SOME THOUGHTS ON MICHAEL CHWE'S "JANE AUSTEN, GAME THEORIST"[1]

Marek M. Kamiński*
University of California

Abstract: *The article examines the decision-making components of Jane Austen's six major novels as reconstructed in Michael Chwe's book and his argument that Austen was a precursor of game theory. In her novels, Austen describes an abundance of strategic situations in the mating process within the British higher classes. Social constraints made mating within this world a tough game due to harsh punishments for failure, especially for women, and severe limitation on signaling interest or sympathy. Austen cleverly investigates this environment and reconstructs many aspects of strategic behavior that have their counterparts in formal concepts of game and decision theory. While she hasn't made contributions to theory per se, she deserves being named a precursor of applied strategic thinking and an expert on a particular strategically sophisticated social environment.*

Key words: *Jane Austen, game theory, decision theory, mating.*

ANALIZA KSIĄŻKI MICHAELA CHWE "JANE AUSTEN, GAME THEORIST"

Streszczenie: *Artykuł analizuje rekonstrukcję procesów podejmowania decyzji w sześciu powieściach Jane Austen dokonaną przez Michaela Chwe oraz tezę, że Austen była prekursorem teorii gier. Austen przedstawia sytuacje strategiczne towarzyszące szukaniu partnera w świecie arystokracji brytyjskiej. Restrykcje społeczne skomplikowały ten proces ze względu na duże koszty porażki, szczególnie dla kobiet, oraz duże ograniczenia komunikacyjne. Inteligentna analiza Austen opisuje wiele aspektów strategicznych decyzji mających odpowiedniki w formalnych pojęciach teorii gier i decyzji. Austen nie wniosła wkładu ściśle teoretycznego, jednak w pełni zasługuje na tytuł prekursora stosowanej teorii*

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* Marek M. Kamiński, Department of Political Science and Institute for Mathematical Behavioral Sciences, University of California, 3151 Social Science Plaza, Irvine, CA 92697 5100, U.S.A.; email: marek.kaminski@uci.edu.

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decyzji i eksperta od aspektów strategicznych wyrafinowanego świata wyższych sfer brytyjskich.

Słowa kluczowe: *Jane Austen, teoria gier, teoria decyzji, szukanie partnera.*

Jane Austen (1775-1817) lived her relatively short life through the prosperous imperial Georgian era in a family of noble roots but modest income. British life was stable at that time, income was predictable, and the average annual inflation rate in the United Kingdom over Jane's lifetime was only about 1.4%. With few professional opportunities for women of her class, the only realistic career path was to marry well. Given the scarcity of suitable prospects and narrowness of mating markets, looking for a husband was the main objective for a young woman living in that era. Unsurprisingly, Austen's six major novels revolve around marriage and romance. The list includes *Sense and Sensibility* (1811), *Pride and Prejudice* (1813), *Mansfield Park* (1814), *Emma* (1816), *Northanger Abbey* (1818) and *Persuasion* (1818). While she published and enjoyed some honoraria, real fame came years after her death.

Looking at the title some may conclude that Michael Chwe's book "Jane Austen, Game Theorist" may not have a serious game theoretic content. This would be a mistake. A careful look at the Contents reveals why, so does a quick glimpse at the back cover full of endorsements from game theorists such as Thomas Schelling. The book includes a thorough analysis of Austen's writing divided into chapters that deal with foundations of game theory, competing models, discussion of Austen's understanding of strategic thinking, innovations, and even disadvantages of strategic thinking. A substantial amount of space is devoted to the analysis of a concept of "cluelessness." These are serious and interesting issues.

Austen's predominant interest was marriage and, slightly more general, the matching process within the British higher classes. The core of matching human partners, as we think about it today, is about one person expressing interest in another under incomplete information about the other person's interest in the first one. The reward for success is obvious; the punishment for failure to obtain reciprocity is the embarrassment and its various consequences.

Before we start describing Austen's world of matching that is reconstructed by Chwe, let's juxtapose it with contemporary matching services. Such services try to contain the embarrassment and lower the transaction costs of evaluating your potential matches. With match.com a person can send a prospective partner s/he likes

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an explicit "wink" to signal sympathy; s/he can also "like" her or him secretly. This "like" is revealed only if it is reciprocated; then, there is a "match" that is revealed to both prospective partners. Match.com makes sure that if you like X then your profile will appear "randomly" as a suggestion for X among other not necessarily liking profiles, so that X has a decent chance to evaluate and like you. Other "hookup apps" such as Tinder, use information from social media to further decrease the transaction costs of a mutual match and to allow for more or less casual encounters.

Social constraints made matching within Austen's world a much tougher game by adding harsher punishments for failure and severely limiting the options for signaling interest or sympathy. In addition to communication constraints, local matching markets were small. Finally, the window for matching opportunity for women was short. At 28, you were already considered an "old maid." This is an environment that requires substantial skills and may be extremely rewarding to masters of strategic sophistication. Austen's work investigates this feature of her social habitat.

When reading about such an environment, one would expect to see stories with strategic content. Chwe estimates that there are more than fifty such strategic stories (called "schemes") in the six major novels (p. 5).[2] Let's get acquainted with Austen's world by analyzing one particularly clever scheme from *Pride and Prejudice*.

Horseback or carriage?

A new neighbor in town creates an opportunity for Mrs. Bennet to advertise her five unmarried daughters. After rich, young and unmarried Mr. Bingley acquires nearby Netherfield Park, it quickly turns out that he could be interested in Jane. When Jane receives an invitation for dinner from Mr. Bingley's sister, Mrs. Bennet insists that she ride on horseback. This comes as a surprise to Jane since "I had much rather go in the coach." But Mrs. Bennet persuades her husband to say that the coach horses are not available and reveals the real reason behind her scheme "[…] my dear, you had better go on horseback, because it seems likely to rain; and then you must stay all night." Hence she would get to spend more time with an attractive marriage prospect. Having more face time with a prospect turns you from an anonymous nobody into a flesh-and-blood persona. It permits him to learn more about you, which increases your chances of success. Being invited due to circumstances rather than de facto self-inviting doesn't send an undesirable signal of desperation. In the novel, indeed there was rain and while the scheme had an unexpected conclusion of Jane falling sick, she stayed with the Bingleys overnight.

[2] Hereafter, the references are made only to pages in Chwe's book where a given issue was discussed.

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Mrs. Bennet's plot involves a few minor intrigues – so in fact we have more players here than her and Nature – but she disregards the unimportant and sees the big picture of maximizing the opportunity for prospective marriage. I would represent the core of her intuitive "scheme" as a strategic 2×2 game (equivalent to a decision problem) of Ms. Bennet and Nature. Nature chooses between Rain and No rain; Ms. Bennet, not knowing Nature's choice, chooses between Horseback and Carriage for Jane. If there is No rain, Ms. Bennet's strategies make no difference (she doesn't care about Jane's own preferences); if there is Rain, Horseback is better (it is a weakly dominant strategy). Mrs. Bennet can be rightly proud that she identified the situation and found a sharp strategy for her daughter when others wouldn't even notice a strategic opportunity. [3]

This is a delightful story that every game theorist could tell uninitiated undergraduates in an introductory game theory class. However, an identification of a strategic situation and clever description is not sufficient to claim a game-theoretic contribution. But there is more, says Michael Chwe, and takes us for a journey where he explains Austin's analyses of schemes as informal contributions to game theory.

Austen's strategic concepts

Chwe records Austen's use of many concepts connected to strategic thinking. Some of them – while interesting – probably belong more properly to the microeconomics toolbox. The most important concepts that appear in game-theoretic models are "choice" (in the form of actions or strategies) and "preferences" (as payoffs in ordinal games that do not utilize von Neumann-Morgenstern's utility).

Choice may be interpreted as a proxy for "action" or "move" in game theory. Choice often appears in Austen's novels in a normative context since it is especially important for women to be able to say "yes" or "no" to a marriage proposal (and in various yes-no events leading to this culminating moment). An interesting observation is that while having more options is typically desirable, sometimes restricting choices

[3] Marcin Malawski correctly noted that the problem is decision-theoretic, with one player and Nature, rather than game-theoretic. However, the original story is more complex than the simple one-player game proposed above and involves forecasting other players' responses by Ms. Bennett; adding more players essentially wouldn't affect the main point but would make the analysis more complex. Let's describe informally one modeling option: after Nature and Ms. Bennett move (say, Rain appears with the British-typical probability of 1/2), Jane learns their actions and, in all four decision nodes, chooses between "Stay" with the Bingleys (i.e., accept an invitation or ask for one) and "Leave" (regardless of the invitation). The payoffs are identical for Jane and Ms. Bennett and equal to 0 when Jane Leaves; 1 when she Stays after Rain and Horseback (because she would get a sincere invitation) and –1 when she Stays otherwise (because she would force the hosts to invite her). The reader may check that in such a game (1) Ms. Bennett no longer has a weakly dominant strategy; (2) Jane has a weakly dominant strategy; (3) There is a unique subgame perfect equilibrium such that Ms. Bennett chooses Horseback and Jane Stays only after Rain and Horseback, and Leaves otherwise.

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is better. A situation described in *Mansfield Park* resembles credible commitment: Fanny chooses which one of two gifts to wear: a gold chain or a gold necklace (p. 99). She doesn't want to offend any donor, but it turns out upon closer examination that the gold necklace wouldn't go through the ring of Fanny's cross. This lucky problem eliminates one option, forces Fanny to wear the gold chain, and provides an objective explanation for her choice.

When preferences are considered (p. 102-105), the examples focus on the difficulties of aggregating strong emotions and feelings into preferences, the "strength of preferences" (today, we would probably call it cardinal utility or, more general, the issue of the measurability of utility) or tradeoffs between different factors. For instance, Lady Russell is described as balancing the displeasure from seeing Mrs. Clay with the compensating satisfaction of seeing Mr. Elliot (103). We may suspect that – *implicitly* – Lady Russell employs a model of additive utility. The examples document Austen's excellent understanding of the difficulties behind the process of forming preferences over complex objects even in the case of two alternatives.

Other discussed concepts, such as the opportunity cost or revealed preferences, belong to microeconomics. There are also some advanced problems that include strategic incompetent arrogance or learning to be strategic which may also be connected to frontiers of game theory. Strategic acumen, called by Austen "penetration" and often discussed by her heroines and heroes, is an especially intriguing idea. It denotes the ability to create a "scheme" or to understand one that is going on. We could call this property the ability to form adequate strategic models – a fascinating subject deserving experimental research.

Austen, writes Chwe, is so careful that she implicitly considers – with little sympathy – theories that are competing with strategic explanations. The long list includes instincts, habits, rules, social factors, ideology, intoxication and constraints so severe that make choice effectively impossible. Probably the most interesting of the competitors is decision making led by emotions. Emotions can lead to bad decisions, may sharpen one's acumen, or may make one unable to act. Sometimes they can be managed strategically; Austen's heroes do this by taking time out to cool down and return to proper decision-making. Some emotions cannot be controlled as they involuntarily signal the emotional state of a person. Blushing is such an involuntary signal but even when a player cannot control blushing, she may use her blush *ex post* in order to establish her innocence and pure heart (p. 119).

A common mistake made by critics of game theory is the identification of strategic thinking with selfishness, with pecuniary rewards, or with the imposition on players of some ethical guidelines. Chwe documents that Jane Austen is fully aware that none of such identifications are correct (p. 131-137). The most interesting "Strategic

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thinking is not…" section documents that Austen made a clear distinction between strategic acumen and aptitude in "inconsequential games," such as board games; perhaps both types of skills even correlate negatively. The point is debatable – for instance, early game theorists, including John von Neumann, were obsessed with poker – but the core observation is sound: skills in parlor games do not need to be perfectly correlated with social skills of reading people and "scheming." The focus on well-defined simple puzzles may obscure the ability to conceptualize the important ones. The observation resembles the famous harsh condemnation of trifling skills by Marcus Aurelius (2013): [I learned] "not to breed quails for fighting, nor to give myself up passionately to such things". This is a deep issue with interesting contemporary questions. One could speculate how this correlation in Austin's times and within her social group changed within our more homogenized societies.

Austen's contributions

Chwe writes specifically about Austen's "innovations," i.e., specific issues important in strategic endeavors that are discussed often and in depth. The list includes "partnership in strategic manipulation," "strategizing about oneself," "preference change," "constancy" (in preferences or feelings), analyzing "strategic thinking's disadvantages" and – what Chwe considers Austen's biggest contribution – "cluelessness."

"Strategic partnership" resembles creating secret coalitions that happen in almost all con games. More than actual manipulation, Chwe interprets this concept as strategic exchange of information in pairs and (sometimes) the help or even defense in a conversation with a third party. Typically, information exchanges involve sharing more complete information about other players and correcting inconsistent beliefs. All exchanges revolve around marriage – the ultimate coalition in Austen's world.

Strategizing about oneself acknowledges the difficulties in forming clear preferences, but it also makes a few other interesting points. Austen explicitly emphasizes the tension between a more rational decision-maker and impulsive, subconscious self. She believes that one can consciously choose the path for development of one's self-management by giving more freedom to the impulsive self or by constraining it with reason. Her heroine from *Sense and Sensibility*, Elinor, mastered the art of governing her feelings, but also knew that this "was a knowledge which […] one of her sisters had resolved never to be taught" (p. 155). The two sisters made different choices about the formation of their integrated selves. Austen makes other incisive observations along those lines, such as noting the possibility that "one

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of your selves might be biased" by emotions or rejecting information inconsistent with one's beliefs (p. 157). About a similar issue of preference change, Chwe identifies an impressive list of mechanisms that can facilitate such a change: "the noble mechanism of gratitude, the understandable mechanisms of being near dead or in love, the slightly dubious mechanism of 'reference dependence,' the condemnable mechanisms of flattery and persuasion, and the absurd mechanism of self-rationalization." Opposite to preference change is "constancy" that, especially when concerning the feelings of two partners, requires hard work and a strategic understanding of its long-term positive effects. Finally, the depth of Austen's discussion of disadvantages of strategic thinking (or, in some cases, disadvantages of being known as a strategic thinker) is truly surprising. I counted 12 different potentially disadvantageous effects, and all of them were entirely convincing! Perhaps the most obvious is that strategic thinking takes mental effort. Strategic aptitude may also lead to a more complicated moral life, and can have other potentially negative consequences for one's personality and well-being. Being known as a strategic thinker may lead others to overburden you with requests. Others may form expectations about you that are not advantageous for your schemes. For instance, your reputation would make it harder to play Schelling's "madman" who benefits by making a seemingly unreasonable threat look reasonable.

The final contribution, one that Chwe considers to be Austen's most important, is the analysis of "cluelessness" or the absence of strategic thinking. He reconstructs five explanations that Austen has for cluelessness: the lack of ability or strategic ineptitude, social distance that hampers intellectual empathy, narcissistic self-referencing, avoiding thinking about lower-status people, and the ability to impose one's preferences on others that prevents such a mighty person to develop strategic thinking (with perhaps the extreme example of owning a wish-granting Aladdin lamp). Probably the most universal and obvious of those explanations is strategic ineptitude. Chwe finds Austen's components of strategic ineptitude surprisingly similar to the characteristics usually associated with autism. They include the fixation on numbers, attention to visual detail and attachment to literal meaning.

Enjoyable examples of cluelessness are abundant. In *Pride and Prejudice*, Lady Catherine tried to force Elizabeth to explicitly commit to never enter engagement with Mr. Darcy. Her goal was to marry Darcy to her daughter, Miss de Bourgh. Elizabeth refuses to rule out such engagement. Outraged with her refusal, Lady Catherine relates to Darcy her impressions of Elizabeth being rude and disregarding of social status. Unwittingly, she conveys a different message, a message Darcy was most delighted to hear. Had Elizabeth written Darcy off, she wouldn't have had any objections against acknowledging this fact. The clueless diatribe of Lady Catherine carried the signal to Darcy that Elizabeth's affection is alive, and this signal killed the prospects of Miss de Bourgh.

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So, was really Austen a game theorist?

Before discussing the book's main argument, let's consider what "making a game theoretic contribution" means. There are two main types of such contributions. One develops theoretical aspects of game theory and uses mainly mathematics. The other applies games to gain insight into the nature of real life interactions. Game theorists typically specialize in one type of contributions but some of them, like Michael Chwe, are equally comfortable with both types, and have made important contributions to both.

Mathematics lays the clearest, inter-subjective and cumulative fundament to any science. The date of game theory's birth is commonly set in 1928, when John von Neumann published an article with his celebrated Minimax Theorem proving that all two-player zero-sum games have a minimax equilibrium in mixed strategies. Von Neumann's (1928) result established equilibrium existence for a fairly large class of games. Various contributions were also made before von Neumann. Among notable pioneering works, there were Augustin Cournot's (1838) analysis of duopoly, Ernst Zermelo's (1913) proof of the existence of an optimal strategy in chess, and various contributions of Émile Borel (1921) and Hugo Steinhaus (1925) that included early definitions and analyses of minimax and maximin (see also Dimand and Dimand 2002). All those pioneers were accomplished mathematicians who nevertheless stopped short of taking the crucial formal step made by von Neumann. Jane Austen clearly does not belong to this category.

Austen was not a mathematician – but this doesn't imply that she couldn't have developed useful theoretical concepts or provided other important insights into game theory. The analysis of strategic behavior can be and often is performed outside the language of mathematics. Most notably Tom Schelling, a sine qua non game theorist who was awarded the 2005 Nobel Memorial Price for his contributions, was neither a mathematician, nor did he use mathematics to make his main points. (He once told the author of this essay – his student – "Can you believe that? I got an honorary doctorate in mathematics from the Iranian Sharif University! They didn't have a Department of Economics, so they gave me one in mathematics.") Schelling can be considered the most prominent representative of "intuitive" game theory, where clear concepts and ideas are in principle translatable into math, but are expressed intuitively starting with examples. Did Jane Austen make such informal contributions?

I am inclined to give Ms. Austen credit for such ideas as the intuitive understanding of a weakly dominant strategy in the "Horseback or Carriage?" scheme. This comes very close to identifying a general concept of weak dominance (even if strategic games are not defined formally). Nevertheless, she failed to present her ideas in a

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sufficiently inter-subjective manner to claim a prize in this sub-category. Perhaps, if she were not a woman with all the limits that women were facing at that time, or if she lived a century later, or if she lived a longer life, she would have been able to turn her experience and material into more general hypotheses and propositions. Perhaps. But she didn't.

What about applied game theory? A modeler is usually well-familiar with some empirical domain – it may be economics, Cold War dilemmas, or ordinary democratic politics – and applies various bits of strategic thinking to shed light on the outcomes. It may be formal or not. Sun Tzu, Niccolò Machiavelli and Carl von Clausewitz were not mathematicians, and we wouldn't call them game theorists, but they made substantial contributions to strategic analysis of war and politics.

In my opinion, the material collected meticulously by Professor Chwe documents that Austen indeed deserves the title of a precursor of applied strategic thinking, by linking it with concepts of game theory, decision theory, microeconomics and behavioral psychology. Austen did a marvelous job in modeling her empirical domain, the mating behavior of British higher classes. Her awareness of various subtleties involved in strategic thinking and acting was extraordinary. It is worth noting that her books described strategic issues in the domain that later formed a more general theory of "matching" – or developing beneficial relationships in pairs or larger sets. Matching has recently generated two sets of Nobel Memorial Prizes in Economic Sciences (Mortensen, Pissarides and Diamond in 2010, Shapley and Roth in 2012).

Conclusion

There are a few issues that a scrupulous reader might want to raise. Chwe doesn't resist the temptation to tell several anecdotes unrelated to Austen's work, such as on Shakespeare's *Much Ado About Nothing* (pp. 20-22), African American slave folktales stories (pp. 22-25), or the analysis of "Real-World Cluelessness" (pp. 211-227). Interesting, enjoyable and insightful, they belong to a different – maybe new? – book. Perhaps Professor Chwe, a serious game theorist who is also an avid collector of strategic delights in literature and cinema, will write one?

The book is sometimes demanding to read unless you are a devoted Austen fan. It lists myriads of strategic interactions and recounts numerous conversations and exchanges among different characters from different books, making it is easy for a reader to get lost in this vast universe of Austen's writings. It could be interesting to try some sort of quantification of Austen's contributions – I realize that in general

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this may be an unrealistic wish – but in some specific cases, such as the already mentioned 12 disadvantages of strategic thinking, is utterly doable.

At times Chwe sounds apologetic for game theory, its "coldness" or unrealistic treatment of preferences. I believe that most criticism of game theory adversaries is due to their ignorance and mistaken interpretations. Limitations of game theory are well known within the discipline and some of them, such as preference measurability and comparability, have formal representations or are well understood as simplifying assumptions. Many problems are caused by multiple equilibria, incomplete information or the sensitivity of equilibria to small changes in a game's parameters. What really deserves criticism is the often-nonchalant use of game theory by intellectual parvenus eager to join a fashionable trend.

Chwe seems to concur too easily with Austen's image of men, who overall are – *explicitly* or *implicitly* – almost strategic idiots compared to women. If this were true, then women would need much less strategic sophistication. Austen's men are mostly capable of taking only two types of actions: cheating (their wives, instilling in women false beliefs or hiding previous engagements) or sheepishly 'doing the right thing' that fully satisfies the other sexes' expectations (i.e., marrying or keeping their promises):

> Perhaps being male is a fifth related characteristic of weak strategic thinkers: as mentioned in chapter 2, some interpret autism as an 'extreme male brain.' It is true that Austen is more willing to accept cluelessness in a grown man than in a grown woman […]" (p. 196)

The image of male's cluelessness may simply be the consequence of Austen's better familiarity with her own gender, its "schemes" and emotions, and the lack of long-lasting intimate relationship with a man. Disappointment in men is imprinted in her novels. In *Northanger Abbey*, for instance, she writes, "[men believe that] imbecility in females is a great enhancement of their personal charms" (p. 174). What may be Austen's biggest failure is incomplete understanding that both genders may be driven by different objectives and may face different constraints. Men are also capable of "scheming" in love matters, as Cyrano de Bergerac and Giacomo Casanova would surely agree, albeit their objectives were different.[4] Incidentally, one of the greatest Polish writers and a 1905 Nobel Prize in Literature laureate, Henryk Sienkiewicz, was criticized for trivializing women in his epic novels. A common explanation was his hapless experience with the finer sex.

[4] In his "scheme," a good friend of mine created a network of "profiles" on a matchmaking website to lure a very attractive lady who was apparently getting hundreds of winks and messages daily. One of the profiles, written in prison argot that he spoke fluently, caught the lady's eye. An online conversation started and quickly switched to applying to a PhD program in the United States, which the lady mentioned in her profile. Being familiar with the chores, he offered help. After a proper while, they got married.

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Finally, the reader may also wonder why Jane Austen, a lady from a high stratum of British society, was so attracted to strategic thinking. The author chose not to speculate but we can. Jane was not rich, and according to her only known portrait, not a beauty – but she was extremely intelligent and sensitive. This is an explosive combination that was bound to generate many mating disappointments, endless speculations about hesitant prospects, and shrewd failed schemes. A quick look at Austen's biography at least partially confirms this hypothesis. Serious and never-ending thinking about marriage and suitable partner probably helped Austen to acquire seemingly effortless gift of mating analysis and project it to her heroines "[…] in Austen's novels, people calculate all the time without the slightest intimation that calculation is difficult, 'cold,' or unnatural" (p. 109). Since many women were in comparable situations to Austen, we may speculate that this was indeed the norm. One can say that in general, interest in the empirical domain facilitates skillful decision-making. Pressure from social environments makes rational experts of their inhabitants. Inmates make smart choices about their vital interests (Kaminski 2004); academics that loathe game theory conceive elaborate strategic intrigues when it comes to tenure, new hires or graduate student recruitment. Smart decision-making always develops when rewards for being strategic are substantial.

Despite those, perhaps petty, quibbles, the book is truly excellent and original. It stirs our imagination and explains to us how an extremely popular 19th century writer encoded in her novels strategic choices in the eternal game between man and woman. The smart choice of a strategy is as important in this game as it is in market economies, democratic polities and international negotiations. The documentation of Austen's awareness of various subtle effects and assumptions of strategic thinking and acting is impressive. After reading Chwe's book, I am fully convinced by his argument about Austen's intentions (pp. 179-187) to make strategic issues deliberately the central point of her writing. Indeed, her focus on strategizing might have renewed the interest in her novels in our increasingly more calculative societies. It is tempting to summarize the general point that can be extracted from Austen's writing as "strategies matter even in love." Or, in more words, while we cannot change our biological and social endowments, life is full of strategic decisions that have the power to move us between considerably different levels of fortune – even when we are looking for a soul mate. This is a point that virtually every game theorist would endorse.

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About the book's author: Professor Michael Suk-Young Chwe is an economist and political scientist working at the University of California, Los Angeles. Before coming to California, Professor Chwe worked at the University of Chicago and New York University. His research interests include coordination problems, jury decision-making and television advertising. His most recent research investigates how communication networks can resolve coordination problems. He teaches game theory at undergraduate and graduate levels.

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