



<http://ojs.uwindsor.ca/ojs/leddy/index.php/iasza>

Interdisciplinary approaches to surviving the Zombie Apocalypse Conference

October 28-29, 2016, University of Windsor

GAME THEORY, THE WALKING DEAD, AND REBUILDING CIVILIZATION IN THE ZOMBIE APOCALYPSE

Pages 1-12

David Bright

*Niagara College, Niagara-on-the-Lake, Canada.
dbright@niagaracollege.ca*

GAME THEORY, THE WALKING DEAD, AND REBUILDING CIVILIZATION IN THE ZOMBIE APOCALYPSE

David Bright

*Niagara College, Niagara-on-the-Lake, Canada.
dbright@niagaracollege.ca*

ABSTRACT

In the aftermath of a zombie apocalypse, there will be two categories of survivors: those who scavenge off the collapsed civilization, and those who commit to rebuilding civilization anew. If the latter are to succeed, small groups of survivors will inevitably encounter and engage with other like-minded groups. Drawing on the television series *The Walking Dead*, this paper applies the principles of game theory to explore how the pre-conditions for re-building civilization might be established.

Keywords: *civilization, game theory, strategy, pay-off, non-zero-sum, zombies.*

1. INTRODUCTION

Two emergent themes in *The Walking Dead* are the efforts of survivors to re-establish various forms of civilization and the struggle to discover or define some basic rules that could underpin these attempts (*The Walking Dead* 2010-16). The alternative is to scavenge off the perpetually diminishing remnants of the old, pre-collapse civilization. Yet the attempts to rebuild civilization that we encounter in the show ultimately fail, largely because rival groups of survivors are unable to define new rules that would allow them to move from conflict to cooperation. In an early episode, when Andrea asks if taking a broach for her sister might be considered looting, former sheriff Rick Grimes replies, “I don’t think those rules apply any more, do you?” (*The Walking Dead* 2010-11). In the zombie apocalypse, previous notions of law and order, common sense and traditional morality are no longer foundations for survival. But this is not the same as saying there are *no* rules at all. Rather, it is up to Rick and other survivors to determine what new rules might apply in the walker-infested world. Drawing on the concepts and strategies of game theory, this paper sets out to assist that quest.

First, however, we might consider what conditions and problems survivors would face in the aftermath of a zombie apocalypse. As Jonathan Maberry points out, “The more people panic, the more bad choices they make; the more bad choices they make, the easier it is for everyone to become totally self-centered savages.... That’s how we fall. The question is really

about how we get up again. Or if we do” (Maberry 2011, p. 21). Considering the collapse of advanced society more generally, David Runciman argues that, “[W]e don’t know what failure is going to look like. There are simply no historical precedents to go on: we have no example of prosperous, secure, successful societies, used to the levels of comfort and material benefits of today’s western democracies, going into reverse. That doesn’t mean it can’t happen” (Runciman 2014, pp. 58-59). Yet we can make some reasonable assertions about the nature of the problems survivors would encounter (Tainter 1988; Diamond 2005; Scranton 2014). In his own study of the apocalyptic world of *The Walking Dead*, Maberry identifies five basic physical and psychological weaknesses that would reduce the odds of surviving such a disaster: our dependence on advanced technology; the resource-rich nature of our daily lives; our reliance on structures and systems that provide the basic necessities of life and security; a lack of basic survival skills among inhabitants of post-industrial western societies; and a lingering faith that the failed systems would somehow be restored (Maberry 2011). In other words, it is the affluence and complexity of advanced societies that render them most vulnerable to any sudden calamitous shock to the system (Nikiforuk 2012). At first, survivors could scavenge off the detritus of the old civilization, but this could only be a short-term strategy as food, fuel and other resources inevitably diminish over time (Dartnell 2014). Instead, groups of individuals would have to make the transition to medium-term goals such as the re-establishment of farming and some minimal manufacturing, and then the longer-term aim of engaging with other similar groups, whether through trade, alliance or merger.

This, in short, describes the world of *The Walking Dead*. Rick and his group face the ever-present threat of walkers (or zombies) and frequently encounter small, deadly tribes of scavengers (e.g. the Wolves and the Claimers), but their main aim – and the show’s narrative drive – is not mere survival, but the re-establishment of some form of civilization. This brings them into contact with other groups that share the same basic objective, although not always the same methods or values. As Jennifer Golbeck notes, “[I]t’s other humans who pose the most complex and serious threat to one’s safety ... from roving gangs that rape, assault and kills others, to charismatic, violent, unstable leaders such as the Governor, to mentally ill, murderous children...” (Golbeck 2015, p. 105).

Our focus here is on three particular communities that Rick’s group encounters: first, Hershel Greene’s farm, a patriarchy where Hershel’s word is final; second, the town of Woodbury, where liberty is surrendered for security under the dictatorial rule of the Governor; and finally, the utopian commune of the Alexandria Safe-Zone, guided by the

seemingly benevolent former congress-person Deanna Monroe. Each represents a different challenge to Rick, and his response to each depends, in part, on how well he understands the aim and strategy of the other leader. As we will see, this is where game theory is of value. Although each encounter tests Rick in a different way, three common themes emerge. First, for stable co-existence to prevail, rival groups need to shift any preference for conflict to cooperation. Second, in making this adjustment, both sides need to build forms of mutual trust. Third, to elevate the resulting relationship beyond the merely personal, new rules must be articulated and accepted by both sides. While Rick may be right that the old rules no longer apply, it is interesting that even scavengers on *The Walking Dead* acknowledge the need for some basic rules of survival. For example, when Daryl Dixon almost comes to blows with one of the Claimers over a rabbit each has just shot, he is told, “See, the rules of the hunt don’t mean jack out here.” The Claimers’ leader, Joe intervenes to explain the new, post-apocalypse rule. “See, going it alone, that ain’t an option,” he tells Daryl. “Still, it is survival of the fittest. That’s a paradox right there. So I laid out some rules of the road to keep things from going Darwin every couple of hours.... All you got to do is claim. That’s how you mark your territory, your prey, your bed at night. One word: claimed.” Still unconvinced, Daryl mutters, “There ain’t no rules no more,” at which point Joe ends the exchange by noting, “Oh there are. You know that. That’s why I didn’t kill you for the crossbow” (*The Walking Dead* 2013-14). Thus, even among the scavengers, we have not yet devolved to a Hobbesian state of nature (Ryan 2012).

Rather than Hobbes or political theory more generally, this paper draws on and applies the principles of game theory as a way of exploring how civilization might be rebuilt in the wake of a zombie apocalypse. Originating with John von Neumann in the 1920s, but coming to the fore in the Cold War decades of the 1950s and 1960s (Abella 2008), game theory is “a rigorous branch of mathematical logic that underlies real conflicts among (*not* always rational) humans” (Poundstone 1992, p. 6; Dixit and Nalebuff 2008; Fisher 2008; Brams 2011; Poundstone 2014; McAdams 2014). Its basic premise is that in any interaction or ‘game,’ each individual makes decisions in accordance with their own wishes or interests, which in turn must be taken into account by the other player. “While you are trying to figure out what they are doing, they will be trying to figure out what you are doing,” writes Morton Davis. “In a game each player must assess the extent to which his or her goals match or clash with the goals of others and decide whether to cooperate or compete with all or some of them” (Davis 1983, p. xiv). In addition to the players of each game, other key elements of game theory are:

common knowledge (each player knows the preference of the other and, moreover, knows that the other player knows that he or she knows this, and so); strategy (a plan of action that describes what a player would do under all possible circumstances); and pay-offs (the reward or loss a player experiences as a result of playing their strategy) (Dixit and Nalebuff 2008).

The games themselves fall into one of two broad categories: simultaneous and sequential (Dixit and Nalebuff 2008). In the former, players make their moves at the same time without any firm knowledge of the other player's intent. In the latter, players take turns to move, and therefore have information of all the moves played to date, including the other side's most recent move. In *The Walking Dead*, we most commonly witness examples of sequential games, such as Rick's encounters with Hershel, the Governor and Deanna. Each character – or player, in game theory terminology – is aware of their opponent's prior actions or decisions, and incorporates that knowledge into developing their own optimum strategy. This leads to what Avinash Dixit and Barry Nalebuff call 'Rule 1' in game theory: namely, look forward and reason backwards. "Anticipate where your initial decisions will ultimately lead," they write, "and use this information to calculate to your best choice" (Dixit and Nalebuff 2008, p. 35). Thus in Rick's encounters with Hershel, the Governor and Deanna, he should consider all possible outcomes (i.e. pay-offs) in determining his best response (i.e. strategy) to their original actions or decisions. By reasoning backwards in this way, Rick can determine his own best course of action.

The outcomes of each game can also be divided into two categories. The first is zero-sum, in which one side's gain is exactly equal to (and at the expense of) the other side's loss. The second is non-zero-sum, implying that the respective gains or losses of either side do not necessarily add up to zero. Rather, such exchanges raise the possibility of both sides coming out ahead; for example, by benefiting from a mutually advantageous trade of goods or services (Morton 1983). This distinction is important, because it is in the arena of non-zero-sum relations that diverse and even rival groups can find some form of common ground and move from the realm of conflict to co-operation. This, it may be claimed, is the true basis for rebuilding civilization. Indeed, Robert Wright has argued that non-zero-sum interactions have been the driving force of all human history:

[B]oth organic evolution and human history involve the playing of ever-more-numerous, ever-larger, and ever-more-elaborate non-zero-sum games. It is the accumulation of these games – game upon game upon game – that constitutes ... growth in biological and social complexity.... Non-zero-sumness is a kind of potential – a potential for overall gain, or overall loss, depending on how the game is played.... Non-zero-sumness, I'll argue, is something whose ongoing growth and ongoing fulfillment define the arrow of the history of life, from the primordial soup to the World Wide Web (Wright 2000, p. 327).

In this respect, if we could find examples of surviving groups in *The Walking Dead* who accept the fact that the underlying rules of the collapsed world no longer apply, but at the same time seek to build non-zero-sum relationships based on co-operation and mutual trust, then we might regard them as tentative, but genuine, attempts to start rebuilding civilization.

Three examples from *The Walking Dead* are explored here through the lens of game theory. For the sake of convenience, each group is identified with its nominal leader. The first is Rick's exchange with Hershel at the latter's farm; the second is the final standoff between Rick and the Governor at West Central Prison; the third is Rick's interaction with Deanna Monroe at the Alexandria Safe-Zone. In each case, Hershel, the Governor and Deanna have a choice of two basic strategies; in turn, Rick can respond to each in one of two ways, giving him a total of four possible strategies. For the sake of simplicity, Rick's options in each case are limited to either accepting the decision (Yield) or to rejecting it (Fight). The potential outcomes or pay-offs are ranked in descending order from 4 to 1, 4 being the best or optimum pay-off and 1 the worst. Two points are important to note here. First, the order is relative, not absolute: we do not need to know by how much a player prefers pay-off 4 to pay-off 3, just that he or she does prefer it. Second, a rational player – a core assumption of game theory – will seek to maximize their pay-off. In the following scenarios, we adopt Dixit and Nalebuff's rule and reason backward from the pay-offs in order to look forward to see which strategy is optimum for each player.

2. SCENARIO 1: RICK AND HERSHEL

Hershel orders Rick and his group to leave the farm, where the latter have been staying since one of Hershel's men accidentally shot Rick's son, Carl. "We don't normally take in strangers," Hershel says. "I can't have you people thinking this is permanent. Once ... your boy's fit to travel, I expect you'll move on. We need to be clear on that" (*The Walking Dead* 2011-12). From Hershel's point of view, this is no doubt a reasonable proposal. He is granting Rick

temporary relief, while making his own position unequivocal. Rick sees things differently. He appeals to Hershel as a fellow father (“I’m not asking for ... myself. I’m asking for my boy”); he offers Hershel a utilitarian bargain (“You know we can help you out with your work”); he even pleads on pure humanitarian grounds (“You’ve been shielded from what’s going on out there.... [W]hat the world is out there isn’t what you saw on TV. It is much worse and it changes you. Either into one of them or something a lot less than the person you. Please do not ... send us out there).” He finally reveals the news that his wife, Lori is pregnant. “That’s either a gift here,” he says, “or a death sentence out there” (*The Walking Dead* 2011-12).

Hershel remains unmoved, although he does open the door to possible compromise. “There are aspects to this,” he tells Rick, “things that I can’t and won’t discuss. But if you and your people respect my rules, no promises, but I will consider it. You have my word.” Foremost among the things that Hershel will not discuss is the fact that he is keeping undead members of his family locked in a barn, hoping that they might yet be cured. How much this fuels his desire to see Rick leave is unclear, but when Rick’s group do discover the barn’s contents for themselves, this new knowledge alters the game. “You and I have our differences with the way we look at the walkers,” Rick tells Hershel. “These people, they may be dead, they may be alive. But my people – we are alive right now, right here. You send us out there and that could change” (*The Walking Dead* 2011-12).

The impasse is resolved only when Rick’s former police partner, Shane, opens the barn and forces Hershel to witness his undead family be killed for a second time. But could things have worked out differently? Using game theory, is it possible to find a pay-off that would have been to the benefit of both Rick and Hershel? Figure 1 depicts the strategies available to each man.

FIGURE 1. RICK AND HERSHEL

	Rick Yields	Rick Fights
Hershel orders Rick to leave	4 / 1 (A)	1 / 3 (B)
Hershel allows Rick to stay	3 / 4 (C)	2 / 2 (D)

Reasoning backwards from the pay-offs, if ordered to leave Rick’s preference is to fight (3) rather than to yield (1). This decision (B) would result in the worst possible pay-off for Hershel, who would be outgunned by Rick’s group and likely lose control of his farm. Hershel’s best pay-off (4) is obviously for Rick to walk away, but Rick’s own preference in this

instance rules this out of consideration. On this basis, Hershel's better strategy is to let Rick stay. In that event, there is still a small chance that Rick might decide to attempt to overthrow Hershel anyway and take control of the farm (D). Both sides would lose members in the subsequent fight, and it is likely that it would end in an uneasy and unstable truce between the two sides, this represents a less than favourable outcome for both. But Hershel knows that Rick is unlikely to stage such a coup – "Your barn, your farm, your rules," Rick tells him, even *after* the discovery of the barn full of walkers – and so he can probably calculate that Rick would accept his offer to stay more or less on Hershel's terms (*The Walking Dead* 2011-12).

In this way, if both men can judge that (C) is their optimum pay-off, then Hershel will see it in his best interest to allow Rick to stay, and Rick in turn will accept the offer. Both men may still distrust the other's motives and future events might easily fracture the peace, but for now they have shifted from a strategy of conflict to one of co-operation, not from any genuine sense of altruism but simply by calculating a pay-off that is in their own best interests (Oreskes and Conway 2014).

3. SCENARIO 2. RICK AND THE GOVERNOR

A long-running conflict between Rick's community at West Central Prison and the Governor's fortified town of Woodbury eventually ends with the downfall of the latter. The Governor himself, abandoned by his followers, later takes command of another group of survivors, captures two of Rick's friends (Hershel and Michonne), and leads a new assault on the prison. "They got walls ... fences, lots of land for farming," he tells his group. "We could live there. If we're willing to take it from 'em." Arriving atop an armoured tank, he offers Rick a simple choice: "You and your people have until sundown to get out of here, or they die" (*The Walking Dead* 2012-13).

As he did with Hershel, Rick attempts to reason with the Governor. He points out that firing on the prison would leave it defenceless; that it would only attract the nearby walkers; that his own group includes children who were too sick to move; and that they could even co-exist with each other. "We let go of it all, and nobody dies," Rick says. "Everyone's who's alive right now, everyone who's made it this far, we've all done the worst kind of things just to stay alive. But we can still come back. We're not too far gone. We got to come back. I know ... we can all change." The Governor rejects the idea of any such co-operation ("I don't think my family would sleep well knowing that you were under the same roof," he tells Rick), but still has two options open to him: to attack or retreat (*The Walking Dead* 2012-13). In turn, Rick

would have a total of four possible responses. Figure 2 depicts the strategies and pay-offs for each player.

In this scenario, if the Governor attacks then Rick has a slight preference to fight rather than yield (B). While both sides would suffer casualties in a conflict that would also, as mentioned, compromise the prison itself, returning to life on the road would be a worse option for Rick (A). On the other hand, if the Governor were simply to retreat, leaving Rick in command of the prison (C), this would avoid bloodshed but probably strengthen Rick's position by allowing him time to fortify his defences. On the other hand, fearing that such a retreat might be merely be a tactical ruse, Rick may choose to pursue and attack the Governor anyway; in this event, however, the resultant casualties make this a poorer option (D). Accordingly, option C appears to represent the preferred strategy for each side.

FIGURE 2. RICK AND THE GOVERNOR

	Rick Yields	Rick Fights
The Governor attacks	4 / 1 (A)	2 / 2 (B)
The Governor retreats	3 / 4 (C)	1 / 3 (D)

However, there is a problem here. When Rick tries to persuade the Governor to cooperate, he tells him, "I'm not saying it's gonna be easy. But I don't think we have a choice." The Governor's response is, "We don't. You do" (*The Walking Dead* 2012-13). With this, he is effectively ruling out retreat as an option. In game theoretic terms, he has committed himself to attack, and thereby forced Rick to choose fight rather than yield. He soon reinforces this challenge when he decapitates the hostage Hershel, thus rendering moot any hopes Rick had entertained that a bargain was possible. In short, it seems probable that the Governor's original offer was never genuine, but rather that he was determined to fight to the finish, one way or another. His refusal now to even consider co-operation reflects the fact that the Governor views his encounters with Rick – and possibly the new world in general – in zero-sum terms, in which his gains can only be made at the expense of the other's loss, and vice versa. Thus while the Governor has accepted the collapse of the old world and has adjusted well to survive in the new, he is unable to make the transition to trust and co-operation necessary to rebuilding civilization.

4. SCENARIO 3: RICK AND DEANNA

By the time that he reaches the Alexandria Safe-Zone, Rick's distrust of strangers has been compounded by his recent encounter with Terminus, a community that advertised itself as a haven but which instead turned out to be a human slaughterhouse (*The Walking Dead* 2014-15). This experience is the context for understanding his strategy when he and his group are invited to join Alexandria. While on the road, Rick's group has been watched scouts from the Safe-Zone, to assess if they were suitable to admit. They pass the test. "Aaron says I can trust you," Deanna Monroe says, in reference to her son's first encounter with the group. Rather than confirm this judgement, Rick warns Deanna: "Aaron doesn't know me. I've killed people. I don't even know how many by now, but I know why they're all dead. They're dead so my family – all those people out there – can be alive." In this way, both Deanna and Rick lay their cards on the table as they each consider their next move. Does Deanna really want Rick to stay? Can Rick really accept Deanna at her word, or is he walking into another Terminus-like situation? "I am exceptionally good at reading people," Deanna tells Rick. "If I didn't win re-election, I was going to be a professional poker player" (*The Walking Dead* 2014-15). With this, each now must decide their best strategy. Based on their knowledge of the other, can they chose co-operation over conflict as their preferred option?

Here, it seems, is a community that shares Rick's underlying goal: to rebuild a civilization that he and his family can be safe in. Yet, ironically, it is Rick who is now unable to reciprocate that offer of trust. As they approach the gates of Alexandria, Aaron asks Rick and his group to surrender their weapons. "You're staying, you need to hand them over," he says. Rick's terse reply is, "We don't know if we want to stay," before adding, "If we were gonna use them, we would have started already." Once inside the settlement, Rick, Carol and Daryl meet secretly, and soon plot to recover their confiscated weapons. "We need to do it sooner than later," Rick says. "Right now they're not watching us, not worrying about meetings like this. We may need the guns, we may not" (*The Walking Dead* 2014-15). Given this weave of trust and mistrust, the exchange between Rick and Deanna is the most complicated of the three examined here. Should Deanna follow her instincts and allow Rick and his group to stay, or should she have 'read' him a bit more carefully and reverse her original decision? In turn, how should Rick react to Deanna's final decision, whichever way it goes? Once again, game theory allows us to assess the options and strategies available to each player. Figure 3 sets out the possibilities.

FIGURE 3. RICK AND DEANNA

	Rick Yields	Rick Fights
Deanna orders Rick to leave	3 / 1 (A)	1 / 2 (B)
Deanna allows Rick to stay	4 / 3 (C)	2 / 4 (D)

We can assume that Deanna was sincere in her original offer and would prefer that Rick’s group remain with the Safe-Zone. If she orders Rick to leave, then he will surely fight as he has nothing to lose; and even if his group suffers casualties in the process, they are likely to take over Alexandria (B). Deanna is not stupid – she has already told Rick that his is the first group they have accepted in a long time – and she must therefore know the potential threat that he poses. Her preference is for him to accept her offer and work with the community (C). For Rick, this is a good pay-off but he might still prefer, as his actions suggest, to challenge Deanna’s authority and attempt a coup even if she offers accommodation (D).

In short, Deanna’s best strategy is to let Rick stay, but in doing so she needs to persuade him that co-operation (C) is better than conflict (D), and that he should adjust his anticipated pay-offs accordingly. If she is indeed as good at reading people as she claims, then perhaps she has already calculated that the addition of Rick’s group might come at a price, and if this means that she will have to yield authority to Rick, then that may be for the best. Rick cautions her that, “[I]t’s all about survival now.... People out there are always looking for an angle.... They measure you by what they can take from you. By how they can use you to live. So, bringing people into to a place like this....” Rick lets the implication hang in the air between them. Is it a threat? If so, then Deanna gives no sign of backing down, but seems to have already considered the warning. “Are you telling me not to bring your people in?” she asks. “Are you already looking after this place?” (*The Walking Dead* 2014-15). In keeping with game theory, Rick and Deanna have incorporated each other’s interests into their own strategy, and in doing so have shifted the terms of reference for the game. If Deanna can persuade Rick to change his own preference from fight (D) to yield (C), then the two groups might work together in genuine co-operation to turn Alexandria from a ‘safe-zone’ into something more permanent.

5. CONCLUSION

In conclusion, these three game theory scenarios throw light on the possibility of rebuilding civilization. Rick encounters Hershel in the immediate aftermath of the collapse, and while the two men appear to share similar values, Hershel's isolation from the full devastation of events allows him to cling to the belief that the old rules do still apply, which prevents the two men from building a genuine mutual trust. The Governor, by contrast, has fully accepted the new post-apocalyptic realities, but views the world in zero-sum terms. His gains can only be made at the expense of another's losses, and vice versa. Power can only be contested, not shared, and as a result co-operation is impossible. Deanna's commune at Alexandria combines the physical security of Woodbury with the benign rule of Hershel's farm. Yet it too is flawed, as Deanna proves to be unable to make the cold, lethal decisions that often need to be made in this new world. She recognizes this weakness in herself, which, again, is perhaps why she welcomes Rick's group and even regards Rick as a more effective leader than herself.

It might seem to be common sense that co-operation is preferable to conflict. But common sense does not always prevail in *The Walking Dead*. "I told you. I said it: Can't go back, Bob," Terminus leader Gareth tells a captured member of Rick's group. Then, as if to underline the point, he takes a bite of the leg he has just cut off Bob (*The Walking Dead* 2014-15). This, then, is one vision of the survivors' fate: not merely living off the dwindling residue of past generations, but literally feeding off each other. But if there is no going back, how might the survivors move forward? By building trust, making co-operation preferable to conflict, and by establishing some basic rules. As such, game theory, rather than common sense, allows us to perceive how a new civilization might arise from the ashes of the post-collapse world. In a zero-sum game, there is no possibility of making the collective advances that have marked human civilization. However, if the human inhabitants of a zombie apocalypse could calculate their way into forming non-zero-sum alliances, then there just might be hope for recovery. In a world where the old rules most certainly do not apply, this is probably the best we can hope for.

REFERENCES

- Abella, Alex (2008). *Soldiers of Reason: The RAND Corporation and the Rise of the American Empire*. Orlando: Harcourt.
- Brams, Steven J. (2011). *Game Theory and the Humanities: Bridging Two Worlds*. Cambridge: MIT Press.

- Dartnell, Lewis (2014). *The Knowledge: How to Rebuild our World from Scratch*. New York: Penguin Press.
- Davis, Morton D. (1983). *Game Theory: A Nontechnical Introduction*. New York: Dover.
- Diamond, Jared (2005). *Collapse: How Societies Choose to Fail or Succeed*. New York: Viking.
- Dixit, Avinash K. and Nalebuff, Barry J. (2008). *The Art of Strategy: A Game Theorist's Guide to Success in Business and Life*. New York: W.W. Norton.
- Drezner, Daniel (2011). *Theories of International Politics and Zombie*. Princeton: Princeton University Press.
- Fisher, Len (2008). *Rock, Paper, Scissors: Game Theory in Everyday Life*. New York: Basic Books.
- Golbeck, Jennifer (2015). Who Needs an Untrustworthy Doctor? Maslow's Hierarchy of Needs. In: Travis Langley (Ed.), *The Walking Dead Psychology: Psych of the Living Dead* (pp. 93-106), New York: Sterling.
- Harford, Tim (2009). *The Logic of Life: The Rational Economics of an Irrational World*. Canada: Anchor Canada.
- Hetterly, James (2015). The Claimers. In: Travis Langley (Ed.), *The Walking Dead Psychology: Psych of the Living Dead* (pp. 218-21), New York: Sterling.
- Kunstler, James A. (2012). *Too Much Magic: Wishful Thinking, Technology, and the Fate of the Nation*. New York: Grove Press.
- Lloyd, Martin (2015). Becoming a Sociopath. In: Travis Langley (Ed.), *The Walking Dead Psychology: Psych of the Living Dead* (pp. 137-47), New York: Sterling.
- Maberry, Jonathan (2011). Take Me to Your Leader: Guiding the Masses Through the Apocalypse with a Cracked Moral Compass. In: James Lowder (Ed.), *Triumph of the Walking Dead*, (pp. 15-34), Dallas: Smart Pop.
- Poundstone, William (1992). *Prisoner's Dilemma: John von Neumann, Game Theory, and the Puzzle of the Bomb*. New York: Anchor Books.
- (2014). *Rock Breaks Scissors: A Practical Guide to Outguessing & Outwitting Almost Everybody*. New York: Little Brown.
- Runciman, David (2014). *Politics*. London: Profile Books.
- Ryan, Alan (2012). *On Hobbes: Escaping the War of All Against All*. New York and London: Liveright Classics.
- Scranton, Roy (2014). *Learning to Die in the Anthropocene: Reflections on the End of a Civilization*. San Francisco: City Light Books.
- Sheppard, Si (2012). Realistically, Nice Guys Finish Last. In: Wayne Yuen (Ed.), *The Walking Dead and Philosophy: Zombie Apocalypse Now* (pp. 129-40), Chicago: Open Court.
- Tainter, Joseph A. (1988). *The Collapse of Complex Societies*. Cambridge: Cambridge University Press.
- The Walking Dead* (2010-16). AMC.
- Wright, Robert (2000). *Nonzero: The Logic of Human Destiny*. New York: Vintage.