



Systems of Belief and Internal Social Values: Game Theory and Strategic Thinking in Jane Austen's *Sanditon* (1817)

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Abstract

The present research applies game theory to Austen's *Sanditon* (Austen, 1817b) by analyzing the novel's characters in the light of games, choices, and rational thinking. The application of game theory is especially relevant, considering Austen's particular focus on interactions and choices within society in her work. Moreover, a lack of incorporation of rational and mathematical models of decision-making in the field of literature, along with the shortage of academic studies on Austen's *Sanditon* (1817b) prompts the present study. In the present paper, the major characters in Austen's original novel fragment are divided into strategic and non-strategic (or clueless) characters. Some characters (Lady Denham, Charlotte Heywood, and Mary Parker) are found to be strategic, while others (Tom Parker, Sir Edward Denham, and Diana Parker) are established as clueless. On a larger scale, the study's concentration on rational decision-making and the prediction of character decisions in *Sanditon* (1817b) creates an opportunity to incorporate empirical evidence while studying works of literature.

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1. Introduction

Jane Austen's *Sanditon* - published posthumously in 1817- is centered on the building of a seaside resort, the likes of which were springing up with alarming speed near the end of Austen's own life. In the novel fragment that is left behind, Austen gets as far as introducing the characters and the setting in almost 12 chapters or 24,000 words, which is estimated to be about one-third of a typical Jane Austen novel. In the novel, Charlotte, the twenty-two-year-old protagonist, gains the opportunity to visit Sanditon, a seaside resort, when Mr. and Mrs. Parker – the chief investors – have an accident near her home. Charlotte later meets Lady Denham, the twice-widowed rich childless heiress, her potential heirs Clara Brereton (her companion) and the Denham siblings Sir Edward and Miss Denham, and the Parker siblings: hypochondriacs Diana, Susan, and Arthur Parker. The novel fragment leaves off after just beginning to introduce the fifth Parker sibling and probable hero Sidney Parker, and rich young half-mulatto heiress Miss Lambe who is visiting Sanditon. Despite the commonplace features, *Sanditon* (Austen, 1817b) includes unique elements that were new to Austen's works: the first black character, a particular focus on the elements of time and place, and a focus on a critique of the economy and industrial change.

Similar to Austen's previous works, *Sanditon* (Austen, 1817b) features a mixture of social interaction and the psychological mind of individual characters at its finest. Since Austen's fiction is realistic and deals meticulously with psychological issues, it naturally involves an abundance of choices and decisions, often based on the expectation of other characters' anticipated choices or decisions. This feature yields itself conveniently to game theory, as it also deals with the analysis of players (or characters) and their choices.

This study demonstrates how game theory concepts and models can be useful in understanding Austen's unfinished work by identifying the strategic abilities and competencies in *Sanditon* (1817b). In particular, the significance of the present study lies in the combination of two relatively unexplored territories in the academic world: 1) utilization of game theory's empirical model to study the strategies, choices, and their

consequences in a work of literature, and 2) using Austen's *Sanditon* (1817b) as a platform for exploring unfinished pieces of literature and providing models of prediction for further advancement of the novel.

2. Theoretical Framework

Michael Chwe (2013) offers an elaborate study of Jane Austen's use of strategic interactions in his book entitled *Jane Austen: Game Theorist*, where he claims that Austen intentionally applies concepts of game theory in her works. By analyzing certain interactions in Austen's novels through tree diagrams of rational choice theory, Chwe further claims that Austen is a "theoretician of strategic thinking". On a broader scale, Chwe challenges the common criticism that game theory is passionless and selfish, moralistic or economic. He also negates the idea that game theory serves ideological or political purposes, or that it centers on inconsequential games like drawing room games and cards (Chwe, 2013).

Chwe finds Austen's tendency to use game theory in certain ideas presented in her novels. In particular, he notes the repetition of choice and preferences, references to strategic thinking (e.g., "penetration", "foresight" and "schemes"), and the inclusion of strategic sophomores or the "clueless" in Austen's novels. He also mentions the combination of characters' emotions, instincts, habits, rules, social factors, ideology, and constraints with various models of game theory in Austen's works (Chwe, 2013).

Chwe studies six completed works from Austen in terms of the development of the characters' strategic abilities, with a particular focus on the protagonists. He notes how the characters in *Pride and Prejudice* (Austen, 1813) – specifically Elizabeth and Darcy – are sufficiently capable of strategic thinking. He proposes that in *Sense and Sensibility* (Austen, 1811), two strategic dimensions of Sensibility (Marianne) and sense (Elinor) are compared and contrasted, which further demonstrates the need for thoughtful decision-making (Elinor) and fanciful speculation (Marianne) in strategic thinking. In *Persuasion* (Austen, 1818), Anne is capable of strategic decision-making but must learn to trust her ability. *Northanger Abbey* (Austen, 1817a) and *Mansfield Park* (Austen, 1814) also feature heroines who must learn strategic ability by facing social situations

and making decisions. Lastly, *Emma* (Austen, 1815) is a study of the dangers of pride and overconfidence in one's strategic ability (Chwe, 2013).

Apart from Chwe, other critics have also noted Austen's use of gamified interactions or simply "games" in her works. Alistair Duckworth in *Spillikins, Paper Ships, Riddles, Conundrums and Cards: Games in Jane Austen's Life and Fiction* (1975) points out the "extraordinary high frequency of "game" words" in *Emma* (1815), such as "trick, finesse, puzzle, mystery, connivance, speculation and double-dealing" which are "by no means always restricted to the playing of games" (Duckworth, 1975, p. 294).

John Dussinger (1990) in his book *In the Pride of the Moment*, claims that Austen's writing prowess lies in the minute "encounters" that reveal her characters' preferences rather than the larger design of the story. Drawing on the work of sociologists like Gregory Bateson (1904 – 1980) and Erving Goffman (1922 - 1982), he places Austen's characters in the frame of an encounter (following from Bateson's concept of a frame for the events of a game). Dussinger applies Goffman's model of a game on Austen, to show how the focus, for participants in an encounter, is "on a single objective for the duration of the gathering", much like a game of chess, and without considering "any aesthetic, economic, or sentimental interest that would interrupt this attention" (Dussinger, 1990, p. 22).

In his book *British Romanticism and the Science of the Mind* (2001), Alan Richardson remarks that while critics (Handler et al., 1999; Poovey, 1985) have elaborated on the importance of education, culture, and society on Austen's protagonists, they overlook Austen's nuanced attention to the innate aspects of her characters' mind. In particular, Richardson notes how some of the characters in *Persuasion* (Austen, 1818) – Austen's last completed novel – are ahead of their time in terms of incorporating the surroundings and the environment in their decision-making (Richardson, 2001).

Remarking on Austen's choice of the word "instinct", Richardson concludes that Anne's "rationality" (his quotation marks) could be "placed on a continuum with, rather than directly opposed to, her automatic, non-

rational, but quite natural responses elsewhere in the novel at times of heightened emotion" (Richardson, 2001, p. 104). This cross-section of natural response (or desire) and rationality is what makes for strategic thinking and rational choice theory. Furthermore, Richardson refutes that Anne's sensibility makes her a "denervated rational agent", echoed by Chwe when he argues that game theory, often seen as "reductive and technical" is sensitive and discerning, as Austen manages to attest (Chwe, 2013).

The present study owes much to two dissertations: one is dedicated to the analysis of games in *Pride and Prejudice* (Gaches, 2012), while the other is a more superficial application (and comparison) of game theory on three of Austen's works *Emma*, *Persuasion* and *Pride and Prejudice* (Starobová, 2008). While the former is a more in-depth application of game theory, the latter covers more games and is a bigger picture into the workings of game theory, and aims to prove the applicability of the game theory in literary works. A significant observation from both studies that contributed to this research was the presence of marriage-related games in Austen's novel, where "the characters are involved in a game, primarily a love-game" (Gaches, 2012, p.3).

In general, very little scholarly attention has been paid to *Sanditon* (Austen, 1817/1975), and no game theory or cognitive theory research has been devoted to it. Even Chwe's elaborate study of games in Austen's works does not mention Austen's unfinished novels or novel fragments such as *The Watsons* (1871), *Sanditon* (1817b), and *Lady Susan* (Austen, 1871). While *Sanditon* (1817b) has been the subject of some academic studies (Friedman, 2013; Lauber, 1972; Mallory-Kani, 2017; Tuite, 2012), most of them are either outdated or cursory and transitory which feature the off-handed application of theories such as historicism, deconstruction, close reading, structuralism, and medical theories.

Therefore, a case might especially be made for *Sanditon* (1817b), a 24,000-word unfinished novel with sufficient scene setting and character introduction to predict what came next. The novel fragment has inspired multiple continuations and a recent well-received ITV adaptation (Davies et al., 2019), directing the academic eye back towards Austen's original

work of *Sanditon* (1817b). This study aims to fill that gap by a game theory reading and analysis of *Sanditon* (1817b).

3. Methodology

3.1. Materials

Literature is not new to humanistic applications of game theory, and such application ranges from short stories to operas (Brams, 2011). The field of literature, then, has for a few years been actively encouraged as fertile ground for strategic analysis. Using game theory to study literature can not only explain the strategic choices characters make in a work of fiction, but it can help explain decisions uncharacteristic to certain characters, like those in tragedies (Brams, 2011).

Since Austen's novels are domestic and realistic, they are filled with choices, interactions, and decisions that can be analyzed to gain insight into her method, plot, and characters. Game theory has evolved from its original narrow definitions in the field of mathematics and statistics to a diverse application in the fields of humanities and literature, among others. For this research, the theoretical framework is limited to certain concepts of game theory that lend themselves well to the application of realistic situations in Victorian domestic novels, namely strategic thinking, backward induction, cluelessness, and rational choice theory.

Therefore, according to the aim of the present study, the material of research is provided through the text of Austen's *Sanditon* (1817b) where the pivotal choices of the main characters are analyzed. In particular, these characters will be categorized, based on the text, into strategic and clueless characters, and the outcome of their decisions will be examined and further predicted based on the evidence at hand.

3.2. Instruments

In the present study, two aspects of game theory are used which are necessary for breaking down the complex, realistic writing in a work of literature and demonstrate the relationship between decisions and choices: 1) the game tree model, also known as the extensive form of the game or the decision tree (Watson, 2013) and the strategic (or normal) form of the game also

referred to as the payoff matrix (Pastine & Pastine, 2017).

Two main branches of game theory are cooperative games and non-cooperative games. In the former, an entirely different set of concepts is necessary to study a players' behavior. The most important concept in cooperative games is contractual behavior, which occurs regardless of whether contracts are written or less formal verbal agreements (Watson, 2013). Non-cooperative games involve competition between different players, and alliances are only possible if enforced using credible threats (Pastine & Pastine, 2017). A credible threat is one that a rational player would carry out, one that would be in his best interest. The kind of games this study expects to deal with are mostly non-cooperative games.

Considering the realistic nature of interactions in *Sanditon* (1817b), it should be noted that most real-life situations do not lend themselves easily to be divided into cooperative and non-cooperative games. For example, while it may seem like most people are competing against each other in an "adversarial contest" (Watson, 2013), real life is full of situations where people have the choice to cooperate or compete, and in the former, they may even be more assured of overall better payoffs.

However, non-cooperative games are used in the present research for three reasons: One, it is simply necessary to limit an application to literature to get desired results, which the basics of game theory ensure by simplifying complex situations so they can be demonstrated as models. Two, in literary works of Victorian realism, characters are either competing for more money (e.g., receiving the most inheritance in comparison with other inheritors) or for suitors' hand in marriage, both of which are apt instances of non-cooperative games. Lastly, human interaction in games makes cooperation difficult to achieve because individual incentives are at play (Pastine & Pastine, 2017).

As mentioned previously, "game trees" are the main tools that are used in the present paper to study the choices and strategies in *Sanditon* (1817b). The two basic elements of a decision or game tree are nodes and branches. A node indicates where and by whom a decision takes place, whereas the branches showcase the

possible outcomes or the variation in different actions that players can choose (Watson, 2013). To contribute further to the logical element of this model, numbers can be used to represent payoffs for choices (Chwe, 2013), representing the final “happiness” or “utility” of the players

(Pastine & Pastine, 2017). If a player gets what they wanted, the number assigned to that outcome would be higher for them as compared to an option that could be desirable but also could be relatively inferior.

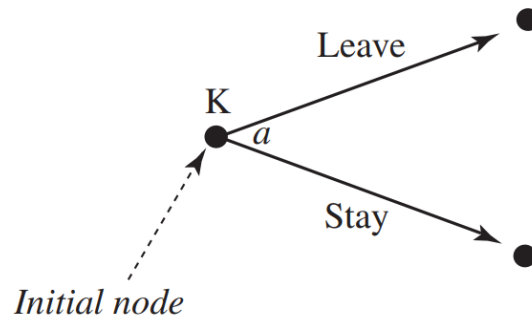


Figure 1

A Basic Game Tree (Watson, 2013, p. 10)

Figure 1 shows the simplest game tree where two outcomes are expected. In its most elaborate form, the payoffs in a game tree are assigned with numbers that range from 1 (worst) to 10 (best). Simple ‘tree-like’ structures have been used for years to represent choices made by the players of a game in a mathematical model. To denote choices in the form of a game tree, it is necessary to focus on and isolate just one or two main strategic elements of the game (Watson, 2013). This is particularly important when modeling real-life or realistic problems, as is the case with realistic novelists such as Jane Austen. To simplify complex decisions made human brain, it is also necessary to ascribe one game for the analysis of the major decision. Modeling games in this manner is sometimes referred to as the “extensive form” of the game (Watson, 2013), although it must be noted that the extensive form is not only limited to one model, the game tree but can include other models as well.

Game trees form the backbone of game theory’s application to *Sanditon* (1817b) in the present paper. There are, however, other concepts used to explain interactions and strategies assumed by characters which are as follows:

Rational Choice theory is a theoretical framework first used to understand and model social and economic behavior. In rational choice theory, it is assumed that every player’s goal is personal gratification and maximization of their payoffs. The rational

choice theory does not explain a person’s preferences or the process which leads to a choice but rather provides an insight into the self-absorbed strategies assumed by the players in a game (Chwe, 2013).

“Sequential Move” games are games where there is an order to players’ actions, and players can observe the actions of others before making their moves. In strategic interaction, one player’s decision affects the other player’s actions and vice versa. Once a decision has been made and it is the player’s turn to make the next decision, a new game is created, which is known as a ‘Subgame’ (Pastine & Pastine, 2017).

Finally, strategic sophomores or people who do not understand that other people make their decisions according to their preferences are referred to as ‘Clueless’. “The conspicuous absence of strategic thinking” is what Chwe calls cluelessness after *Emma*’s 1995 movie adaptation *Clueless* (Chwe, 2013, p. 3).

3.3. Procedure

Based on the instruments and methodology offered above, the present study divides characters into strategic and clueless characters according to the behavior they demonstrate in the text. The strategic characters include Lady Denham, Charlotte, and Mary Parker. The Clueless characters consist of Tom Parker, Diana Parker, and Sir Edward. The decisions

these characters make are organized within a game tree to 1) predict the future course of action these characters are likely to take, and 2) the way strategic abilities affect the manner in which characters navigate the changes around them. The concepts offered by Schön (1992) of “reflection on action” and “reflection in-action”, indicate that when dealing with troubles and challenges, “professionals” may use their previous experience and improvise or act spontaneously on the basis of their existing practical knowledge. This seems to be a concept very similar to what is here called “strategy” (Toktanova et al., 2021, p. 182).

4. Results

Syzdykov asserts that “External mediation prevailed in the old class society, where life was hierarchical and unfairly rigid, but at least direct conflict was avoided.” (2021, p. 162). However, it is important to keep in mind that although “in conflict interactions, parties operate from a baseline of disagreement or difference”, “neither party is able to resolve the incompatibility without the other.” The result is a “dialectic tension between cooperation and competition” (Gasiorek & Giles, 2013, p. 12). One of the elements that make Austen’s literary works and game theory a particularly good fit is that since Austen always writes from a woman’s perspective, the issue of choice and decisions is of particular significance. Writing of (and in) a time when social obligations “ensnared” women, choices – mostly with regards to whom they wanted to marry – were what made Austen’s trademark domesticity subversive. Analysts’ (Dadlez, 2009; Stasio & Duncan, 2007) work examining literature using cognition and rationality as a tool can be linked to Austen’s work. Then, the main idea in Austen’s writing that can be highlighted using game theory is the element of rationality in her character, with a particular focus on her heroines (Chwe, 2013). To study these features in *Sanditon* (1817b), the characters are divided into two categories of “strategic” and “clueless”.

4.1. The Strategic Characters of *Sanditon* (1817b)

4.1.1. Lady Denham

Lady Denham has been married twice and yet, at present, is unburdened with a husband. By studying the case of her marriages closely, we

see that she is skilled at backward induction. From her first marriage to Mr. Hollis, who had “considerable property in the country” (Austen, 1817b, p. 8), the money she gains is her payoff: “He had been an elderly man when she married him, her age about thirty. Her motives for such a match could be little understood at the distance of forty years ...” (Austen, 1817b, p. 9).

From her second marriage to Sir Denham, her payoff involves acquiring a title – she is henceforth called Lady Denham. One can infer, then, that Lady Denham’s marriages were strategic interactions. Her age of marriage supports the supposition that she is rational; she marries at an age that does not leave her vulnerable to romantic notions. A thirty-year-old woman can hardly be accused of marrying for love. She makes an advantageous match not once but twice. Furthermore, she manages to avoid having children from either of her marriages, reducing any chances of competition where her husbands’ inheritances are concerned.

Her decision to bring Clara Brereton with her back to Sanditon House is also a curious one. It may seem at first glance that Clara’s relatives opportunistically tricked a normally resolute Lady Denham by way of her bad circumstances (and their good spying!), rendering her temporarily clueless. However, Lady Denham’s decision to bring back Clara, who can be assured of staying humble and pleasing due to her inferior position in the world and her sudden privileged position in Sanditon House, can also be seen as a rational move. It ensures that other heirs, like the Denhams, who may not share Clara Brereton’s humble disposition due to their nobler circumstances of birth and have a house (Denham Place) close by, will be kept at bay. This way, when faced with decisions both of which have low payoffs, Lady Denham succeeds in choosing the path with a relatively higher payoff number.

The strategic ability of this kind is rare, particularly in a woman of her age who is also uneducated. After all, most of Austen’s strategic characters are educated: they are either young women who read, or they are men who give them plenty of opportunities to educate themselves (e.g., Mr. Darcy, Elizabeth Bennett, Emma Wodehouse, and Anne Eliot).

However, she is also very proud of her strategic ability, and overconfidence in one's strategic abilities could lead to being clueless. The clearest example of her boastfulness of strategic ability is when she tells her friend, "... Though she had *got* nothing but her title from the family, still she had *given* nothing for it"

(Austen, 1817b, p. 9). Austen follows directly by admitting that it was to be supposed then that Lady Denham had married for the title, the value of which is nothing small. Since Austen does not finish the fragment, it remains unclear whether Lady Denham's pride will be her clueless fall, but the book sets her up for one.

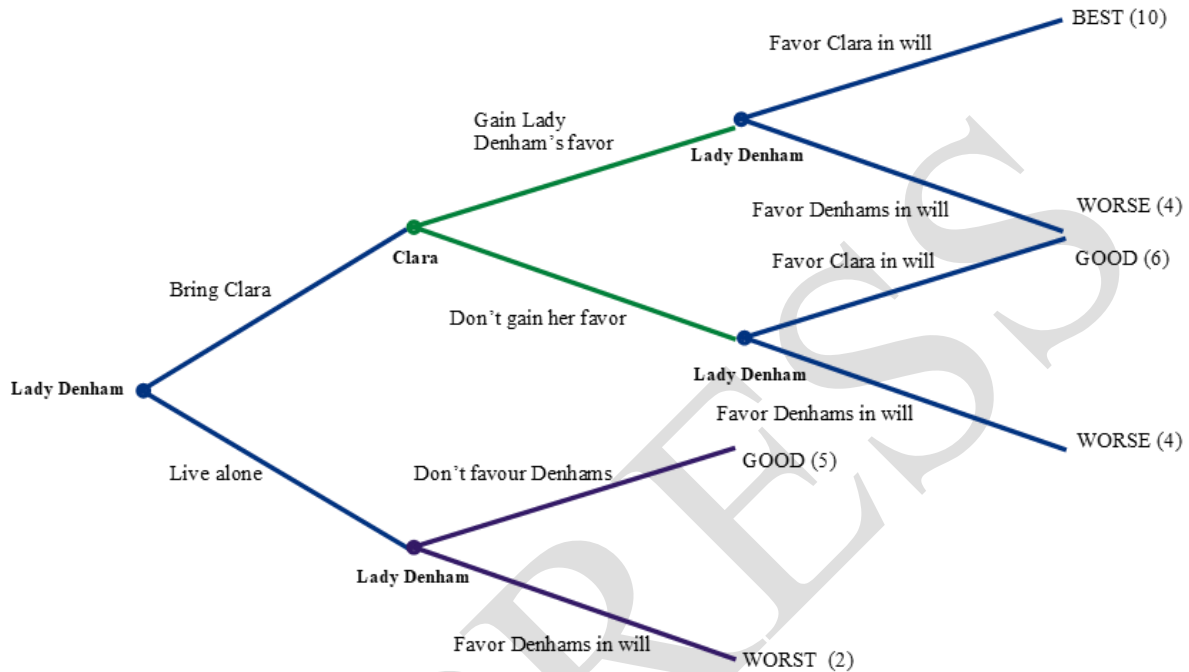


Figure 2
Lady Denham's Game of Inheritance

Lady Denham's strategic abilities are demonstrated in Figure 2, where it is shown that Lady Denham can choose to either bring Clara Brereton with her or live alone. If she brings Clara with her (which she does), Clara will either prove to be a pleasing companion to Lady Denham and win her favor, or she will fail to do so. If Clara were to gain Lady Denham's favor, Lady Denham now has an option of who to leave her inheritance to Clara and her family, the Breretons, or the Denhams.

Since Lady Denham does not favor the Denham siblings, it might be argued that Clara Brereton was brought to Sanditon House by Lady Denham to deter the Denham siblings from imposing themselves upon Lady Denham. This assumption is further approved when she tells Charlotte about Miss Denham's attempt to invite herself to Sanditon House: "Matters are

altered with me since last summer, you know. I have Miss Clara with me now, which makes a great difference" (Austen, 1817b, p. 22).

The best-case scenario is favoring Clara in her will after she has gained Lady Denham's favor, symbolized with the imaginary payoff number 10 (the highest): Lady Denham gets both an agreeable companion, the satisfaction of jilting the Denhams as well as managing to deter the Denhams from visiting Sanditon House. However, even if Clara does not prove agreeable, and Lady Denham chooses to favor Clara in her will anyway, she has the satisfaction of both jilting and deterring the Denhams, so the payoff number is 6. In both cases (Clara managing to be agreeable or not), favoring the Denhams in her inheritance is assigned a payoff number of 4.

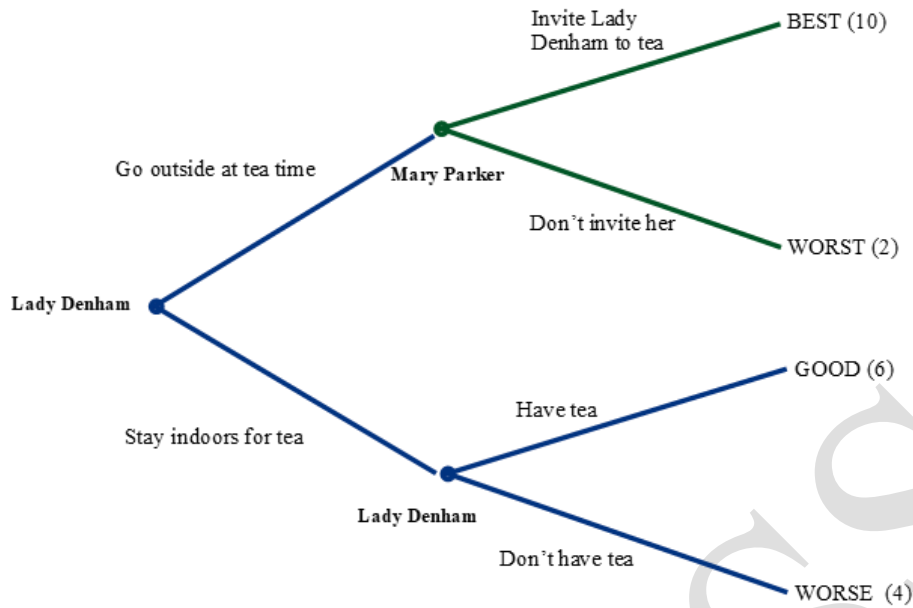


Figure 3
Lady Denham's Game of Economy

There are few things Lady Denham dislikes more than having to spend money: "I should not choose to have my two housemaids' time taken up all the morning in dusting ... If they had hard places, they would want higher wages" (Austen, 1817b, pp. 22-23), "I should not like to have butcher's meat raised, though. And I shall keep it down as long as I can" (Austen, 1817b, p. 18)

Lady Denham has several measures for saving money, and having her tea at other people's houses is one of them (Figure 3). She is often found outside at tea time. When she runs into Mary Parker, Mary has the choice of inviting her to tea or not inviting her. If she invites her, this is the best case for Lady Denham – she gets tea without having to pay for it, so the payoff number assigned is the highest (10). In reality, this is the scenario that takes place: Lady Denham's strategic ability can be seen here, and even Mary's decision to invite Lady Denham is not coincidental because knowing Mary to be polite and sociable, Lady Denham can predict her behavior to an extent.

However, if she goes outside and is not invited, this will be humiliating; a case worse even than not having tea, and so the payoff number is the lowest (2). Lady Denham's other alternative is to stay at home. There, she can choose whether to have tea or not have tea. Having tea would be wonderful, but she would have to spend money, so the payoff number assigned is 6. If she

chooses to go without her tea, the payoff number is 4 – lower than not getting any tea but still higher than being humiliated by not being invited.

4.1.2. Charlotte

Charlotte's rational and strategic tendencies are evident from the very beginning; in chapter two, she is selected to be invited to visit Trafalgar House from among her other siblings. This decision may be owing to her status as the eldest daughter of the Heywood household, but also, this choice on the part of the Parkers can be inferred from Austen's writing to be in direct consequence to Charlotte's being "under her mother's directions...particularly useful and obliging to them" (Austen, 1817b, p. 8)

Charlotte's powers of observation are still developing, and it is to be presumed that like some of Austen's other heroines (e.g., Catherine Morland in *Northanger Abbey* (1817a) and Fanny Price in *Mansfield Park* (1814) (Chwe, 2013)), Charlotte was to have developed her strategic powers by the end of the novel. That her strategic ability is still in its early stages can be demonstrated through her quickness to be flattered by the charming Sir Edward, reminiscent of Wickham in *Pride and Prejudice* (1813). Using her strategic abilities, she soon realizes from Sir Edward's looks and actions that he is only trying to make Clara Brereton jealous, on whom he seems to have fixed designs. This is, in fact, a sequential move

game that Sir Edward is trying (unsuccessfully) to play.

Strategic ability sometimes means escaping an unwanted situation by ceding to a less undesirable one, as Charlotte frequently demonstrates. When Lady Denham invites Charlotte to walk with herself, Charlotte accepts, not because she enjoys Lady Denham’s company but because the other alternative is suffering Sir Edward’s misquoted poems and his failed attempts at being flattering towards her (Austen, 1817b).

One of Charlotte’s frequently used strategic moves is her silence and knowing where to employ it. She does not voice her opinions on the Parker siblings’ self-declared diagnoses, even though her thought process, relayed through Austen’s narrator (Free Indirect Discourse) tells the readers that she sees the illnesses for the hypochondria that it is (Austen, 1817b). She also does not express her outlook on Diana Parker: “the words “unaccountable officiousness!” “Activity run mad!” had just passed through Charlotte’s mind, but a civil answer was easy” (Austen, 1817b, p. 27).

Silence is a key component in being successfully strategic. The main difference between the two principally strategic characters in *Sanditon* (1817b), Charlotte Heywood and Lady Denham, is vanity. It is as important to know when strategic powers are not suited to a situation as it is to be observant and strategically apt. Lady Denham frequently gives herself away by voicing her opinions in situations she should not. She tells Charlotte, who is only a stranger, about the favors she does for her family. Charlotte, like Austen’s readers, understands her mean character from this behavior. This goes against her favor, particularly in the Victorian society social game, where to win, you also have to win favor with society and have them think well of you.

Other characters know that Lady Denham is mean, stingy, uneducated, and near-sighted. Charlotte remains in society’s good graces. Mr. Parker, while describing Lady Denham to Charlotte, says, “There is at times ... a little self-importance but it is not offensive ... and ... there are points, when her love of money is carried greatly too far” (Austen, 1817b, p. 9).

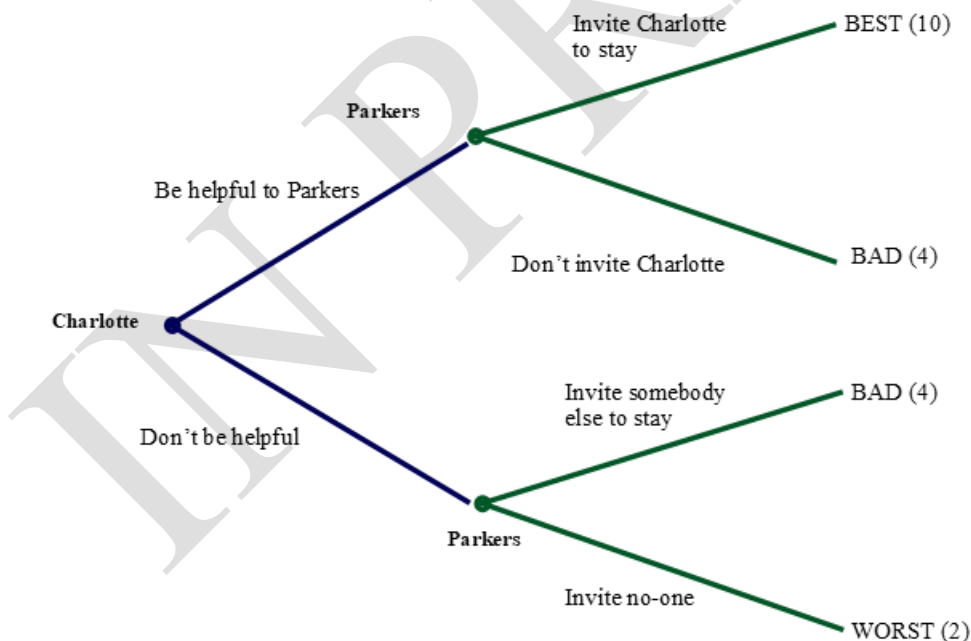


Figure 4
Charlotte’s Sequential Move

When the Parkers’ carriage overturns near the Heywood home and they have to stay for a fortnight, Charlotte makes herself useful to the Parkers. “Their invitation was to Miss Charlotte Heywood ... the one who, under her mother’s

directions, had been particularly useful and obliging to them; who had attended them most and knew them best” (Austen, 1817b, p. 8).

When the Parkers arrive, if Charlotte chooses to be helpful, the Parkers will decide whether to invite Charlotte to Sanditon, which is what happens (Figure 4). This is an excellent opportunity and gives the maximum payoff (10). The Parkers might still not invite her even if she helps them out, which has the payoff number 4.

If Charlotte chooses not to be helpful, the Parkers may invite someone else (who chose to be obliging) or invite no one. The former is better than the latter because the invitee would still be one of Charlotte's siblings and she may hope to be invited in the future. The worst-case scenario is the latter, where no one from the Heywood family gets invited to Sanditon, with the payoff number being 2.

4.1.3. Mary Parker

At the start of the novel, Mary Parker seems like a meek woman, submissive to the desires of her husband and unable to speak her mind. When Tom and Mary Parker's carriage overturns at the start of *Sanditon* (1817b), Austen introduces Mary Parker as such: "His wife... stood, terrified and anxious, neither able to do or suggest anything and receiving her first real comfort from the sight of several persons now coming to their assistance" (Austen, 1817b, p. 1). Therefore, she barely speaks, her husband talking enough for two, and even when he asks her questions, he either seems to not wait for an answer or gives one himself.

The conclusion from her first appearance, however, is subverted by her being a strategic character. Mary Parker's strategic ability is more subtle than that of Charlotte Heywood and Lady Denham's. Practicing rationality, she does not offer her opinion against her husband's in most (although not all) places simply because she knows him too well and knows that rather than reaping any benefit from an understanding from Tom Parker, she will likely incur his annoyance instead. So, she only offers her opinions in situations where she thinks it will bring about any real result to her. She also becomes surprisingly opinionated and articulate in front of other characters, like Charlotte, who match her temperament and have in common with her sensible behavior.

Another strategy of Mary Parker's that works exactly as planned is acting helpless. We realize this in Chapter 11, when Mary Parker, who is about to set off to visit Lady Denham, is suddenly faced with the overwhelming requests of not just Tom but also Diana Parker. Realizing that refusing will only earn her disapproval, she strategizes by first keeping silent, a tactic she and Charlotte share in their strategic arsenal, followed by agreeing with them and then acting to serve her interests. The result is that Tom Parker withdraws his appeal when he realizes there is a chance he might be outdone, after which Diana also follows suit, getting Mary what she wanted (Figure 5).

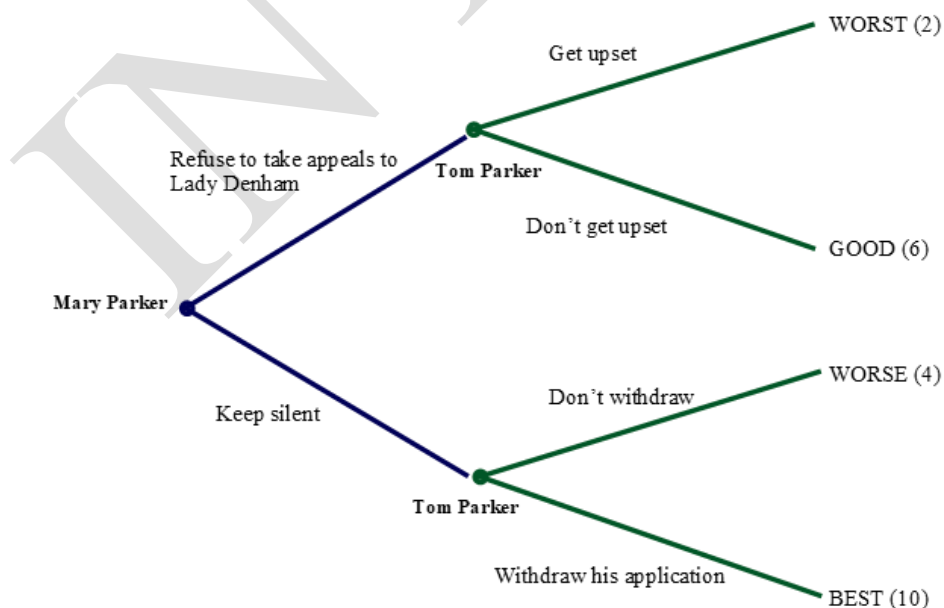


Figure 5
Mary Parker's Subtle Strategic Ability

Mary's husband, Tom, and his sister (Diana) both ask Mary to take appeals for charity causes to Lady Denham. Tom wants to ask Lady Denham for a charitable subscription on behalf of the Mullins', and Diana wants to appeal for a "poor woman in Worcestershire", "the establishment of a charitable repository" and "the family of the poor man who was hung last assizes at York" (Austen, 1817b, pp. 34-35).

Mary is in a predicament: she is polite and wishes to be pleasing, but she also does not want to face Lady Denham when making so many appeals to her, especially since she is aware of Lady Denham's thriftiness. Therefore, Mary has two choices when faced with these appeal requests. She can refuse and argue with her husband and sister-in-law, or she can maintain silence.

As shown in Figure 5, arguing and then having Tom upset with her would bring the worst-case scenario for Mary, which is denoted with a payoff number of 2. If Tom doesn't get upset, arguing with him might still be unpleasant, and there is no guarantee that he will release her of the obligation. This is allotted a payoff number of 6. Alternately, if Mary chooses to keep silent, Tom may or may not withdraw his application.

However, Mary has considered an additional factor: Tom's request is being overshadowed by Diana's request. Realizing this, he will withdraw his request, and Diana will follow suit, and this is the best-case scenario for Mary, the payoff number being 10.

4.2. The Clueless Characters of *Sanditon* (1817b)

4.2.1. Tom Parker

Tom Parker falls into the category of a fool, a group Austen frequently uses to condemn the flaws in her society. Other Austen characters in this category are Mr. Collins in *Pride and Prejudice* (1813), and Mr. Woodhouse and Miss Bates in *Emma* (1815). Tom cannot distinguish the good from the bad, the mean from the generous, and the pretender from the sincere. He tries only to show Lady Denham in a good light – clearly biased by her role as co-investor. We know this from following Charlotte's thought process, when, after meeting Lady Denham for the second time, she thinks: "Mr. Parker spoke too mildly of her. His

judgment is evidently not to be trusted ... their very connection prejudices him" (Austen, 1817b, p. 23).

Tom Parker moves from a sturdy, comfortable home where his ancestors have lived to a new house he has built, Trafalgar House. Mary was fond of this comfortable house with its convenient garden, and it was also sheltered in summer. The new house is "... standing in a small lawn with a very young plantation round it, about a hundred yards from the brow of a steep but not very lofty cliff" (Austen, 1817b, p. 13).

Tom does not make decisions rationally, which is defined by choices geared towards payoff maximization. Only a fool dismisses the age-old wisdom of building houses as Tom Parker does – "our ancestors...always built in a hole...without air or view" (Austen, 1817b, p. 11). Mary Parker remarks that their old neighbors, The Milliers, did not feel the gale on a particularly windy night when they at Trafalgar house were "literally rocked in our bed". Tom Parker is clueless about his wife's logic for the older house: "We have all the grandeur of the storm with less real danger because the wind, meeting with nothing to oppose or confine it around our house, simply rages and passes on..." (Austen, 1817b, p. 12).

4.2.2. Diana Parker

Diana Parker cannot envision what will happen as a consequence of her decisions. Her thought process does not extend to the second level of the games she is involved in or even initiates. A simple example is when she writes to tell her brother Tom claiming in no uncertain terms that her siblings and herself are categorically too ill to travel. She does not think about what will happen when she changes her mind and shows up.

It was not a week since Miss Diana Parker had been told by her feelings that the sea air would probably, in her present state, be the death of her; and now she was at Sanditon, intending to make some stay and without appearing to have the slightest recollection of having written or felt any such thing. (Austen, 1817b, p. 28)

Diana's lack of ability in backward induction is prevalent in her friends' letters informing her of the party that is to arrive in Sanditon. It is

noteworthy that all the reasons Austen gives for the occurrence of this misunderstanding on the part of Diana Parker include the same reasons that are cited as signs of cluelessness or the lack of strategic ability: "... the appearance of

incongruity ... might very fairly be placed to the account of the vanity, the ignorance or the blunders of the many engaged in the cause by the vigilance and caution of Miss Diana Parker" (Austen, 1817b, p. 32).

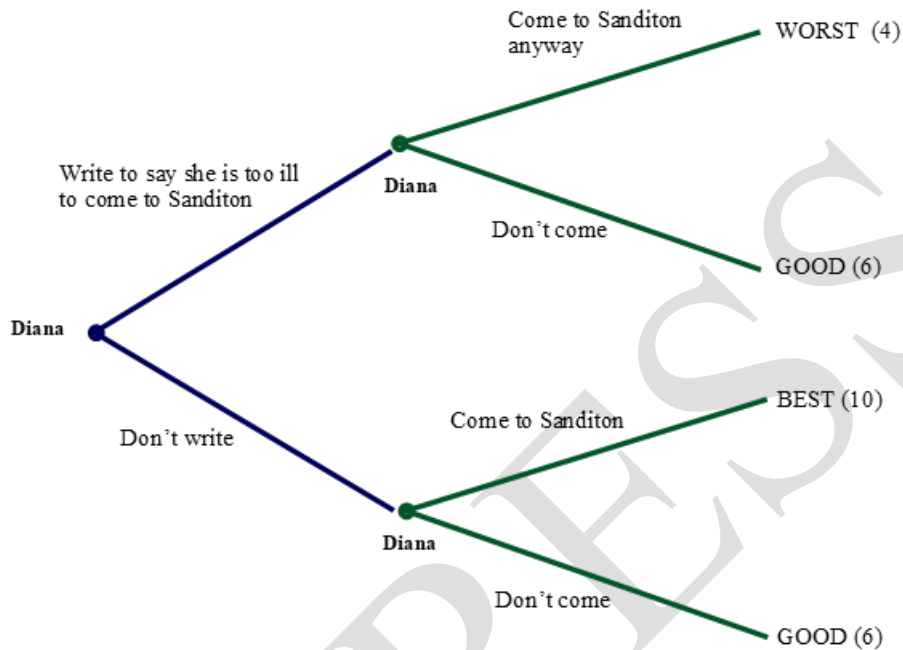


Figure 6
Diana Parker's Poor Backward Induction

Figure 6 shows Diana's lack of strategic ability. Diana writes to her brother, Tom, informing him that she and her siblings Arthur and Susan are too sick to leave their beds, and so he must excuse them from coming to Sanditon. However, Diana and her siblings do come to Sanditon. Diana can choose between writing to her brother or not informing him. If she writes that she will not come, she can choose to come anyway, which will be humiliating and make her look indecisive and wavering. Therefore, this is the worst-case scenario for her (payoff number 4). If she writes that she is too ill and she doesn't come to Sanditon, she appears resolute, but she doesn't get to visit the beautiful Sanditon, so the payoff number is 6.

Alternately (and if she were not clueless), Diana could choose to refrain from writing that she is too sick to travel. In this case, she can then choose to either come to Sanditon or not come. If she comes, this is the best case in this game tree: she gets to visit Sanditon, and she does not risk looking indecisive, so the payoff is 10. However, if she doesn't write and then

doesn't go either, she does not lose face but also does not get a stay at Sanditon. The payoff for this scenario is not much different from if she writes but doesn't come, so its payoff number is also 6.

4.2.3. Sir Edward

Sir Edward underestimates the strategic ability of others and assumes that everyone is as clueless as he is. His cluelessness leads him to assume that others feel and think as he does. If he feels that poets like Burns were exempt from any kind of moral judgment because of their genius, or that morality in novels is overrated, or sentimentality in novels is a favored quality, he does not stop to think that Charlotte, or other people for that matter, might not share his sentiments and think him "downright silly" (Austen, 1817b).

Moreover, Sir Edward's lack of control in flirting with the women around him supports the fact that he makes short-sighted decisions. Lady Denham, whose inheritance Sir Edward is

vying for, strongly insists on marrying a woman of fortune. However, not only does Sir Edward pay no heed, but he also does so in plain view of Lady Denham herself. In addition, he overestimates his strategic abilities. He imagines himself as clever for making sure Clara Brereton sees him talking to Charlotte on the beach to make her jealous while being unaware that not only is Clara not interested in him, but Charlotte can see through his attempts.

5. Discussion

This research has applied a theory that has been sparsely applied to Austen's works and never to *Sanditon* (1817b): game theory. Moreover, the present paper analyzed the characters of *Sanditon* (1817b) in the light of games, choices, and rational thinking: elements that are especially relevant considering Austen's particular focus on psychology and choices in her works.

The characters' thoughts, dialogues, and most importantly, choices and decisions were studied thoroughly and major characters whom Austen introduced in more detail were divided into strategic and non-strategic (or clueless) characters. The results were as follows: Lady Denham, Charlotte Heywood, and Mary Parker were found to be exercising rational thinking, making strategic moves, and working out other characters' decisions or future events by backward induction. Tom Parker, Sir Edward Denham, and Diana Parker were established as clueless characters based on their poor payoff maximization motivation and lack of backward induction skills.

To study how far a model like the game theory can help predict crucial decisions, character behavior, and plot, some important decisions were isolated and illustrated in the form of game trees. The first of these was Lady Denham's inheritance game, which started with Lady Denham's decision to bring Clara to Sanditon House, and included Clara's decision to be pleasant and gain Lady Denham's favor, and the final result being Lady Denham's decision of whether to favor Clara in her will or the Denham siblings, Sir Edward and Miss Denham.

The second game was the game of Lady Denham's economy. To save money, Lady Denham stayed outside her house at tea-time,

so she could both enjoy tea (by increasing the chances of having someone invite her) and not have to pay for it. The game expands on one such occasion where she runs into Mary and the choice that Mary then makes of inviting Lady Denham to her house for tea.

The third game involved Diana Parker's poor, backward induction, first deciding to write a letter claiming she is too sick to travel to Sanditon and then actually showing up to Sanditon.

The fourth game illustrates Mary Parker's excellent strategic skills: when she is faced with charity appeals to take to Lady Denham on behalf of both her husband Tom and his sister Diana, she can choose whether to stay silent or protest, following which is her husband's decision to either withdraw his complaint, stay silent or get upset with his wife.

The final game was Charlotte's sequential move game when she chose to be obliging to the Parkers when they happened to stay at their house after their carriage overturned. Since Willingden is a small, non-happening place for a young woman of twenty-two, it is Charlotte's advantage to be pleasing to the couple who lives on a fashionable seaside resort where a variety of guests visit.

Being the first research to apply game theory to *Sanditon* (1817b), this study aims for a humble place in studies on Jane Austen. This is a privileged position to be in, considering the legendary status that Austen has managed to achieve since after her death. Therefore, the fresh eyes that were used in this study, the compatibility of game theory concepts with the interactions in Jane Austen's *Sanditon*, (1817/1975) and the addition of empirical models in studying a work of literature are among the strengths of the present study. Austen is a realistic writer with a particular focus on human psychology and social interactions. Jane Austen depicts how women's lives in the early 19th century are limited in opportunity and that marriage is women's best route to financial security and social respect. The application of game theory in Austen's *Sanditon* (1817b) illustrates how her characters develop their strategic thinking, social interaction, and interpersonal cooperation for maximum payoff.

Sanditon (1817b) is yet unexplored territory in literary academia and could be analyzed using medical psychology, considering the detailed account of the hypochondriac Parker siblings. Other theories like Marxism and feminism could also be used to investigate whether Austen has indeed provided a new perspective in this very last of her writings that seems to have started a shift in her style that, regrettably, she did not have time to explore.

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