Master thesis proposal

Can reputation drive cooperation?

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1 Introduction

The tension between private and collective interest is paramount to many everyday interactions. This situation is illustratively captured in a Prisoner's Dilemma, in which two actors simultaneously decide to cooperate or defect (e.g., Binmore, 2007; Luce & Raiffa, 1989). Regardless of the choice of one's partner, an individual actor cannot do better than by defecting. This mutual uncooperative outcome however yields lower returns than mutual cooperation, characterizing the game as a "social dilemma" (Kollock, 1994; Nowak, 2012; Ostrom, 1998; Raub, Buskens, & Corten, 2015). The associated tension (which is also present in other dilemma situations illustrated by, e.g., Trust Games, Investment Games, Helping Games, Public Goods Games etc.), can be alleviated by accounting for *embeddedness*.

Embeddedness refers to the recurring nature of many dilemma's, in the sense that two actors may interact multiple times (dyadic embeddedness) or are related to common third parties (network embeddedness, Buskens & Raub, 2002, 2013). If future interactions are sufficiently important, embeddedness fosters cooperation by allowing for *control* (i.e., future sanction possibilities, Buskens & Raub, 2002, 2013; Nowak, 2006, 2012; Yamagishi & Yamagishi, 1994). Specifically, if I experience that you take advantage of my cooperation today, I may defect in our future interactions (*dyadic control*). Additionally, if information about your uncooperative behavior against me reaches your future interaction partners, these partners may refrain from cooperation as well (*network control*). Hence, the potential harm of a poor reputation may diminish the incentives for uncooperative behavior (e.g., Axelrod, 1984; Axelrod & Hamilton, 1981; Kandori, 1992; Nowak & Sigmund, 2005; Raub & Weesie, 1990; Trivers, 1971).

2 Past research

Multiple studies found that dyadic embeddedness and corresponding control opportunities foster cooperation (e.g., Dal Bó, 2005; Dal Bó & Fréchette, 2011, 2018; Embrey, Fréchette, & Yuksel, 2018; Mao, Dworkin, Suri, & Watts, 2017). Research on effects of network embeddedness and resulting control opportunities on cooperation is less decisive (Table 1). All but one (Corten, Rosenkranz, Buskens, & Cook, 2016) experiments that compared network embeddedness with a condition without embeddedness found that network embeddedness promotes cooperation (Bolton, Katok, & Ockenfels, 2004; Pfeiffer, Tran, Krumme, & Rand, 2012; Seinen & Schram, 2006). However, when interactions were embedded dyadically and in a network, network control opportunities resulted in

more cooperation for those who could exploit their partner's cooperation in some studies (Buskens, Raub, & van der Veer, 2010; Frey, Buskens, & Corten, 2019), but not in an other study (Van Miltenburg, Buskens, & Raub, 2012). For those whose cooperative behavior could be exploited, network embeddedness generally had no effect on cooperation (Barrera & Buskens, 2009; Buskens, Raub, & van der Veer, 2010; Frey, Buskens, & Corten, 2019; Van Miltenburg, Buskens, & Raub, 2012).

Table 1

Information on all studies incorporated in this project.

Study	Game	Form of embeddedness	Tests on network control effects
Bolton, Katok, & Ockenfels (2004)	Trust Game	Network	Confirmed
Seinen & Schram (2006)	Helping Game	Network	No test (positive trend)
Barrera & Buskens (2009)	Investment Game	Dyadic and network	Not confirmed
Buskens, Raub, & van der Veer (2010)	Trust Game	Dyadic and network	Undecisive
Van Miltenburg, Buskens, & Raub (2012)	Trust Game	Dyadic and network	Not confirmed
Pfeiffer, Tran, Krumme, & Rand (2012)	Prisoner's Dilemma	Network	No test (positive trend)
Corten, Rosenkranz, Buskens, & Cook (2016)	Prisoner's Dilemma	Network	Not confirmed
Frey, Buskens, & Corten (2019)	Trust Game	Dyadic and network	Confirmed

3 The current project

The inconsistencies in the current findings question to what extent network control effects indeed reflect an empirical regularity. Additionally, only part of the mentioned studies tested network control effects explicitly, while the others failed to separate network control effects from potential

confounders (e.g., learning effects). The current project aspires a synthesis of past studies concerning network control effects (Table 1; data sets are available) using a consistent analysis plan. Specifically, if network control effects subsist, one would expect a positive effect of network embeddedness on first-round cooperation, where no confounding by learning effects could have occurred. Additionally, it can be expected that the first uncooperative move by one of a pair of actors occurs later under network embeddedness and that end-game effects (i.e., declining cooperation rates in the last few rounds due to a decrease in control opportunities) will occur later in networked conditions. Building upon this, network control effects can be compared with dyadic control effects in terms of magnitude.

The contribution of this thesis is not mere theoretical, but also methodological. Although similar hypotheses can be derived for all studies involved, the diverse nature of these experiments using varying experimental games, operationalizations of network embeddedness, game lengths and network sizes renders a meta-analytical framework infeasible. Therefore, past findings will be synthesized using a novel method, called Bayesian Evidence Synthesis (BES, Kuiper, Buskens, Raub, & Hoijtink, 2013). This method, which is built upon the foundation of the Bayes Factor (BF, Kass & Raftery, 1995), allows researchers to pool evidence for a general hypothesis using varying study-specific hypotheses, regardless of seemingly incompatible designs. Although relatively unknown, this method has an enormous practical applicability, because a robust line of evidence is necessarily built by combining various ways of testing the same hypothesis, using different sources of data and different methodologies (e.g., Buskens & Raub, 2013; Jackson & Cox, 2013; Lawlor, Tilling, & Davey Smith, 2017; Munafò & Smith, 2018). Ultimately, this project aims to build such a robust line of evidence regarding the existence of a network control effect using a broad and diverse range of empirical studies, while simultaneously illustrating how BES can be applied in a practical and realistic research setting.

4 Literature

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