**OUTLINE THESIS INTRO + THEORIE THOM**

***Notes***

I added the methods, results and discussion section to the outline, but do not discuss the content of these sections in principal (if time permits, I might add some points already).

**Introduction** (max 1,000 words)

1. Relevance of the article, provide example, give a schematic illustration using a PD.

* People continuously find themselves in situations that can, in isolation, be described as social dilemmas.
* Provide one or two (short, one/two sentence(s)) examples.
* Explain what a social dilemma is.
* Introduce Prisoner’s Dilemma as a schematic representation of a social dilemma (because a PD can be easily teared apart/modified to represent a Trust Game, or a Helping Game, but discuss these games only in the “Studies under consideration”-section).
* Explain the tension between private and collective interest (benefits of defecting versus the costs of cooperation).

1. Discuss how embeddedness can relieve this tension 🡪 focus on control (cooperating for the sake of avoiding sanctions/obtaining rewards (reciprocity) in mind).

* Control can be dyadic (i.e., direct reciprocity) or through a network (i.e., indirect reciprocity). I think that in the thesis, it is important to discuss direct and indirect reciprocity, because it explicitly links the sociological/economical branch of research with the evolutionary biologists branch.
* Mention that control is an entirely forward-looking model of behavior.
* And that the aim of this paper is to assess to what extent network control effects indeed foster cooperation (in a general sense, the specific contributions will follow later).

1. Past research

* Multiple studies on network (control) effects have been conducted, and the evidence is far from conclusive.
* Some studies that focused explicitly on network control effects found support for such an effect (ADD REFS), but others have not (ADD REFS). Additionally, several studies studied the effect of network embeddedness in general, but not on control effects specifically.
* The inability to replicate many findings in the social and behavioral sciences may cast doubt to what extent findings in line with a network control effect represent genuine effects rather than artefacts of current scientific practices. The tendency to predominantly publish studies that found evidence in agreement with hypothesized effects on behalf of scientific journals, combined with researchers who may regard trying to publish null-effects unfruitful, may lull scholars into a disproportionate amount of confidence in the presence of a network control effect. Going back to the original data to apply a consistent analysis plan to all studies under consideration may mitigate such potential biases, and add to the current state of knowledge, especially because not all studies under consideration have explicitly tested for such network control effects.
* Therefore, the goal of this paper is to reanalyze data from past studies using a consistent analysis plan to summarize evidence on network control effects over multiple studies. Additionally, it will be investigated how network control effects relate to dyadic control effects in terms of the magnitude of effects.

1. Introduce Bayesian Evidence Synthesis

* To summarize evidence, ‘Bayesian Evidence Synthesis’ will be used (Kuiper, Buskens, Raub, Hoijtink, 2012).
* Past research generally relied on meta-analysis to aggregate the evidence over multiple studies. However, meta-analysis requires similar study designs and relatively similar operationalizations of the variables of interest.
* However, the studies under consideration do not allow for this approach, because of differences in games, operationalizations of network embeddedness and game length.
* Rather than combining effect sizes, BES combines the evidence for an overall theory by aggregating the relative support for study-specific hypotheses.

1. Short paragraph on the contribution of this research

* 1. No attempt has been made to summarize the evidence over multiple studies with different design, studying network control effects in different ways.
* 2. We showcase how this new method can be used practically.
* 3. We actually perform new analyses, that have not been done before (although this is of course not independent of the already published articles, I’d say that it would add something new in terms of data analysis).
* 4. We make a statistical comparison with dyadic embeddedness (although probably not all studies will allow for such a comparison of effects).
* 5. Related to the remark made by you, Vincent, after the presentation: a distinction between effects for trustors and trustees can probably be made (and also quantified!), but comparing this with actors in a PD is probably not possible (but I will think about this!).

**Theory and hypotheses** (max 1,500 words)

1. Embeddedness fosters cooperation in social dilemmas (first infinitely repeated).

* Whereas in an isolated Prisoner’s Dilemma no cooperation is theoretically expected, embeddedness allows for cooperation in equilibrium.
* Specifically, control effects explain why cooperation can be supported in equilibrium, if the continuation probability is large enough (given a grim strategy).
* Under dyadic embeddedness, the actor that is defected on can refrain from cooperation in future rounds.
* Under network embeddedness, information can be disseminated on potentially defecting actors. Consequently, third parties may punish the defective actor by defecting against this actor, while cooperating with previously cooperating actors.
* Under both forms of embeddedness, people thus have an incentive to behave cooperatively, because it is in their self-interest to build a good reputation that can lead to cooperative future interactions.
* Additionally, if network embeddedness is implemented alongside dyadic embeddedness, the sanction opportunities increase, and, theoretically, the incentives to deviate from cooperation decrease.
* Make a short note that, although the specifics might differ slightly according to which game is played, similar tendencies can be expected for all games.

1. With some modifications, a similar argument can be constructed for finitely repeated games.

* Backward induction argument (no cooperation in equilibrium).
* Introduce assumption of uncertainty about players’ incentives.
* Now, cooperation is possible (if an actor believes with sufficiently high probability that their partner is altruistic).
* Control: cooperation is possible as long as the uncertainty about player types exist and when the number of rounds that are to be played is sufficiently large.
* Defecting would take away your partner’s doubts about your altruism, and from this point onward, cooperation cannot be supported in equilibrium anymore.
* Under perfect information, the exact same expectations result from network embeddedness as compared to dyadic embeddedness.
* Under imperfect information, cooperation can be expected to increase in the amount of information that is distributed through the network, because more information allows for targeted sanctions, and hence the incentive to deviate from cooperation should decrease.
* If network embeddedness is implemented alongside dyadic embeddedness, the sanction opportunities increase, so that incentives to deviate from cooperative behavior should decrease.
* Hence, cooperation rates are expected to increase with the amount of information that is disseminated through a network and with the importance of future interactions (i.e., the number of rounds left to play).
* Perhaps a short note on the problematic nature of sharing of reliable information in real-life (in the experiments this is not a problem).
* Practically, there are multiple ways to assess network control effects. It should be noted that simply comparing conditions with network embeddedness to conditions without is not one of them. If people play multiple games, they may have learned from past experiences, in the sense that they stopped cooperating due to uncooperative behavior against them, or from their partner against others. However, this would confound the effect of forward-looking behavior that we study with backward-looking behavior. This problem can be circumvented in three distinct ways. First, we can focus on behavior in the first round of the games. Second, analyses can be restricted to games in which no defective action has been observed by either of the two players. Third, in the analyses, there can be controlled for observed behavior.

1. If the focus will be on comparing trustors and trustees statistically, it would make sense to add a paragraph on differences that can be predicted between these groups, based on the complexity of the reasoning.

**Studies under consideration** (max 2,000 words)

Order of the studies:

1. *Prisoner’s Dilemma studies that focus on no embeddedness versus network embeddedness (simplest comparison, and closest to the example discussed in I would say).*

* Corten, Rosenkranz, Buskens & Cook (2016)
* Pfeiffer, Tran, Krumme & Rand (2012; if the data is provided)

1. *Helping Game study (relatively close to PD, and compares no embeddedness with network embeddedness, so in that sense it’s also close to the previous two).*

* Seinen & Schram (2006)

1. *Trust Games (requires a bit of an explanation to what extent these studies differ from PD’s).*

* Bolton, Katok & Ockenfels (2004) (*also compares no embeddedness versus network embeddedness, and is, in that sense, closest to the previous studies*).
* Buskens, Raub & Van der Veer (2010) (*also on Trust Games, so in that sense similar to BKO, but adds network embeddedness to dyadic embeddedness*)
* Van Miltenburg, Buskens & Raub (2012) (*similar to above*).
* Frey, Buskens & Corten (2019) (*relatively similar to above*).

1. *Investment Game*

* Barrera & Buskens (2009)(*Relatively similar to trust game, but with a continuous outcome, and hence a linear model rather than a logistic model.*)

If the study-specific hypotheses are really similar (no study specific details, but similar hypotheses that can be tested in all studies (so no end-game effects that depends on the specifics of the studies, for example)), then a single paragraph with the hypotheses will suffice. If the study-specific hypotheses differ (for example due to taking the number of rounds in a game into account), then I will hypothesize this when discussing the specific study.

Closing remarks on the goal of the study: quantifying the amount of evidence for a network control effect (if possible using all three operationalizations of a network control effect at once, as well as separated), and comparing this effect with the effect of dyadic control in terms of magnitude.

**Methods** (max 2,500 words)

*This is work for later.*

**Results** (max 2,000 words)

*This is work for later.*

**Discussion** (max 1,000 words)

*This is work for later.*