Communications Technology (ICT) have reshaped many of the traditional contexts and parameters of human interaction. Nevertheless, the socio-material dynamics of online networks are still comparable to those of past and present offline networks.

Globally, online multiplayer gaming has become a popular pastime (Global Industry Analysts 2010). In the majority of multiplayer games, especially in so-called Massively Multiplayer Online (MMO) games, interaction between players is a central element of play (*e.g.* Cole and Griffiths 2007; Kaye and Bryce 2012; Yee 2006). The different virtual worlds evoked in these games all have their own specific cultural dynamics based on game design choices and the nature of the player base (Bogost 2007; Corneliussen and Rettberg 2008; Graham and Gosling 2013). In general, social interactions in multiplayer games are based on the same inter-human social factors as offline social networks, and players will have a real sense of connection to their virtual counterparts (Jesper 2005; McCreery *et al.* 2013). One of the driving forces behind online multiplayer gaming is player cooperation which, although not always necessary, will present a range of in-game benefits.

At the core of a multiplayer game is the idea that players form groups, either durable collectives or spontaneous coalitions. Even if they are durable, due to the more flexible nature of online gaming, groups often form, split, merge or disappear at a far more rapid rate than in offline social networks. Sometimes these groups are based on real life social relations, such as groups of friends or family members playing a game together on separate computers. More often, such temporary or permanent coalitions spring from online interactions between players that have never met offline. The result is a much higher rate of anonymity and a greater likelihood than in offline social interactions that people will never interact again if they do not desire to. Through such fast and flexible interactions, players may create a large network of online contacts. Some players, however, will continuously play together and thereby keep helping each other in the game, creating an online community. In many ways social life in these online communities is much the same as offline. People spend a large amount of time gossiping, engaging in small-talk or even romantic liaisons.

Importantly, the virtual acquisition of 'powerful' objects is a defining element of many of these games. Besides increasing one's skill at

the game, players can become more successful by increasing the power of the characters they are playing. In Role Playing Games (RPGs), for example, 'stats' (statistics) determine how well a character performs at certain actions. Generally, stats can be increased in two ways: by gaining experience with the character 'levelling up' or gaining access to better equipment ('looting'). The latter in particular can give a player's character unique powers, appearance and identity. Objects in games are always hierarchically ordered, and the best items reflect the many hours of play that are needed to acquire them. Aside from the increase in a character's stats, objects are highly desirable because they are markers of prestige. Experienced players have a large amount of knowledge on the 'object hierarchy' and regularly recognize many of them on sight (Van Looy *et al.* 2012). Much as is the case in real world 'tournaments of value' (Appadurai 1986: 21), acquiring, owning and giving away these objects reinforces or changes the identities of, and hierarchies among, players.

The quantity and quality of a player's possessions is dependent on his or her success in the virtual economy. This is an essentially open-ended, circulatory system with predesigned ways of acquiring, distributing and losing possessions. In many games, a player (semi-)randomly gains new objects by defeating enemies and exploring the world in which the game is set (see below). A player is often also given more direct control by being allowed to buy certain objects from in-game shops with virtual currencies. Some games allow a player to put together materials and, from that, craft equipment and other useful items.

Yet, in multiplayer gaming, the quality and amount of virtual possessions a player owns are heavily dependent upon their interactions with other players. In turn, the nature and scope of online player interaction is, to a large extent, determined by the design of the virtual economy. The difficulty for MMO game designers lies in finding the right balance between players' interactions with each other and the virtual material economy, so that online cooperative and competitive play is both fun and challenging. In a sense, virtual economies and material cultures can be seen as 'mimicking' the reality of human life—solving problems and overcoming obstacles by using resources from one's environment and interacting with others. As such, MMO games are comparable to many other types of play in which humans engage (Huizinga 1955; Jesper 2005).

Virtual material culture and the challenges and affordances it provides to players are thus an integral part of the game experience. Virtual objects may even have an impact on offline life. For instance, some players

spend their offline resources (time and often money) in order to acquire virtual possessions. Other players even display online behaviour normally associated with non-virtual material culture, such as carefully storing prized possessions and showing off their collections to other players. Interestingly and somewhat paradoxically, while objects in online networks are not really 'material culture' in the traditional sense of the word—because they only exist in virtual worlds—they still have an enormous materiality. This materiality is directly linked to a mechanism which game designers and players, seemingly instinctively, introduce into their games, by putting the acquisition and exchange of virtual material culture at the heart of cooperative play and *vice versa*.

This insight will be explored further here by a discussion of the social network formation and virtual economies of three multiplayer games: *Lord of the Rings Online, DayZ* and *Diablo III*.[7] These particular games represent three different types of multiplayer game which, despite differently designed social networking opportunities and potentials as well as virtual economies, appear to prompt the same type of player behaviour.

Lord of the Rings Online

Lord of the Rings Online (LOTRO) is a Massively Multiplayer Online Role Playing Game (MMORPG) developed by Turbine, Inc (2007).[8] The game takes place in the fantasy world of Middle Earth, famously known from J.R.R. Tolkien's literary trilogy *The Lord of the Rings* (Tolkien 1954a, 1954b, 1955) In this expansive world, players take on the role of heroes battling dark forces bent on dominating the races of men, dwarves, elves and hobbits. Like many other MMORPGs, the design of the game actively supports both the formation of social networks and the production and exchange of in-game material culture.

In *LOTRO,* a player can independently acquire new items in a number of ways. Defeated enemies will drop gold that can be used to buy new objects from one of the many merchants found within the game. On rare occasions, enemies will also drop 'loot': weapons, equipment or other

[7] Research for this study was done through online participation and observation in the three games from May to September 2012. I had not previously played any of these games, participated in these games anonymously and did not have any prior contact with any of the players I interacted with or observed having interactions online. As online games and communities are continuously adapting, my discussion of the virtual economy and player interactions may not represent the current state of affairs.

[8] See also the LOTRO-wiki (2007).

items. Objects can also be acquired as rewards for completing specific, computer-generated quests. The looting of chests, cases, boxes *et cetera,* opening containers and taking their contents, for example, is a central part of the game experience and is one of the aspects most enjoyed by players of this and similar games (see below). Finally, a player can gather a range of materials and use them to craft items. Acquiring a good, let alone the best, set of arms, armour or other items of material culture takes a lot of time and hard work for the player. Crafting and questing (*i.e.* carrying out 'missions' and undertaking other tasks given to the player by the non-playable characters in the world) is time-consuming. Furthermore the quantity and quality of loot dropped by monsters and found in containers is generated randomly, so the player can most of the times not foresee what the rewards will be for his actions.

For those players who wish to work together, *LOTRO* presents more efficacious ways of acquiring the things they desire. One of these is through exchange between players. This can be accomplished in 'face-to-face' interactions or through an in-game auction house. In addition, by forming coalitions, players may often be more successful in taking on dangerous opponents and situations. There are different types of coalitions. 'Fellowships' of up to six players can be formed opportunistically and for short durations to tackle quests that are too difficult to complete for a single player. Any loot that they gain is shared between them. Raids are scripted events that bring together a group of players that want to tackle a specific monster for large rewards. A player can also become part of a 'kinship', a collective in which players come together with the express intent of cooperating for a longer period.[9] Some benefits of being part of a kinship are the measure of prestige that comes with belonging to a renowned kinship, and the fact that kinships also have access to certain exclusive resources like 'kin houses'. However, the main goals of a kinship are to help other members with questing and fighting monsters and to work together in larger challenges that cannot be tackled by single or small groups of players.

In addition, these groups will also often form crafting networks (fig. 1). By themselves, players cannot collect and craft all the materials they need to create finished products. To make such items, ore needs to be mined, smelted and crafted into a weapon. One player can specialize in mining,

[9] Many names for groups in online games are taken from well-known anthropological or sociological concepts of groups, such as kinships, clans, guilds or brotherhoods. It has to be noted that often these online collectives are similar in name only and do not bear any direct relation to their real-world counterparts in terms of general structure, dynamics or foundational principles.

but cannot simultaneously be a 'metalsmith' and 'weaponsmith'; a 'cook' can only prepare food from what another player grows as a 'farmer'; a 'tailor' can make clothing only from the skins a 'hunter' has gathered. *LOTRO* thus encourages players to interact by making crafting activities part of a *chaîne opératoire* that cannot be efficiently completed by a single player. If players form crafting networks, in which raw materials and semi-finished items are circulated, then together they can combine their skills to create weapons, armour and other useful items. If a group of expert craftspeople joins forces they can create impressive material culture that will mark them out as skilled players and co-operators.

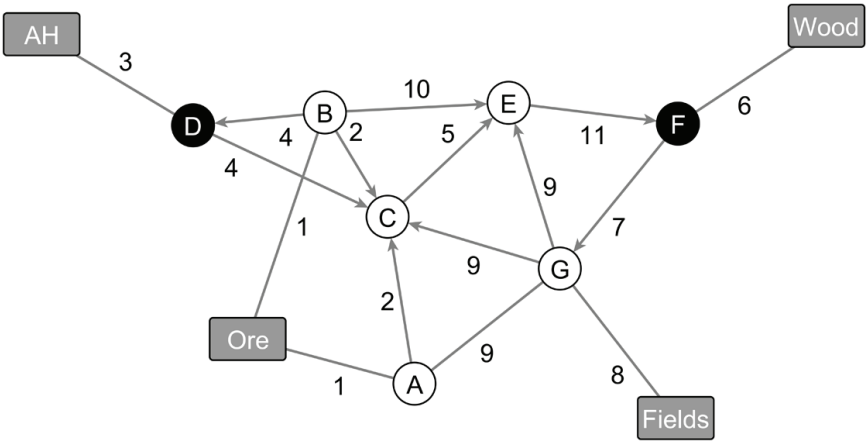

Figure 1. The following interactions (witnessed on 27 July 2012) are an example of crafting exchange networks in *LOTRO*. In this case, members of one kinship (white nodes) exchange things with non-members (black nodes) and acquire raw materials from natural sources and the auction house (AH) to craft temporary stat-enhancing foodstuffs and some sets of armour before going on a 'raid quest' together.

1. **A and B get ore from source and smelt it to ingots.**
2. **A and B give metal ingots to C.**
3. **D buys metal ingots from the auction house.**
4. **D gives metal ingots to C and B gives tool to D.**
5. **C gives armour to D and E.**
6. **F gets wood from source.**
7. **F gives wood (for cooking fire) to G.**
8. **G gets produce from agrarian fields.**
9. **G gives food to C and E.**
10. **B gives precious metal ingot to E.**
11. **E gives jewellery to F.**

DayZ

As a multiplayer game *DayZ* is completely different from MMORPGs like *LOTRO* (Hall 2012).[10] First of all, it is not a MMO game in the strict sense of the term, with a maximum of 64 persons playing on one server at a time. The setting is also quite different. *DayZ* is a zombie apocalypse survival simulator in which players find themselves on a fictional Russian island, with each of them equipped only with some food, drink and a flashlight.

In contrast to most online multiplayer games, when a player's character dies the player loses all of the things that their character possessed, and thus has to start all over again. This sense of loss after dying is exacerbated because the game economy challenges players by confronting them with a scarcity of equipment and food, coupled with a constant need for the in-game characters to eat, drink and keep warm and healthy. This puts pressure on players to go from the relatively safe countryside into the villages and towns to find supplies and equipment. In these towns, hordes of zombies gather, as well as 'bandits'—players that prey on other players. As a defeated player has no way of easily reprising themselves, killing other players is often a much more profitable enterprise than sneaking into buildings or hunting zombies in search of loot. Thus there is always an initial deep mistrust when encountering other players in the game.

The design of *DayZ* neither actively supports the formation of social networks nor the exchange of the game's material culture through its game interface. In fact, in contrast to games like *LOTRO,* the formation of social groups and cooperation is not organized by the designers nor is it an explicit aim of the game, but is much more a grassroots endeavour. Even so, player collectives ('clans') do exist, and these are organized outside of the game on forums (DayZ Forums 2012). Some of these can be 'bandit clans' that use their larger numbers to more easily overcome and rob other players. Other clans are devoted to making the game-world a safer place for all by cooperatively hunting bandits and setting up a system of services, such as safe houses, field hospitals and even in-game market places (fig. 2).

Aside from the benefits arising from larger numbers of players, the goal of these clans is to foster cooperation between members so they can search more effectively for high-end equipment, like military weapons, cars and even helicopters. This way, for clan members some areas of the

[10] This discussion relates to *DayZ* as a modification of the *Arma III* game (Hall 2012), not the recently published standalone version of the game (Bohemia Interactive 2013).

game world can lose some of their dangers. It is notable that many clans have an unspoken or sometimes outspoken code that prompts them to share equipment, foodstuffs and medicinal supplies with each other. More importantly, a player that preys on his or her fellow clan members— for example, by stealing their possessions—will likely be banished from the group.

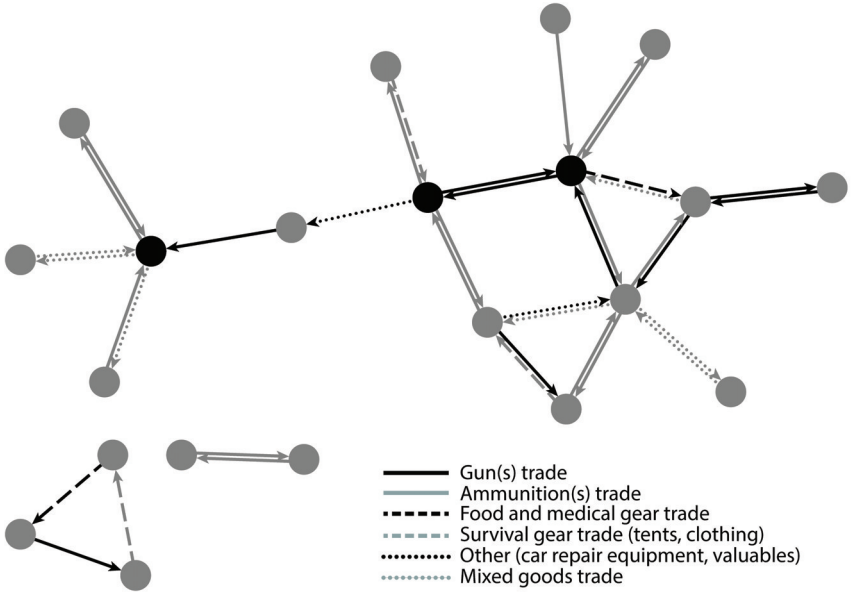

Figure 2. A network of players and their trades at a trading post operated by a clan (members are black nodes) in *DayZ*, documented during a three-hour window (witnessed on 2 September 2012).

Diablo III

The RPG *Diablo III* is not considered a MMO game, still it displays some of the same socio-material dynamics as MMO games. In the game the player takes on the role of a hero who faces the daunting task of defeating the forces of Hell. Initially, however, the players' characters are poorly equipped to succeed at this task (Blizzard Entertainment 2012). The main way in which players can strengthen their characters is by collecting increasingly more effective weapons, armour and other warrior accoutrements. Notably, *Diablo III* presents the extreme opposite of the material scarcity of *DayZ*. Loot is dropped by monsters and can be found in chests or other places in copious amounts, even compared to other online RPGs like *LOTRO*.

However, most of the loot is useless, because it cannot be used to upgrade the equipment that a character already has. Therefore, players will gather large amounts of loot in one go, an activity referred to as 'farming'. Following this, a player will 'sort the wheat from the chaff' by keeping only potentially useful equipment. Useless items are then sold off at in-game shops or destroyed to make raw materials that can be used to craft new, more functional items. These crafted items will never be as good as those that can be found by defeating monsters, the rarest of which will qualitatively exceed items that the player can craft him- or herself.

At first glance, *Diablo III* offers little incentive for creating larger online social networks. There is no support for larger groups of players playing together at the same time, because the maximum number of players in one game is four. Furthermore, loot drops are unique for individual players, meaning that the game will never require a player to share or compete with others over a piece of equipment. Face-to-face exchanges of items between players are inhibited because they require using a non-intuitive menu which is difficult to access and use. Exchange rather takes place in the form of anonymous transactions in a global auction house in which both in-game currency and real money circulate. Every player has their own chest to store items in, which is not accessible to others. Only if a player drops an item is it possible for another player to pick it up.

At the same time, group play is a central aspect of looting, because it is often easier to defeat monsters as part of a larger group. What is more, pooling loot received by collective farming, also called 'loot runs', will often result in a higher yield of items to suit individual characters. Thus, players will find ways to circumvent restrictions on interaction in order to be able to share objects found in the game with larger groups of players called 'guilds'. As one guild leader remarked in a podcast:

> Getting everything organized in the game can be difficult, but […] when [we are done with] farming we make a couple of games with an officer in it, where one officer will be for weapons, one will be for armour and so forth. Then we will drop the things on the ground and then clan members will join and take the stuff that benefits them (MOG Radio 2012; fig. 3).[11]

Aside from these organized redistributions, even in impromptu coalitions of players that are not part of a guild, giving away equipment by dropping it from the inventory is commonplace.

[11] The relevant excerpt of the podcast can be found between 55:30 and 56:30 minutes.

By lacing together such virtual gifts and exchanges between players, networks that are more extensive than the originally intended maximum of four players will emerge. For example, I was able to trace an item that was originally acquired in a cooperative loot run, then was passed from one player to another as a gift, and then passed on a third time before it was transformed into a raw material that was later traded back to one of the original participants of the initial loot run. Even if *Diablo III* was designed in such a way that the acquisition of virtual material culture and social interactions were mostly kept separate through non-intuitive interfaces and a lack of explicit encouragement to form clans or other support groups, players have found ways to merge the acquisition of their weapons, armour and other warrior accoutrement with the fun of cooperative gaming.

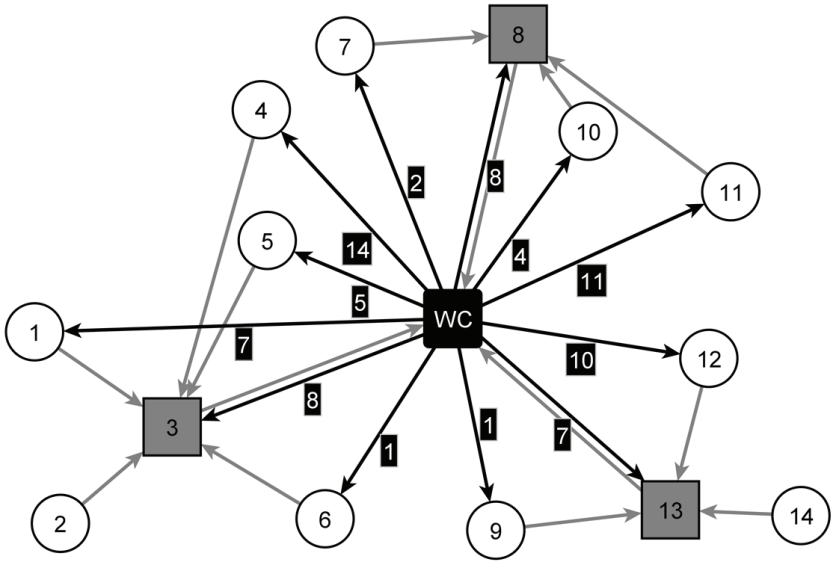

Figure 3. An organized collective 'loot run' in *Diablo 3* (witnessed on 12 June 2012). Three officers (grey square nodes) and other players (white nodes) play in order to get as many items as they can over the span of an evening. Afterwards the three officers collect all potentially interesting items (grey ties) and put all items in a single pile or 'war chest' (WC). Then every player is given a turn to pick a piece of the collected loot (black ties). In this graph the number of the black link corresponds to the number of the player node that originally collected the item. Note that, although some players opt to take back the item they originally collected, most players will end up with an item that was originally collected by another player.

Discussion: The 'origins' of cooperative gaming

As stated above, one of the interesting aspects of MMO games is that, within the context of the virtual environment, in-game social interactions mimic those of real life, and we can see the formation of 'clans', 'kinships' and other types of offline social networks, whose main aim—besides their social off- and online function—is to work together to gain access to and exchange resources. The virtual economy in these games is predicated on the idea that the acquisition of better items results in becoming better equipped to succeed at the game—*and* being identified as a better player—but that the best items are hard to come by when playing on one's own. These two aspects come together in a game mechanism found in many MMO games which ensures that cooperative play allows players to gain easier access to valued virtual playthings. Game designers thus strategically use these virtual economies to get humans to enter into cooperative and competitive play. Of course, online networks also form without the availability of virtual material culture, and players may be able to enjoy virtual possessions without the interference of other people. Nevertheless, while online networks have an existence outside of the spheres of influence of virtual material culture, when these two factors come together a new dynamic emerges. They are the constituents of interdependent socio-material networks.

Yet rather than standing on its own as a curious example of modern life, the material embedding of online social networks can be connected to old and new theories of sociality and material culture. I propose that the intuitive drive of players to interact in mutual support networks to counter the resistances of the virtual economy is part of a more universal phenomenon in which people and objects are part of interdependent social and material networks. This becomes apparent when discussing the social dynamics and the virtual economy structuring online games in the light of the idea that exchanging things drives the formation of online social contacts and contracts.

We can come back to Hobbes's original assumption that humans in a 'state of nature' were characterized by the lack of social relations and the lack of things. In other words, a human being in this hypothetical state is not part of any society *and* lacks a material culture in the most real sense of the word—his or her 'culture' is not material because it does not create anything that endures beyond the grasp of a single individual. This is an analogous situation to most online multiplayer games in which players generally start off with no (or very few) in-game social contacts and with no or only very weak possessions.

Of the three games that have been discussed, *DayZ*, with its zombie infested game world and a high degree of material scarcity, theft and mistrust between players, bears the most obvious reference to an online Hobbesian 'state of nature'. In *DayZ* there is no pre-designed authority or social mechanism to prevent people from just taking what they want. Following Hobbes's view, this lack of social contracts enforced by a clear authority, should result in an endless war of all against all. Yet, even if many of the players that play *DayZ* experience in-game lives that are "solitary, poor, brutish, and short" (Hobbes 1929 [1651]: 99), the conflict between players is also counterbalanced by player alliances, trade and companionship. The desire for better material culture, survival gear and weapons in this case, and ultimately, a player character's survival is a large causal factor in the creation of social relations.

The design of the social universe and resource economy in games like *Diablo III* and MMORPGs like *Lord of the Rings Online* does not have as great a resemblance to Hobbes's 'state of nature' as do survival games like *DayZ*.[12] Still, the combination of social interaction and the need or desire for better equipment and other material benefits in these cases also leads to emergent, more complex social networks and dynamics. In *LOTRO* and *Diablo III* kinships, crafting guilds or clans provide the (unwritten) moral codes, alliances and hierarchies that structure social networks in the game. Once again it is clear that one of the largest causal factors to engage with others in-game is based on the acquisition of material culture.

When following Hobbes it seems to be the case that in a 'state of nature' limited means and infinite needs actively prevent social networks from forming. His theory sees the need for material possessions to finally win over the more selfish and destructive urges of individuals and cooperation, according to a social contract enforced by the state, resulting in laying down the ultimately destructive individual's right to another individual's possessions. However, as Mauss and others have outlined (Corbey 2006; Graeber 2001; Mauss 1990), in the absence of clear (state) authority and regulations, as is the case in on-line games, exchanging and sharing material culture can also serve to create and sustain wider social networks.

[12] In fact, it could be argued that these games have much more in common with the 'state of nature' as hypothesized in Rousseau's *Discourse on Inequality* (2012 [1754]). Like Hobbes a century before, Rousseau also arrives at the same need for a social contract. Yet he argues, contrary to Hobbes, that the original environment of humans would have been peaceful and given them near infinite ways to see to their needs, comparable to the inexhaustible abundance of loot and crafting materials found in games like *Diablo III* and *LOTRO*.

Most multiplayer games have rules (user agreements and code of conducts) to prevent anti-social behaviours of players towards other players, such as verbal abuse, hacking player accounts or 'griefing' (deliberately harassing or irritating other players). Multiplayer games generally rely on player reports to identify this behaviour. However, and more importantly, there are no rules against in-game theft or other social violations that pertain strictly to the in-game experience. In the case of games like *DayZ* this is often an inherent part of the game.

Indeed, based not on any rules or regulations but on a design that will drive players with a desire for better in-game items to cooperate, games like *Lord of the Rings Online* make acquiring better virtual material culture a principally social endeavour. This can be based on direct reciprocal exchanges, such as the redistribution or trade of goods. What is more, in-game relations in *Diablo III, LOTRO* and *DayZ* are often not predicated on the need for balanced exchanges. Particularly within clans, kinships and other gaming collectives, there is a large amount of 'unaccounted gifting', which is indicative of a type of social mechanism that occurs in larger, non-kin groups that is known as 'strong reciprocity' (Fehr *et al.* 2002).

Some games, such as *DayZ,* use open-ended game designs that allow players to decide consciously whether or not they wish to risk the danger of seeking the company of other characters in order to be able to create a richer virtual material culture. The major aim of the social networks in these games is to overcome the external, material factors of the game's virtual economy. Other types of multiplayer games, like *Diablo III*, limit the ability or necessity for players to form social networks to acquire valued things. Yet, as the example of the cooperative loot runs and following redistribution in *Diablo III* shows, irrespective of the actual game design, players will still seek to form larger socio-material networks. In these games, by virtue of the looting, sharing, joint crafting and exchange of virtual objects, the social contract is 'discovered' online.

Conclusion

While social network studies have traditionally incorporated many types of ties, they have often not fully appreciated the role that material culture plays in creating and sustaining social relations. However, as recent archaeological and material culture theory has clearly demonstrated, society and material culture are interdependent systems. This applies to the materially embedded and historically contingent social networks that

archaeologists try to re-construct; but, as shown above, this insight can also be extended to newer network forms like MMO games.

I suggest that the creation of a new field of research that studies online exchanges or other types of social interactions featuring virtual material culture will be able to make significant contributions to our understanding of how society and material culture form interdependent systems. This can take the form of a 'top-down' approach, by studying in greater depth the type of choices game developers make when designing these games, on what grounds they make these choices, and how the game's pre-designed socio-material dynamics work out in practice. This research can also be carried out 'bottom-up' through (participatory) 'network ethno-archaeology', by studying how online social (group) identities and interactions influence the acquisition, crafting and exchange of virtual material culture and *vice versa*. The large data-sets that can be gathered in these relatively controlled environments can then be abstracted and analyzed with network-scientific methods and techniques to test hypotheses about socio-material dynamics. This will be of considerable use for a better understanding of the dynamics of the offline, socio-material networks they study in archaeology and other material culture studies.

It is, for instance, revealing of both the material and social roots of present and past societies that the scenarios described by 'socio-material theorists' like Hobbes and Mauss are quite analogical with the types of network formation and maintenance processes that emerge in today's online environments. Hobbes's philosophies as well as those social theories that emerged afterward like those by Mauss and his followers are very much products of the European Enlightenment (Sykes 2005). Nevertheless, the games discussed above and many other feature 'Hobbesian' social universes and economies, coupled with the possibility to engage in 'Maussian' relations. The fact that players consistently engage in these 'Maussian' relations, brings to light a possible universal dynamic between sociality and materiality, one in which humans are attracted to engage collectively with material culture. In this regard, it is noteworthy that it does not become explicitly clear from more traditional social theories how humans developed these interdependencies with material culture (Graeber 2001, 2011a; Olsen 2010). This is where archaeology and other material culture studies seeking to connect deep historical views of social network processes with material culture practices and repertoires can be of importance (Hodder 2012; Knappett 2005, 2011).

As I hope to have shown in this paper, interdependencies between social and material systems and dynamics in online networks are what

drive part of the design and player's enjoyment of multiplayer gaming. By studying players and their play-things in online networks we will be able to better understand how social and material systems form and function. Furthermore, many other games and other types of online networks increasingly rely on virtual material culture to make their social life and that of their gamers more engaging. Hence it is likely that, as online social networks become increasingly pervasive, the type of online interactions that are 'scaffolded' by virtual material objects will become more and more entangled with offline social and material fields. Further studies of virtual things in online social networks may thus not only provide analogical cases that could serve as models for archaeological studies, but may also help in understanding the dynamics of socio-material networks in the present.

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References

Appadurai, A. 1986. Introduction: Commodities and the politics of value. In Appadurai, A. (ed.), *The Social Life of Things: Commodities in Cultural Perspective*. Cambridge: Cambridge University Press, 3–63.

Blizzard Entertainment 2012. *Diablo III*. Published by Activision. Website: battle.net/d3, accessed on 9 October 2013.

Bogost, I. 2007. *Persuasive Games: The Expressive Power of Videogames*. Cambridge: MIT Press.

Bohemia Interactive 2013. *DayZ Game*. Website: http://dayzgame.com/, accessed on 17 February 2014.

Borgatti, S.P., Mehra, A., Brass, D.J. and Labianca, G. 2009. Network analysis in the social sciences. *Science* 323(5916): 892–895.

Brandes, U., Robins, G., McCranie, A. and Wasserman, S. 2013. What is network science? *Network Science* 1(1): 1–15.

Brughmans, T. 2013. Thinking through networks: A review of formal network methods in archaeology. *Journal of Archaeological Method and Theory* 20: 623–662.

Castells, M. 2011. *The Rise of the Network Society: The Information Age: Economy, Society, and Culture 1*. Chichester: Wiley-Blackwell.

Cole, H. and Griffiths, M.D. 2007. Social interactions in massively multiplayer online role-playing games. *CyberPsychology & Behavior* 10(4): 575–583.

Corbey, R.H.A. 2006. Laying aside the spear: Hobbesian Warre and the Maussian gift. In Otto, T., Thrane, H., and Vandkilde H. (eds), *Warfare and Society: Archaeological and Social Anthropological Perspectives.* Aarhus: Aarhus University Press, 29–36.

Corneliussen, H. and Rettberg, J. W. 2008. *Digital Culture, Play, and Identity: A World of Warcraft Reader*. Cambridge: MIT Press.

Coward, F. 2010. Small worlds, material culture and ancient Near Eastern social networks. *Proceedings of the British Academy* 158: 453–484.

DayZ Forums 2012. *Clan/Group Recruitment. DayZ Game.* Website: http://dayzmod.com/forum/index.php?/forum/69-clan-group-recruitment/, accessed on 21 May 2013.

Dunbar, R. 1988. *Primate Social Systems.* New Haven: Yale University Press.

Dunbar, R., Gamble, C. and Gowlett, J. 2010. *Social Brain, Distributed Mind.* Oxford: Oxford University Press.

Facebook 2007. *Facebook gifts.* Website: https://www.facebook.com/about/gifts, accessed on 7 June 2013.

Facebook 2009. *Farmville on Facebook*. Website: https://apps.facebook.com/onthefarm, accessed on 7 June 2013.

Facebook 2012. *Candy Crush Saga.* Website: https://apps.facebook.com/candycrush/, accessed on 14 January 2013.

Fehr, E., Fischbacher, U. and Gächter, S. 2002. Strong reciprocity, human cooperation, and the enforcement of social norms. *Human Nature* 13(1): 1–25.

Fowler, C. 2004. *The Archaeology of Personhood: An Anthropological Approach*. London: Routledge.

Fry, D.P. 2006. *The Human Potential for Peace: An Anthropological Challenge to Assumptions About War and Violence.* Oxford: Oxford University Press.

Gell, A. 1998. *Art and Agency: An Anthropological Theory.* Oxford: Clarendon Press.

Global Industry Analysts. 2010. *Global MMOG (Massively Multiplayer Online Games) Market to Reach US$14.4 Billion by 2015.* Website: http://www.prweb.com/releases/MMOG_market/MMORPG_market/prweb4113064.htm, accessed on 6 June 2013.

Godbout, J.T., and Caillé, A. 1998. *The World of the Gift.* Montreal: McGill-Queen's University Press.

Graeber, D. 2001. T*oward an Anthropological Theory of Value: The False Coin of Our Own Dreams*. New York: Palgrave.

Graeber, D. 2011a. *Debt: The First Five Thousand Years*. New York: Melville House.

Graeber, D. 2011b. Consumption. *Current Anthropology* 52(4): 489–511.

Graham, L.T. and Gosling, S.D. 2013. Personality profiles associated with different motivations for playing World of Warcraft. *Cyberpsychology, Behavior, and Social Networking* 16(3): 189–193.

Gregory, C.A. 1982. *Gifts and Commodities.* London: Academic Press.

Hall, D. 2012. *DayZ mod.* Website: dayzmod.com, accessed on 21 May 2013.

Henare, A., Holbraad, M. and Wastell, S. (eds). 2007. *Thinking Through Things*. London and New York: Routledge.

Hobbes, T. 1929 [1651]. *Leviathan.* London: Oxford University Press.

Hodder, I. 2012. *Entangled: An Archaeology of the Relationships between Humans and Things.* Malden: Wiley-Blackwell.

Huizinga, J. 1955. *Homo Ludens: A Study of the Play Element in Culture.* Boston: Beacon.

Jesper, J. 2005. *Half-Real: Video Games between Real Rules and Fictional Worlds*. Cambridge: The MIT Press.

Kaye, L.K. and Bryce, J. 2012. Putting the "fun factor" into gaming: The influence of social contexts on experiences of playing videogames. *International Journal of Internet Science* 7(1): 23–37.

Keeley, L.H. 1996. *War before Civilization: The Myth of the Peaceful Savage.* Oxford: Oxford University Press.

Knappett, C. 2005. *Thinking through Material Culture: An Interdisciplinary Perspective.* Philadelphia: University of Pennsylvania Press.

Knappett, C. 2011. *An Archaeology of Interaction: Network Perspectives on Material Culture and Society.* Oxford: Oxford University Press.

Latour, B. 2005. *Reassembling the Social: An Introduction to Actor-Network Theory.* Oxford: Oxford University Press.

LOTRO-wiki. 2007. *LOTRO-wiki*. Website: http://lotro-wiki.com/, accessed on 21 May 2013.

Malafouris, L. 2010. The Brain-Artefact Interface (BAI): A challenge for archaeology and cultural Neuroscience. *Social Cognitive and Affective Neuroscience* 5(2-3): 264–273.

Mauss, M. 1990. *The Gift: The Form and Reason for Exchange in Archaic Societies.* Trans. Halls, W.D. London: Routledge.

McCreery, M.P., Schrader, P.G., Krach, S.K. and Boone, R. 2013. A sense of self: The role of presence in virtual environments. *Computers in Human Behavior* 29(4): 1635–1640.

Miller, D. 2011. *Tales from Facebook.* Cambridge: Polity Press.

MOG radio. 2012. *Diablo: The Inferno, Episode 3.* Website: http://www.mog-radio.com/feed/the-inferno/, accessed on 7 June 2013.

Mol, A. 2007. *Costly Giving, Giving Guaízas: Towards an Organic model of the Exchange of Social Valuables in the Late Ceramic Age Caribbean.* Leiden: Sidestone Press.

Olsen, B. 2010. *In Defense of Things: Archaeology and the Ontology of Objects.* Plymouth: AltaMira Press.

Padgett, J.F. and Powell, W.W. 2012. *The Emergence of Organizations and Markets.* Princeton: Princeton University Press.

Pinker, S. 2011. *The Better Angels of Our Nature: Why Violence Has Declined.* London: Penguin Books.

Prell, C. 2011. *Social Network Analysis: History, Theory and Methodology.* London: Sage Publications Limited.

Rousseau, J.-J. 2012 [1754]. Discourse on the origin and foundations of inequality among men. In Wootton, D. (ed.), *The Basic Political Writings: Discourse on the Sciences and the Arts, Discourse on the Origin and Foundations of Inequality Among Men, Discourse on Political Economy, on the Social Contract.* Trans. Cress, D.A. Indianapolis: Hackett Publishing Company Incorporated, 27–121.

Sahlins, M. 1972. *Stone Age Economics*. London: Routledge.

Santos-Granero, F. (ed.). 2009. *The Occult Life of Things: Native Amazonian Theories of Materiality and Personhood.* Tucson: The University of Arizona Press.

Schrift, A.D. (ed.). 1997. *The Logic of the Gift.* New York: Routledge.

Scott, J. 2012. *Social Network Analysis*. London: Sage Publications Limited.

Sykes, K. 2005. *Arguing with Anthropology: An Introduction to Critical Theories of the Gift.* London: Routledge.

Terrell, J.E. 2008. Islands and the average Joe. *The Journal of Island and Coastal Archaeology* 3(1): 77–82.

Tolkien, J.R.R. 1954a. *The Lord of the Rings Part 1: The Fellowship of the Ring.* London: George Allen & Unwin.

Tolkien, J.R.R. 1954b. *The Lord of the Rings Part 2: The Two Towers*. London: George Allen & Unwin.

Tolkien, J.R.R. 1955. *The Lord of the Rings Part 3: The Return of the King.* London: George Allen & Unwin.

Turbine, Inc. 2007. *Lord of the Rings Online.* Website: http://www.lotro.com/en, accessed on 21 May 2013.

Van Looy, J., Courtois, C., De Vocht, M. and De Marez, L. 2012. Player identification in online games: Validation of a scale for measuring identification in MMOGs. *Media Psychology* 15(2): 197–221.

Weiner, A.B. 1992. *Inalienable Possessions: The Paradox of Keeping-While-Giving.* Berkeley, Los Angeles and Oxford: University of California Press.

Yee, N. 2006. Motivations for play in online games. *CyberPsychology & Behavior* 9(6): 772–775.