Essay

Beyond Focal Points in Coordination Games

Joe Greenwood

University of Essex

Abstract

Built on the assumption of humans as rational self-interested actors with ranked preferences in relation to decisions, game theory has focussed on cooperative conundrums such as the prisoner's dilemma and, crucially for this essay, coordination problems. In coordination games actors have multiple plausible solutions to choose between and would benefit from selecting the same solution as each other but cannot know which solution the other players will choose. A common example is two drivers approaching each other on a road without knowledge of which side to drive on. Neither driver can know which side of the road the other will choose but both would benefit from coordinating so that they do not opt for the same side as each other and crash.

Thomas Schelling's seminal theory of focal points suggests that there are certain solutions to such coordination problems that, due to their physical, psychological, or social features, are naturally more prominent to all actors. In essence, Schelling argues that actors will overcome coordination problems due to the focal quality of certain of the multiple possible equilibria that they can choose. This essay recognises the importance of Schelling's solution within game theory and goes further in arguing that it also relates to wider efforts to reconcile imperfect theoretical models with the complexity of reality. Crucially, it is proposed that theories of power illustrate a feature of reality that is not accounted for by game or focal points theory. However, it is argued that theories of power also only account for one part of reality and that this reveals a fundamental tension between parsimonious explanatory theories and full description of reality. It concludes by proposing that determinism may be a useful philosophical frame through which to understand this tension.

Keywords: Coordination games, game theory, theories of power.

Introduction

Implicit in the question that this essay seeks to answer is the proposal that Thomas C. Schelling's theory of focal points seeks to achieve more than providing a solution to 'indeterminate situations' of multiple equilibria in game theory. (Schelling, 1960, p. 22) Whilst the latter achievement would be significant in itself, this essay does consider that there is a broader concomitant purpose to Schelling's work, which is to reconcile game theory with reality. This underpinning assertion is reflected in the essay's explanation of focal points, its response to them, and its conclusion.

The first section of the essay outlines the problem of multiple equilibria confronting game theory and Schelling's proposed solution to it, as well as subsequent attempts to utilise focal points as a bridge between game theory and critical theory. Whilst considered an enrichment of game theory, the second section suggests the incompleteness of focal points in reconciling theory and reality. In particular, it posits that Steven Lukes' and Michel Foucault's theories of the relevance of power to social influences, including focal points, address that incompleteness.

The essay concludes that Schelling's proposal of focal points provides a useful amendment to game theoretical accounts of human action, interaction, and outcomes. Crucially, its incompleteness in accounting for reality is seen to be only partially addressed with reference to the outlined theories of power. In this light, the tension between explanatory theories and description of reality as it exists is noted and determinism, while flawed, is suggested for future consideration as a means by which to drive critical consideration of the incompleteness of any theory.

The Problem and the Proposed Solution

A simple and good example of a game with multiple equilibria is the 'Battle of the Sexes' in which a female and a male partner wish to spend the evening together but cannot agree whether to attend the ballet (her preference) or the boxing (his preference).[1] The payoff for both actors is higher if

[1] There are a number of key assumptions that underpin scenarios like this in game theory:

- First, each option has a different value for each player (i.e. person). In this instance both players apply the value of 0 to attending either event (ballet or boxing) alone, the value of 1 to attending their less-preferred event with the other person, and the value of 2 to attending their preferred event with the other person. They are thus considered to have ranked preferences (i.e. they can rank their options in terms of the values, or payoffs, that they assign to them);

DOI: https://doi.org/10.5526/esj77

they can coordinate to attend one event rather than go to separate events but there is no way for them to decide between the options. This coordination game is predicated on the key assumptions of game theory, that the players possess 'fully ordered preferences, complete information', and a 'perfect internal computer' (Hollis, 1994, p. 123, p. 116), and on the assumption that they cannot communicate. (Hollis, 1994, p. 129).

Since both the woman and the man have a higher payoff from coordinating but each has a higher payoff from coordinating, respectively, around ballet and boxing, there is no '*dominant* strategy' (Hollis, 1994, p. 124, italics in original). This issue stems from the fact that, in a tacit game, each actor is not 'trying to guess what another will do in an objective situation; [they are] trying to guess what the other will guess one's self to guess the other to guess, and so on ad infinitum.' (Schelling, 1960, pp. 92-3) In fact, it has been convincingly argued that even with communication the multiple equilibria remain because '[w]ords are cheap' (Hollis, 1994, p. 125) and even strategic moves committing resources may be intentionally misleading. (Johnson, 1993, p. 81) Hence the actors do best by mistrusting each other and paying heed to their knowledge of each other's actual preferences.

Since '[a]lmost all games that are remotely realistic representations of reality have more than one equilibrium' and potentially an infinite number (Ward, 2002, p. 70), and since indeterminacy undermines the predictive capacities of game theory and its ability to define rational action (Ward, 2002, p. 72), the problem is critical. In this light, the identification by Schelling of 'the intrinsic magnetism of particular outcomes, especially those that enjoy prominence, uniqueness, simplicity, precedent, or some rationale that makes them qualitatively differentiable from the continuum of

- Second, the players aim to maximise their payoffs (i.e. pursue the option with the highest value to them);
- Third, the ranking of preferences to pursue the highest payoff means that players can identify their dominant strategy (i.e. they can choose the course of action that delivers the highest value to them);
- Fourth, crucially, in this scenario, the players cannot communicate with each other, meaning that it is what is known as a tacit game (i.e. each player must make their decision about the best course of action based on assumptions about the other player's preferred course of action);
- Fifth and finally, in this example, the above assumptions mean that players have no dominant strategy; they cannot anticipate the other player's actions so they do not know the best way to gain the highest payoff (i.e. whether they choose to go to the ballet or the boxing there is always a risk that the other person will go to the other option, so they miss out on the highest payoff (i.e. they both end up with a value of 0 if they fail to go to the same event)).

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possible outcomes' (Schelling, 1960, p. 70) has great utility. This utility is extended by the equal relevance of these focal points, which are considered to be '[t]he psychic phenomenon of "mutual perception"' (Schelling, 1960, p. 101), in both tacit and explicit games. (Schelling, 1960, p. 71) Thus, returning to the example of the 'Battle of the Sexes', a focal point may be the principle of taking turns in which both the woman and the man would consider which pastime was undertaken last time they went out together and do the opposite this time. The principle of taking turns could apply equally in a tacit or an explicit game and, it is worth noting, in a non-game situation (i.e. it is perfectly plausible that an individual, on their own, choosing between two equally enjoyable events would apply the principle of rotation, or taking turns).

Besides their capacity to provide a convincing solution to indeterminacy there is another particularly interesting characteristic of focal points, which is that they are generally not mathematical in nature. (Schelling, 1960, p. 113) Thus, by embracing nonmathematical focal points, people can 'do something that no *purely formal* game theory can take into account; they can do *better* than a purely deductive game theory would predict.' (Schelling, 1960, p. 164, italics in original) In this light, focal points take on a normative character, in that actors ought to pay attention to them to ensure consistently better payoffs than chance alone would allow. (Schelling, 1960, p. 108, p. 64) From a game theoretical perspective there is a problem with the introduction of aesthetic, historical, legal, moral, and cultural properties, which is that they are extremely difficult to model. (Schelling, 1960, p. 113) In effect, acceptance of the concept of focal points means that the answer to any indeterminacy becomes: 'Well, they just choose the equilibrium that's focal for them.' This problem suggests that Schelling is not just using focal points to amend game theoretical models but is also seeking to 'meld deductive and inductive approaches' in order to explain outcomes as they are observed rather than as they are modelled. (Hechter, 1992, p. 38)

In subsequent endeavours, convincing arguments have been proposed that utilise focal points in reconciling game theory and critical theory. Ultimately, such arguments conclude that 'while game theory provides no account of why cheap talk can ever succeed, critical theory identifies a mechanism to explain how, within constraints, it might coordinate social and political interaction.' (Johnson, 1993, p. 825) In doing so, it is emphasised that strategic communication can draw upon Jürgen Habermas' 'lifeworld', or the stock of knowledge relating to the objective, social, and subjective worlds. (Schiemann, 2000, p. 5, p. 3) Focal points are identified as part of the 'lifeworld',

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thus their utilisation by actors is considered a sub-competence of strategic competence. (Schiemann, 2000, p. 2) Again, though the initial purpose of the arguments is to reconcile game theory and critical theory, in attempting to fill the gaps in each they are ultimately attempting to reconcile theory with reality, to provide a more convincing account for occurrences outside models.

Beyond Focal Points

In attempting to account for reality by amending or synthesising theory the efforts previously outlined invite the question of whether they have gone far enough. Are there other pertinent pieces of work, relating to game theory specifically or within other schools of theoretical thought that can further account for reality? There has certainly been interesting work relating to the limits of game theory, even when amended by focal points, suggesting that humans often behave in ways not in line with strict rationality. The 'Allais Paradox' demonstrates convincingly that humans are risk-averse and will pay a high price to eliminate it completely but will not pay the same price to eliminate the same degree of risk if some remains. (Hargreaves Heap et al., 1992, pp. 37-8) Similarly, the 'Ellsberg Paradox' shows that humans are also ambiguity-averse and will trade an ambiguous chance of winning for the alternative of an assured, though perhaps lower, chance of winning. (Hargreaves Heap et al., 1992, p. 45) The former paradox has been used to suggest that the 'independence axiom' in rational choice theory, which underpins game theory, may be inappropriate in accounting for human behaviour due to emotions such as regret, which undermine the independence of available options. (Hargreaves Heap et al., 1992, p. 41) It is possible to perceive such departures from rationality to be forms of 'bounded rationality' but it has also been convincingly argued that transposition of learned, if irrational, considerations into strictly rational games is '*more than rational*.' (Hargreaves Heap et al., 1992, p. 39; Elster, 2007, p. 342)

Thus, focal points may be underpinned by non-rational human attitudes and behaviours that have variously been posited and demonstrated to be genetic, psychological, and social. (Alford and Hibbing, 2004; Gerber et al., 2010; Jennings, 2007; Saggar, 2007; Caínzos and Voces, 2010; Brooks and Manza, 2004) While the former two factors impact on inclinations, for instance towards taking risks, it is social factors that define how inclinations are expressed. (Gerber et al., 2010, p. 111, p. 113; Cohen, 1919, p. 109) One may be an altruist in a social setting that emphasises the family as the key organising group or in a setting that emphasises friends as the crucial social network but

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action, interaction, and outcomes will be different in each. (Wildavsky, 1992, p. 11) In this light the power to influence social spheres, and the focal points constructed therein, becomes pertinent and differentiated power in interactions is rendered relevant.

The relevance of differential power to focal points in social spheres can be seen in the concept of patriarchy, or a society that sustains the domination of women by men. Such a society may well construct the focal point of doing what the man wants and, in the example of the 'Battle of the Sexes', use this to overcome multiple equilibria problems. The construction of such a focal point would represent only one of Steven Lukes' three faces of power, which are worthy of further consideration. (Lukes, 2005, pp. 25-9) The first face of power is the most apparent and encompasses coercion and persuasion. It amounts to the ability of one actor to explicitly gain their favoured outcome from another actor who holds, and is aware of, a different preference ordering. In the example of the 'Battle of the Sexes' this would manifest itself in the capacity of one actor to either physically force, or persuasively convince, the other actor to attend the first actor's preferred event. The second face of power is more subtle and takes the form of agenda-setting, or the ability of one actor to define the terms of the debate. In the example, it would amount to the ability of one actor to ensure attendance at their preferred event by, for instance, asserting that there is no time to debate the options. Finally, the third face of power is the most insidious and amounts to control of perceptions of interests. In the example this would constitute the ability of one actor to, without it being recognised, actually change the preference orderings of the other actor so that they consider it to be in their own interest to attend the first actor's preferred event. The three faces of power are illuminating because they help explain outcomes of interactions as well of the role of power in constructing focal points, as in the example of patriarchy.

Taking the analysis of power one step further, Michel Foucault utilised the idea of the 'panopticon' to illustrate that social power perpetuates its influence through a sense of observation that humans feel, regardless of whether they are interacting with others. (Foucault, 1991, p. 173) The idea that social power 'sustains itself by its own mechanism' (Foucault, 1991, p. 177) leads to the suggestion that it 'is not to be thought of as the property of particular classes or individuals who "have" it, nor as an instrument which they can somehow "use" at will.' (Garland, 1990, p. 138 cited in Lukes, 2005, p. 89) Together, Lukes' and Foucault's theories suggest that actors may utilise power to influence others, for instance by constructing focal points, but that they are ultimately also always

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subject to power, even when perceiving and reacting against it. (Foucault, 1975) In doing so those theories point to influences on humans that account for reality more fully than game theory alone can, even when it is amended by focal points theory.

Conclusion

Schelling's theory of focal points provides a persuasive and highly useful solution to the problem of multiple equilibria in game theory. However, this essay perceives that solution to be only part of its purpose, striving as it does to account for gaps between theoretical models and reality. In this endeavour it is, as any specific theory will be, only partially successful. It does not account for how such 'more than rational' phenomena emerge underpinned as they are by genetics, psychology, and social settings.

It has been posited that the latter of those influences on human behaviour suggests the relevance of theories relating to power in explaining reality. Power relations structure human interactions and are thus directly relevant to game theory, as demonstrated by the application of Lukes' three faces of power to the working example of the 'Battle of the Sexes', and Foucault's convincing argument that power pervades all situations and exerts influence on all humans. Crucially, despite covering relevant and important explanatory ground beyond that covered by game theory, as amended by focal points theory, theories of power remain incomplete in describing reality.

I asserted in opening this essay that Schelling's theory of focal points was, in part, an attempt to reconcile game theory with reality. It has been argued that it did not go far enough and that theories of power must also be considered but that they also remain incomplete. This reveals an important tension between theories that attempt to parsimoniously explain reality, and a complete description of that reality. In this context it may be useful to refer to determinism as a helpful critical tool that forces ongoing recognition that explanatory theory is always incomplete. Its utility is limited because reality can never be fully described but determinism suggests an ultimate explanatory model, providing as it does an equation in which an infinite number of determining factors can be combined to account for the particular outcome in question. (Hempel, 1966, pp. 11-2 cited in Sanders, 2002, p. 52) This renders it simultaneously illuminating and unworkable, but it does not undermine its utility in driving a critical approach to any partial explanation, such as Schelling's, and the search for further determining factors in any outcome.

DOI: https://doi.org/10.5526/esj77

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DOI: https://doi.org/10.5526/esj77