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Note

Stake size and the power of focal points in coordination games: Experimental evidence

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ABSTRACT

We collect data from symmetric and asymmetric coordination games with a focal point and vary the stake size. The data show that in symmetric games coordination on the label-salient strategy increases with stake size. By contrast, in asymmetric games the coordination rates do not vary with stake size and are close to the levels predicted by both the mixed Nash equilibrium and the level- k model used by Crawford et al. (2008). These findings suggest that players' mode of reasoning, and the extent to which it can be explained by team reasoning or a level- k model, crucially depends on the symmetry or asymmetry of the coordination payoffs.

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1. Introduction

The experimental literature on focal points (Schelling, 1960) in pure and asymmetric one-shot simultaneous-move coordination games have found that payoff asymmetries weaken the power of focal points to serve as a coordination device. This is especially the case for focal points based on purely contextual aspects such as the game's "labels" – see Crawford et al. (2008), Isoni et al. (2013, 2014), and Crawford et al. (2013).

In this paper we investigate the hypothesis that the amount of money at stake (the stake size) might play an important role for the power of label-based focal points in these types of coordination games. Our intuition is quite simple: Suppose the monetary gains from successful coordination increase. This might make subjects more likely to engage in a focal-point (or team-based; see Sugden, 1993) mode of thinking, and hence more likely to choose the label-based focal point. High stakes might focus and sharpen players' minds, making them think harder about how they can coordinate, and hence be more likely to appreciate the usefulness of relying on the focal aspect to help them to coordinate.

We test the hypothesis that the stake size matters for the power of label-based focal points by varying the stake size in coordination games similar to those used in Crawford et al. (2008), henceforth CGR. These are battle of the sexes games with

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two strategies for each player, two pure-strategy Nash equilibria, and a symmetric mixed Nash equilibrium. The strategies are labeled “A” and “B”. We hypothesized that choosing A would be more salient than B because A is the first letter of the alphabet.² We independently vary the stake size and whether the game is symmetric or asymmetric (i.e., whether players are indifferent between the pure strategy equilibria or they prefer a different equilibrium). This allows us to measure the effects of payoff asymmetry on behavior for a given stake size (low, medium, or high stakes), and the effect of changing the stake size on the power of the focal point for a given payoff structure (symmetric or asymmetric payoffs).

While there is a large literature on stake size effects in economic experiments,³ we believe that we are the first to examine the effects of stake sizes on the power of focal points in symmetric and asymmetric coordination games.

We vary stake size as follows. In the symmetric game with medium stakes, players 1 and 2 each receive 5 British pounds⁴ (£5) from successful coordination, and zero otherwise. In the symmetric low-stakes game, all payoffs are divided by ten, such that coordination gives each player £0.5. In the symmetric high-stakes game, all medium payoffs are multiplied by three, such that coordination gives each player £15. In the asymmetric low,⁵ medium, and high stake games the coordination payoffs are (£0.5, £0.6) and (£0.6, £0.5), (£5, £6) and (£6, £5), and (£15, £18) and (£18, £15), respectively.

We observe that increasing the stakes in symmetric games from low to medium has no significant impact on coordination, while going from medium to high significantly increases the power of the focal point. In asymmetric games, on the other hand, increasing the stakes does not make the focal point more salient and there is no impact on the coordination rate.

Increasing the stake size in symmetric games thus makes the game's labels more salient, and payoff asymmetry reduces the salience of the label-based focal point significantly, no matter how much is at stake. One interpretation is that the presence of payoff asymmetries causes players to reason in a more individualistic, and less team-based, manner (see also the discussion in CGR, and Faillo et al., 2013). Players are less likely to notice the game's labels, and/or they lose faith that the other player will notice and act on them. Future research should seek to disentangle these explanations.⁶

Our findings are consistent with those from CGR who find that payoff asymmetries significantly weaken the power of focal points. Our results extend their findings by showing that the power of focal points vanishes when payoff asymmetries are introduced, even when the stake size is increased significantly.

2. Related literature

Game theory predicts that changing a game's payoffs, by multiplying all the payoffs by a positive number or adding/subtracting a constant from all payoffs, will not affect players' equilibrium behavior. However, the experimental evidence on this prediction is mixed, as shown in Camerer and Hogarth (1999), who provide a very extensive literature survey on the effect of stake sizes in a large variety of games. In some games players' choices are not affected by the fact that payoffs are scaled up or down. In other games, however, Camerer and Hogarth (1999) note that players' behavior are different when the payoffs are higher.

Feltovich (2011), Feltovich et al. (2012), and Rydval and Ortmann (2005) study the effect of varying payoffs in Hawk Dove and Stag-Hunt games in order to investigate whether loss aversion is a robust empirical phenomenon; see also Cachon and Camerer (1996) who investigate loss aversion in a median-effort game. They find evidence that when payoffs are negative, subjects make very different strategic choices than when payoffs are positive, because subjects dislike losses more than they like making gains. These papers do not investigate the effect of stake sizes on label-based focal points. Moreover, in our experiment subjects cannot make losses, so the focus of our paper differs from these studies.⁷

3. Experimental design

Participants made decisions in a one-shot simultaneous-move 2×2 coordination game.⁸ In order to preserve the one-shot nature of the games, each subject only participated in one treatment (between-subject design) and played its game only once.⁹

² Other examples include “A-grade student” versus “B-grade student”, and “Plan A” versus “Plan B”.

³ For an extensive survey please see Camerer and Hogarth (1999).

⁴ At the time of the experiment £5 = \$7.60.

⁵ The Low-stake games were proposed to us by an anonymous referee; we are grateful for this suggestion.

⁶ See for example Faillo et al. (2013).

⁷ Other experiments have investigated the effects of stake sizes on players' choices in Prisoners' Dilemma games, ultimatum games, and trust games. The conclusions are once again mixed, with some studies confirming the game theoretic prediction and other studies showing that subjects' behavior is affected by stake sizes. See for example Andersen et al. (2011), Cameron (1999), Clark and Sefton (2001), Darai and Grätz (2010), Carpenter et al. (2005), Kocher et al. (2008), and Slonim and Roth (1998). Again, none of these studies consider the effect of stake sizes in coordination games with focal points. Other studies outside the realm of coordination and social dilemma games include Parco et al. (2002), Ariely et al. (2009), Kachelmeier and Shehata (1992), and Vieider (2012).

⁸ As in CGR we choose one-shot games because we wish to concentrate on the coordination power of the salient label and abstract away from other mechanisms that can aid coordination, such as repeated interaction (e.g., through learning, reputation building, and reciprocity).

⁹ Although we could have used a within-subject design and not provide feedback on the outcomes until the end of the experiment, we choose not to because such a design would have introduced the possibility of order and learning effects, which we wanted to avoid.

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