

Sector-specific associations, trust, and survival of PPPs: A behavioral experiment based on the centipede game

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ABSTRACT

Public-private partnerships (PPPs) have become widespread in the delivery of public services. This study explores behavioral mechanisms of building and eroding trust in partnering across sectors at the micro-level of interaction between public and private partners. It shows that partners' sector affiliation can have adverse signaling effects on individuals' intention to uphold effective partnerships over time, and that this intent is moderated by sector-specific associations. Tested with a novel and dynamic multi-stage behavioral experiment based on the classic centipede game ($N=482$; $Obs.=4,338$), results show that sector affiliation functions as a strong but potentially misleading signal for partners' strategic behavior in PPPs and that sector-specific associations asymmetrically moderate respondents' will to collaborate. These findings contribute to micro-foundations of strategic behavior in PPPs, calling into question basic assumptions about coordination efficiency in cross-sectoral partnerships.

Keywords: *PPP, strategic risk behavior, trust, PSM, behavioral public administration*

JEL: *H83, D91, D81, C73*

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INTRODUCTION

Public-private partnerships (PPPs) have become popular with policy makers worldwide (Klijn and Teisman 2003). Across sectoral boundaries, two or more often very dissimilar partners come together to co-create public goods and services, which are considered to be otherwise hard to attain (Hodge and Greve 2007; Hodge and Greve 2017). However, a large body of research shows that the success of cross-sectoral collaboration is too often subject to problems of coordination (Klijn and Teisman 2003) and lack of effective risk-sharing among partners (Hodge 2004). These problems often result in dramatic losses for public agencies, while private partners may ride free (Klijn and Teisman 2003; Hodge 2004; Edelenbos and Klijn 2007; Hodge and Greve 2007; Bryson et al. 2015). As a consequence, the survival of many PPPs is at stake.

From a behavioral perspective, strategic decision-making in PPPs is hard. While partnering across organizational boundaries is challenging in itself, PPPs add another layer of complexity because the context of choice is changed into a cross-sectoral setting, arousing sector-specific attitudes, associations, and motivations. A number of recent studies show that people often hold stereotypical, mostly negative assumptions toward the public sector (see, for instance, James and Moseley 2014; Marvel 2015; Olsen 2015; Marvel 2016; del Pino et al. 2016). Prior research by Kanner (2005) suggests that such beliefs about and attitudes toward societal sectors can indeed bias individuals' perception of the riskiness of partnering across sectors. Since sector-specific stereotypes function as a strong signal for (in-)efficiency, it is reasonable to assume that partners' sector affiliation and sector-specific associations will substantially influence the strategic choices they make and, hence, affect the likelihood of PPP survival.

The sector-specific associations that partners bring into a PPP are likely to interfere with the building and erosion of trust in this partnership. Trust is generally defined as “the willingness of a party to be vulnerable to the actions of another party based on the expectations that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party” (Mayer et al. 1995). Establishing and maintaining trust between the partners lowers the transaction costs of initiating and controlling the partnership because it facilitates information flow and coordination, encourages knowledge sharing, and helps resolving disputes (Doz 1996; Das and Teng 1998; Das 2001; Klijn et al. 2010; Lamothe and Lamothe 2011). Trust also influences agents’ willingness to take risks and to tolerate uncertainty in partnerships: As Kanner (2005) points out, individual worldviews and personal interpretations of the decision context have an impact on subjective assignments of risks in a partnership. Such cognitive frames become even more important the more complex a decision situation is, which is arguably the case in cross-sector as compared to within-sector partnerships.

Given the large body of literature on PPPs (Hodge, Greve & Boardman, 2010), scholars in PA have hitherto paid surprisingly little attention to micro-level dynamics of strategic behavior in PPPs and their impact on the survival of such partnerships. More specifically, it remains unclear how mutual trust, as affected by sector-specific associations with the public and private sectors, drives this behavior and, in turn, affects the longevity of a partnership. Research has rather been preoccupied with the institutional arrangements and mechanisms that govern PPPs (Wang et al. 2018; Xiong et al. 2018). However, governance intends to guide individual and collective behavior in favorable directions (Ostrom, 2015). The design of effective governance mechanisms thus requires insights into the micro-level foundations of strategic behavior in PPPs beyond general assumptions about human agency. For this purpose, this study explores cognitive and behavioral mechanisms of cross-sectoral collaboration at the micro-level of interaction between public and private sector partners. *How does affiliation with the public and*

private sector affect partners' decisions to continue or withdraw from the partnership, that is, the survival of the PPP, and how do sector-specific associations moderate this relationship?

Based on Mayer et al.'s (1995) model of trust, our study shows that the specific role people find themselves in – i.e., the role of being a public or a private sector decision-maker partnering with a private or public sector agent, respectively – substantially influences their intention to uphold partnerships, and that this relation is indeed moderated by sector-specific associations. Surprisingly, and maybe tragically, people with high levels of public service motivation (PSM) are more likely to defect from a PPP and hence to impose welfare losses to the public.

We build on experimental evidence of a between-subject randomized vignette experiment employing a multi-stage choice experiment based on the classic centipede game (Rosenthal 1981). Using a large sample of $N=482$ German participants (graduate university students), this study explores how the sector-specific context of choice influences individuals' likelihood to defect in a PPP setting. Analyzing $Obs.=4,338$ strategic decisions on whether to collaborate or defect under varying degrees of risk and incentive to defect, this study also reveals the decisive role of PSM, risk propensity, and general propensity to trust in determining this likelihood. The results show that sector-specific attitudes and associations asymmetrically moderate people's decision to defect. These findings have important implications for the governance of PPPs regarding team member selection and operational partnership management in the prospect of hidden characteristics and intentions. They encourage practitioners to create mechanisms that breed trust among partners to absorb the destructive capacity of anti-public and anti-private stereotypes as well as a dark side of PSM (see also Schott and Ritz 2018).

Although not central to this study, its innovative methodology comes with a number of crucial advantages. First, by opting for an experimental research design, the current study seeks to identify causal mechanisms based on systematic and balanced treatment variation, heeding to

calls by van Witteloostuijn (2015), Jilke et al. (2016), and Walker et al. (2017). Second, to our knowledge, this study is the first to apply the centipede game (Rosenthal 1981) in the field of public administration (PA) and public management (PM) research, thus introducing a new tool for measuring the evolution and erosion of trust in a strategic choice environment over time. Third, this study combines both direct and indirect measures to answer calls for a more rigorous behavioral approach to PA research (Grimmelikhuijsen et al. 2017; Walker et al. 2017).

The remainder of this article is organized as follows: The second section briefly reviews previous literature on PPPs in the field of PA, particularly the still sparse research on the role of trust in PPPs. We then expand on this stream and take into consideration how trust interferes with sector-specific associations, which results in a theoretical model and hypotheses on PPP survival. The third section introduces the centipede game and describes the procedure of data collection. We present the results of survival analysis and multi-level regression modelling in the fourth section. The final section discusses the theoretical, practical, and methodological implications of these findings as well as limitations with an outlook on future research.

LITERATURE REVIEW, CONCEPTUAL MODEL, AND HYPOTHESES

Success and failure of public-private partnerships

The PA literature on PPPs is vast and varied, with many scholars focusing on the drivers of success and failure of such arrangements (for reviews, see Wang et al. 2018; Xiong et al. 2018). Besides the non-trivial question of how to evaluate a partnership in these terms (Skelcher and Sullivan 2008; Koontz and Thomas 2012; Hodge and Greve 2017), this stream of research is preoccupied with governance mechanisms that contribute to the performance of PPPs. Xiong and colleagues (2018), in an extensive review of this literature, extract four interrelated groups

of governance issues: First, *institutional issues* refer to a supportive environment of a partnership, the creation of which is often in the responsibility of public authorities. For example, enabling organizations support a partnership by providing key functions and services, such as policy guidelines and financial resources (Jooste and Scott 2011). Second, *organizational issues* are those that shape the structure and culture of the partnerships with the aim of preventing and resolving conflicts among the partners. For instance, this is achieved by internal and external transparency (Reynaers and Grimmelikhuijsen 2015) and by creating a collaborative climate to foster mutual trust (Koppenjan and Klijn 2004). Third, *contractual issues* relate to the negotiation, design, execution, and modification of the contracts that are constitutive of a PPP. Core questions include the allocation and sharing of risks among partners (Bing et al. 2005; Nisar 2006) as well as the specification and measurability of outputs and outcomes (Koontz and Thomas 2012). Fourth, *managerial issues* comprise the control of the execution process along the lifecycle of a PPP. For example, public managers of PPPs frequently face the challenge to design the public tendering process in accordance with market conditions (Soliño and de Santos 2016) and to ensure the accountability of the partnership to the public (Forrer et al. 2010).

This body of literature allows for the conclusion that governance arrangements greatly affect the success or failure of PPPs. Yet, attitudes and behaviors of individual actors in PPPs have received less attention in previous research. This is surprising given that governance, by definition, is the regulation of individual and group behavior through rules and norms (Ostrom, 2015). Without basic knowledge about the micro-level behavior of the partners, the design of governance mechanisms for partnerships will be ill-informed. A notable exception from the structural predominance in PPP research is economic literature that uses experimental designs, for example, studies that examine strategic behavior in partner selection (e.g., Ouenniche 2016) and financial (re-)negotiations in PPPs (e.g., Javed et al. 2014). Since these studies often vary

governance arrangements in the experimental scenarios, they link structural aspects of PPPs more directly to behavioral aspects than the PA literature currently does. However, this literature largely overlooks the role of trust in PPPs. This blind spot results from the economic theories that are foundational to this stream of research. Most obviously, transaction cost economics (Williamson 1985) considers trust as a redundant concept and largely equates it with agents' cost-benefit analysis of risk (Bromiley and Harris 2006). A core assumption in this line of reasoning is that economic actors cannot evaluate the trustworthiness of their exchange partners *ex ante* and are, therefore, well advised to treat them as opportunists. We expand on this view and join recent scholarship on the role of mutual trust for interactions in PPPs (e.g., Edelenbos and Klijn 2007; Koppenjan 2005).

The role of trust in public-private partnerships

In sharp contrast to the general literature on interorganizational relations (e.g., Lane and Bachmann 1998), trust has long been an understudied phenomenon in PA (Edelenbos and Klijn 2007) and is still only among the peripheral issues in PPP research (Wang et al. 2018). A possible explanation for this shortcoming is that scholarship in PA traditionally emphasizes more formal governance mechanisms and considers formalization through bureaucratic rules as a substitute for trust (Edelenbos and Klijn 2007; Gazley 2008; Rufin and Rivera-Santos 2010). In a trustful PPP, a partner expects the other partner not to engage in opportunistic behavior even if there is the opportunity to do so. Both partners are confident that the respective other partner will show the agreed upon behaviors and that a collaborative advantage will be gained in return for both partners' continuous efforts put into the partnership (Huxham and Vangen 2005). Consequently, trust is inextricably associated with risk (Warsen et al. 2018). The need for trust only arises in situations in which one partner has an incentive to pursue his or her own

interest at the expense of the prospective advantage for both parties (Johnson-George and Swap 1982; Mayer et al. 1995). Trust in PPPs is therefore the willingness of a partner to be vulnerable and to accept the risks that arise from the collaboration in the given configuration of context, perception, and behavior (Mayer et al. 1995). A major and typical risk in PPPs is that one partner will leave the partnership and force the left partner(s) to bear the costs (Klijn et al. 2010; Warsen et al. 2018).

Consequently, trust among the partners in a PPP is both a precondition and a consequence of their interactions. Without trust, the desired levels of communication and cooperation will hardly develop, and the development and maintenance of trust require a certain level of interaction (Koppenjan and Klijn 2004; Koppenjan 2005). Previous research provides evidence that inter-partner trust is positively related to cooperative behavior within a PPP and, in turn, to the outcomes of the partnership (Warsen et al. 2018). This is because trust reduces the costs of initiating, operating, and modifying the partnership; it stabilizes the relations among the partners, facilitates mutual learning, and increases the capability to innovate (Koppenjan and Klijn 2004). The important role of trust for PPP performance has been echoed by practitioners, a large majority of whom agrees with the statement that trust is the most important condition for PPP success (Edelenbos and Klijn 2007). This view is also broadly in line with what the literatures on collaborative governance (e.g., Ansell and Gash 2007) and strategic alliances (e.g., Das and Teng 1998) suggest.

Yet, it is also scholarly and practical wisdom that trust within interorganizational relations is difficult to establish, and that low levels of trust, or even suspicion and distrust, is rather the norm (Huxham and Vangen 2005). This applies even more to partnerships across sectors, as is the case with PPPs. Compared to alliances within the same sector, partners in PPPs tend to be less familiar with each other because public and private actors have different goals, different

organizational processes, and dissimilar worldviews (Ruffin and Rivera-Santos 2010; Gausdal 2014). Scholarship in institutional theory substantiates this view and attributes the unfamiliarity between government and business to conflicting institutional logics of the public and private sectors (Jooste and Scott 2011; Saz-Carranza and Longo 2012; Beck et al. 2015). This ‘otherness’ undermines the initial conditions for trust building and often manifests in concurrent long-term interests that eventually erode mutual trust and increase partners’ likelihood to defect (Klijn and Teisman 2003; Hodge and Greve 2007; Bryson et al. 2015). Case-based research has revealed that decision-makers in PPPs indeed find it difficult to make joint decisions and develop long-lasting, trustful, and effective relationships across sectoral boundaries (Klijn and Teisman 2003). Accumulating evidence thus calls for a consideration of sector affiliation in the conceptual relationship between trust and risk behavior in PPPs.

A model of trust and sector affiliation

Building on Mayer et al.’s (1995) concept of trust and trustworthiness, Figure 1 illustrates a model of trust and sector affiliation. Mayer et al.’s (1995) classic model is well-recognized for its theoretical and practical merit and has largely been confirmed in subsequent research (Colquitt et al. 2007). It presents a holistic concept of trust including both the micro-level factors of trustor’s and trustee’s characteristics, attitudes, and behaviors as well as the macro-level factor of context and the larger outcomes of both parties’ risk behavior. In the original model, trust is the result of dynamic feedback loops among four factors: (1) a trustor’s individual disposition and attitudes toward risk and trust (trustor’s propensity), (2) the perceived characteristics or factors that (potentially) deem the trustee trustworthy (i.e., the trustee’s hidden characteristics with regard to his/her ability, benevolence, and integrity), (3) the perceived

riskiness of a given situation (perceived risk), and (4) both partners' risk behavior during the lifetime of the partnership (Sitkin and Pablo 1992; Mayer et al. 1995; Sitkin and Weingart 1995).

[Figure 1 here]

Trustors infer expectations about the behavior of trustees based on implicit or explicit signals they receive from the trustees (Johnson-George and Swap 1982). *Ceteris paribus*, partners' sector affiliation is one of the most explicit of these signals. We add this factor to Mayer et al.'s (1995) model in order to account for the difficulties of partnering across the public and private sector. Mayer et al. (1995) point out that the positive effect of trust on collaboration efficiency is especially relevant in contexts where trustor and trustee have dissimilar characteristics, because trust facilitates cohesion and is associated with organizational legitimacy and, hence, increases individuals' capacity and willingness to work together. For decades, scholarship has focused on exploring the institutional differences between the sectors (e.g. Bozeman and Bretschneider 1994; Rainey and Bozeman 2000) to investigate why people behave differently in the context of the public and the private realm (Brewer and Brewer 2011). Cross-sectoral research on managerial choice by Nutt (1999; 2005) shows that individuals indeed follow dissimilar strategies when making decisions in the public compared to the private sector.

Classic theories on administrative behavior suggest that sector-specific peculiarities will affect the behaviors that Mayer et al. (1995) theorize as decisive factors of trustworthiness. In his perennial work on *Administrative Behavior*, Simon (1945, p.108) states that the specific context of the public sector primes and frames the premises of decision-making on the level of the individual. This means that knowing that the trustee belongs to the public or the private sector, respectively, will influence the trustor's evaluation of the trustee's ability and willingness to fulfill his or her obligations in the partnership, affect the trustor's expectations regarding the

trustee's benevolence, and elucidate certain (positive or negative) assumptions about the trustee's integrity.

Sector-affiliation and adequacy of trust

As outlined above, public and private partners pursue dissimilar organizational goals and follow dissimilar institutional logics. These logics define what is regarded as adequate behavior in a specific situation under risk and mold risk perception and risk behavior accordingly (Fottler 1981; Gigerenzer and Gaissmaier 2011; Rohde and Rohde 2011). Private sector agents are expected to maximize individual profits while public sector agents must find a balance between achieving their specific strategic goals within the PPP and satisfying the broader objectives of societal welfare (Simon 1945, 69; Brewer & Brewer 2011; Buurman et al. 2012). Due to these restraints, public partners often experience a relative lack of discretion for strategic maneuver in PPPs under risk, which renders them more vulnerable compared to private agents. Since both partners are cognizant of their partner's sector affiliation and stereotypical logics, we hypothesize that the perceived contextual risk of the partnership as well as the perceived trustworthiness is contingent on a partner's sector affiliation.

We propose two alternative hypotheses for this effect. First, rational agents may exploit the asymmetry of strategic discretion by unilaterally defecting from a PPP if their immediate subjective utility of defection is larger than the subjective expected utility of completing the PPP. Since private agents are assumed to be more likely to follow self-serving utility maximizing strategies (Simon 1945, 69; Brewer & Brewer 2011; Buurman et al. 2012), it follows that

Hypothesis 1a (H1a): Private (public) sector agents are more (less) likely to defect from PPPs under risk than public (private) sector agents.

Alternatively, rational public sector agents may anticipate this asymmetry and interpret their partner's private-sector affiliation as a signal for lower trustworthiness (Weick et al. 2005; Connelly et al. 2011). As a consequence, public agents have incentives to defect themselves early in the tenure of the PPP in order to prevent larger prospective subjective losses, so that

Hypothesis 1b (H1b): Public (private) sector agents are more (less) likely to defect from PPPs under risk than private (public) sector agents.

Sector-specific associations as cognitive frames

In choice situations of incomplete information, which comprise uncertainty, decision-makers predominately rely on heuristic choice strategies or even on pure gut feeling/instinct to come to any form of decision (Overskeid 2000; Loewenstein et al. 2001; Kanner 2005; Brighton and Gigerenzer 2015). PPPs are a prime example of uncertainty especially in the early stages of partnership tenure because the partners' intentions and characteristics are less transparent and more hidden than at later stages of collaboration. Taking the risk of entering and maintaining a partnership across sectoral boundaries, then, will not only depend on the confidence and trust in the partner's sector, but also in one's own sector. The more positive the evaluation of the 'home' sector is, the higher the confidence in its problem-solving capacities will be and the less advantageous and necessary a cross-sector partnership will appear.

Such evaluations are not free of the trustor's individual cognitive frames (Kanner 2005; Weick et al. 2005; Colquitt et al. 2007). These cognitive frames, i.e., the associative network stored in memory, are especially relevant for understanding risk behavior in PPPs. An emerging field of

research in PA/PM shows that individuals are systematically (and often negatively) biased by their stereotypical associations and attitudes toward the public sector (e.g., James and Moseley 2014; Marvel 2015; Olsen 2015; Marvel 2016; del Pino et al. 2016). Attitudes form relatively stable patterns of learned behavior to regularly react toward objects of evaluation in a favorable or an unfavorable way (Schacter and Graf 1986; Chen and Bargh 1999; Conrey and Smith 2007). Abstract, often implicit associations are the psychological foundations of these attitudes. This view adds a non-calculative component to trust because it considers non-analytical beliefs and assumptions that are subject to long-term socialization processes (Bromiley and Hassard 2006). Since associations prime attitudes and attitudes guide risk behavior (Cacioppo and Gardner 1999; Dolan and Sharot 2012), we argue that partners' likelihood to trust each other and, hence, their intention to continue with or withdraw from the partnership will be moderated by their associations with the sector they are affiliated with. Since we assume that this effect occurs in the case of both public and private partners, we state that

Hypothesis 2 (H2): PPP partners are more (less) likely to defect if they have positive (negative) associations with their sector.

DATA AND METHODS

We tested our hypotheses in a dynamic multi-stage behavioral experiment with randomized trials. The experiment is based on the classic centipede game (Rosenthal 1981) and complemented with a sector-specific contextual role framing treatment. This design combines advantages of two experimental procedures: First, it uses pre-tested vignettes elaborating a simplified but still realistic PPP scenario to increase the ecological validity of its results (Neff 1979; Aguiñes and Bradley 2014). Second, the strictly controlled environment of an economic

game setup allows for the systematic manipulation of context parameters, i.e., sector affiliation and risk, and the control of behavioral cues and incentives (Jilke et al. 2016; Walker et al. 2017).

Participants

Our study builds on experimental responses of $N=482$ German participants who made $Obs.=4,338$ strategic decisions in total. The data was collected in the form of an anonymous online experiment from October to November 2017 using a professional panel of (former) graduate students of PM, business administration, political science, and other social sciences at a large national university. Study participants were incentivized with the possibility of winning one of eleven significant money prizes (1x €250, 4x €150, 6x €50) to be paid out as online retail gift vouchers. Out of the total pool of 2,429 individuals, 646 took part in the online experiment, which corresponds to a response rate of 26.6%. Any incomplete responses were excluded rigorously from the dataset resulting in treatment groups of adequate sizes (public sector treatment: $n=263$; private sector treatment: $n=219$) to detect small to medium sized treatment effects (Cohen's $d < |0.30|$, power=0.8, $\alpha=0.05$; $n=172$; Ellis 2010). Although not representative for the general population, this sample is an especially interesting target group for behavioral PA research because the participants in this study are similar in education and other characteristics to those who are or will become decision-makers in public and private organizations.

Contextual framing treatment

The contextual vignette introduced participants to a mega-project carried out collaboratively by a local government (i.e., the public partner) and by a for-profit construction firm (i.e., the private

partner; see Appendix A.1). Both the partnership and the project are described in a very positive long-term oriented way, offering potential benefit to all stakeholders and all partners involved in a sustainable way. This is to trigger neutral to positive associations (i.e., a low level of perceived situational risk) and to provide a logical reason as to why collaboration until project completion was the most beneficial, i.e., “rational”, option for all partners involved. The experiment is a non-zero-sum game. In each round, the instructions emphasized that participants’ individual expected utility in case of defection was substantially smaller than their expected utility in case of collaboration until the project was completed. Consequently, rational agents should interpret this setting in a way that will incentivize them either to defect in the very first node (Aumann 1998) or continue to the very end of the partnership to maximize their individual utility.

Next, respondents randomly received one of two treatments, asking them to assume the role of an executive manager in either of the two partnering organizations (*sector affiliation treatment*). Participants were informed that the PPP had been installed successfully, performing well and to mutual benefit. Yet, a contractual and legal loophole would at this point in time – ten planning periods before its completion – allow partners to unilaterally terminate the partnership to the disadvantage of the remaining partner. This is to create the interdependent vulnerability that makes trust necessary. *Ceteris paribus*, we assume that participants’ role frame will stimulate sector-specific associations and context-dependent behavior toward their partner from the other sector and influence participants’ likelihood to defect (*H1a* and *H1b*).

As with most laboratory experiments, the decision scenario is simplified and does not live up to the full complexity of real-life situations (Grimmelikhuijsen et al. 2017; Jilke et al. 2016). PPPs are usually governed by extensive contracts and in comprehensive legal frameworks, imposing a large variety of boundary conditions on decision-making in such partnerships

(Parker and Hartley 2003; Wang et al. 2018). However, the aim of our study is to explore micro-level behaviors in PPPs at a fundamental level, where basic behavioral mechanisms stand out more clearly if the scenario is reduced to few relevant parameters. This reduction allows us to systematically control the quasi-experimental environment and to identify more clearly the behavioral mechanisms that govern micro-level choice behavior in PPPs (Ghere 2001; van Witteloostuijn 2015). Although fictitious, the scenario is still realistic because it covers essential features of PPPs: First, a major threat to PPPs is the withdrawal of one partner from the partnership (Klijn and Teisman 2003; Forrer et al. 2010; Hodge and Greve 2017). Second, partners share benefits and risks among each other (Hodge and Greve 2017; Reynaers and De Graaf 2014; Villani et al. 2017). Third, the sharing of benefits and risks is subject to (re-)negotiations of the partners with the particular obstacle of dissimilar sectoral logics (Saz-Carrenza and Longo 2012). Failure to reach agreement about how to allocate risks that emerge during PPP tenure is one of the most common and fundamental threats to the successful implementation of the ultimate objectives of PPP projects (Ghere 2001; Bing et al. 2005; Wang et al. 2018).

Centipede game

The scenario was implemented as a pseudo¹ two-player non-zero-sum centipede game set in the domain of gains (Rosenthal 1981; Kawagoe and Takizawa 2012). The centipede game is a

¹ The online-experiment was played with only one respondent at a time but the vignette-scenario was framed as a two-player situation stressing that the opposing party also had the power to terminate the PPP without further notice. However, the experiment was programmed as to always signal that the opposing partner wished to continue the collaboration. We used this mild form of deception to increase the perceived realism of the – explicitly fictitious and controlled – scenario. Following the advice for a reasonable use of deception in economic experiments by Cooper (2014), the introduction reassured participants that their monetary incentive payout was absolutely independent from their performance in the game, that the objective of this experiment was studying the psychological dynamics of cross-sectoral partnering, and participants were adequately debriefed at the end of the experiment.

finite game with a predefined number of rounds² with linear increasing pay-outs and stable rules known to both players beforehand (McKelvey and Palfrey 1992). In this game, two players make consecutive strategic decisions to either cooperate in the prospect of a larger reward at the end of the game or defect to cash-in an immediate and smaller reward. If the first mover (player A) decides to defect and thus end the game, the second mover (player B) will have substantial disadvantages from A's decision. In this way, the centipede game models the classic dilemma of a conflict between short-term self-interest against long-term considerations of mutual benefit, a core problem of incentive structures in PPPs under risk (Wang et al. 2018). The centipede game is the classic game of trust in partnerships. The pie shifted between the two players grows with each round. It is therefore rational and beneficial for all players to continue the game. However, they will only decide to follow this strategy if they feel that they can trust in their partner's ability and integrity to abide by the partnership agreement so that, in the end, they will both profit from sharing the full pie.

In the setup employed in the current study, the centipede game consisted of a maximum of 10 rounds (i.e., the maximal PPP tenure). In each round, players had two choice options: They either (1) stand by the PPP agreement (thus betting on the relatively larger but risky overall pie) or (2) defect to materialize a substantially smaller but immediate individual reward, causing their partner to lose out completely. Figure 2 displays the centipede game structure with individual prospective rewards for each partner in case of collaboration and defection. The progression of the payout structure was informed by Madden et al.'s (2009) *Probability Discounting Questionnaire* because its trade-off tasks provide a validated scheme for systematically varied expected utility under risk.

[Figure 2 here]

² 100 rounds in Rosenthal's (1981) original setup, hence the name. See Figure 2 for an illustration.

Dependent variable

After each round of the centipede game, respondents were asked to indicate whether they wished to collaborate and proceed to the next period or defect and, consequently, terminate the PPP and end the game. Therefore, individuals' exit node in relation to the maximum of 10 rounds serves as the dependent variable, i.e., the relative likelihood of PPP survival (*PPP survival*; *min.*=1; *max.*=10).

Independent variables

Sector affiliation. The affiliation to either the public or the private sector was the experimental manipulation (i.e., role framing), indicated by a dummy variable.

Sector-specific associations. Respondents were asked to think carefully about the role they were asked to assume and to key in at least *three associations* they spontaneously attributed to the sector they were affiliated to (i.e., the public sector if they were to act as a senior civil servant or the private sector if they were asked to assume the role of a strategic manager at the construction firm, respectively). These explicit associations were manually coded and matched with Vö et al.'s (2009) *Berlin Affective Word List* (BAWL-R), a systematic inventory of several thousand German words experimentally tested for their emotional arousal, i.e., the positive and negative feelings they are associated with implicitly. Matching respondents' stated sector-specific associations by their emotional valence helps us to reveal whether respondents held relatively more negative or positive attitudes toward the sectors in a systematic procedure. We calculate a compound valence score based on the rank-adjusted geometric means of Vö et al.'s (2009) list (continuous; range (negative to positive): *min.*=-3 to *max.*=3) for each sector. This

procedure results in two independent variables (*public sector association* and *private sector association*), which we use to test *H2*.

Control variables – trustor’s propensity

Prior research by Mayer et al. (1995), Barsky et al. (1997), and Hartog et al. (2002) suggests that individuals’ will to collaborate is influenced by individual preferences regarding risk, uncertainty, and the trustworthiness of others in general. Respondents’ *risk propensity* was revealed with Madden et al.’s (2009) *Probability Discounting Questionnaire* (PDQ) using Weißmüller’s (2016) algorithm.³ We measure individual’s *tolerance for uncertainty* with Dalbert’s (1999) scale on general and work-related tolerance for uncertainty (eight six-point Likert-type items; range: 1=‘strongly disagree’ to 6=‘strongly agree’). Higher sum-scores indicate higher tolerance for uncertainty. People differ in their motivation to help others and to make meaningful contributions to common welfare, which are important issues in PPPs. We measure *public service motivation* (PSM) with Kim et al.’s (2012) 12-item Likert-type scale, opposite value labels ranging from 1=‘absolutely disagree’ to 7=‘absolutely agree’. Participants’ *general trust in others* was measured with Yamagishi and Yamagishi’s (1994) six-item Likert-type *General Trust Scale* with opposite value labels ranging from 1=‘strongly disagree’ to 5=‘strongly agree’.

Following Brauer et al.’s (2000) example, we also assess respondents’ *explicit attitudes* toward the two sectors as part of the socio-demographic questionnaire to complement the revealed

³ Based on the idea of hyperbolic discounting, Madden et al.’s (2009) PDQ is a measure to reveal individuals’ implicit risk preferences based on the analysis of in-total 30 dyadic trade-off tasks between systematically varied relatively smaller but fixed pay-outs and relatively larger but probabilistic pay-outs. Respondents’ pattern of choice and preference reversals allows deriving a specific numeric discounting parameter for each respondent. This parameter is a reliable predictor for preferences and choice under risk and robust against conscious manipulation (Green and Myerson 2004).

items generated from the association input. Respondents were asked to indicate their explicit attitudes toward the public and the private sector on two single seven-point Likert-type items (order randomized between subjects to inhibit order and priming effects) ranging from 1='very negative' to 7='very positive'.

Furthermore, people have different capabilities in evaluating numerical performance information. Respondents' *numerical literacy* was tested and controlled with the first seven items of Weller et al.'s (2013) *Abbreviated Numeracy Scale*.⁴ Finally, we controlled for respondents' *age* and *gender* in order to balance treatment-groups for socio-demographic differences that may affect collaboration capacity.

Analytic procedure and model estimation

We test our hypotheses in two consecutive steps. First, after a preliminary descriptive analysis, we focus on the treatment effect of sector affiliation on PPP survival (*H1a* and *H1b*) and conduct survival-based mixed effects logistic regression analyses. Second, the association-based dynamics of the relation between sectorial affiliation and PPP survival are deciphered by adding interaction terms to test for moderation effects (*H2*) in a second model. All models were clustered at the individual level to take into account the conditional contribution of each respondent, which is a consequence of the varying number of game periods played by each person.

⁴ This scale originally comprises eight items of statistical word problems of varying complexity. We omitted the last and most complex item for the sake of research pragmatism to prevent higher dropout rates due to survey length.

RESULTS

Descriptive results

The dataset comprises responses by $N=482$ participants, 90% of which were German graduate students. On average, respondents took 14.6 minutes to complete the full experiment and survey. Table 1 presents the descriptive sample statistics and respective correlations with reliabilities. The sample comprises relatively more female participants (61.2%) and respondents are on average $M=24.7$ ($SD=4.94$) years old. The PDQ reveals that the sample is predominantly risk averse ($\ln(h)$: $M=0.96$, $SD=0.80$; risk neutrality at $M=0.00$) and that respondents slightly prefer to avoid uncertainty ($M=2.54$, $SD=0.66$; six-point scale).

[Table 1 here]

Respondents report average levels of *PSM* ($M=3.48$, $SD=0.70$) and *trust in others* ($M=2.54$, $SD=0.66$; six-point scale). They express slightly negative attitudes towards both sectors when asked explicitly (public: $M=2.83$, $SD=1.44$; private: $M=2.76$, $SD=1.47$; 5-point scale; $t(482)=0.770$, $p=0.442$, $d=|0.513|$). Regarding their sector-related associations, respondents ascribe more negative affective valence to the public sector ($M=0.31$, $SD=1.30$) compared with the private sector ($M=0.51$, $SD=1.39$). While this effect is statistically significant ($t(1,444)=2.801$, $p=0.005$), it should be taken as indicative because the effect size is relatively small ($d=|0.095|$). Participants are above average capable of handling numerical information ($M=4.70$, $SD=1.40$), which indicates that their responses to the experiment are reliable and not biased by a lack of numeracy.

Hypotheses testing

At first glance, the descriptive analysis shows relatively little variance between the two treatment conditions if we only focus on the overall likelihood of PPP survival ($min.=1$, $max.=10$; $M=8.62$, $SD=2.90$). On average, public sector agents decided to uphold the PPP for $M=8.51$ ($SD=3.08$) periods and private sector agents for $M=8.73$ ($SD=2.67$) periods; $t(4,336)=0.010$, $p=0.010$; $d=-.078$. Although the differences between treatment groups appear small, there is significant variance between the two treatment groups in the course of the game periods if individual dispositions are taken into account.

One reason for the small size of the treatment effect is revealed by inspecting the smoothed hazard function (Figure 3). The graph shows the relative frequency of defection (in percent) by treatment in each game period. In the first two periods, public sector agents are revealed as being less likely to defect than private sector agents while the former exhibit substantially higher rates of defection in the four last periods.

[Figure 3 here]

This result is substantiated by individuals' explicit perception of their partners' trustworthiness. Figure 4 reveals that agents partnered with a private sector agent experience a 'valley of trust:' Their trust in their private partner starts relatively high in period 1, then decreases with PPP tenure and then increases again toward the final game periods. Yet, we find no equivalent trend for agents partnered with a public sector agent, *ceteris paribus*. Private agents' trust in their partner starts substantially low but experiences linear and transitive growth with each game period. This means that in our game, private sector agents act in accordance with rational strategic behavior in a classic prisoner's dilemma, in which trust among partners increases linearly with the passage of time and through repeated interaction of all members. By observing

that the other members do not betray the group (or defect from the PPP in the case our study), trust is gradually enhanced (Aven 2015). As a consequence, we find that while public sector agents are less likely to defect in the beginning of the PPP lifetime, they become significantly more likely to defect after incentives to defect transgress a certain threshold in period six. Since both treatment groups show equal PSM, this difference cannot be explained by differences regarding individual-based considerations about public welfare but must be treatment-related.

[Figure 4 here]

Table 2 shows the results of the mixed-effects logistic regression estimates.⁵ The main effects model (see Model I in Table 2) is well-specified (Wald Chi^2 (11)=84.95, $p<0.000$) and reveals a negative association between the likelihood of *PPP survival* and collaborating with a private sector partner (treatment effect: $\beta_1=-0.26$, $p=0.049$). This suggests that *H1a* has to be rejected because public sector agents are significantly more likely to defect from the PPP and cause its termination.⁶ The results are consistent with *H1b*. Furthermore, the model reveals that *PPP survival* is also directly and substantially influenced by respondents' *explicit attitudes about the public* ($\beta_3=0.24$, $p<0.000$) but not by their private sector attitudes ($\beta_4=-0.08$, $p=0.212$). In line with our theoretical expectations, individual characteristics such as respondents' *revealed risk preference* ($\beta_5=-0.07$, $p<0.000$), their general level of *trust in others* ($\beta_7=0.32$, $p=0.005$), and (indicatively) their individual tendency to *avoid uncertainty* ($\beta_8=-0.14$, $p=0.096$) also explain substantial amounts of variance, while the model does not reveal age ($\beta_{10}=-0.01$, $p=0.394$) or gender effects ($\beta_9=-0.17$, $p=0.179$) in relation to *PPP survival*. Respondents' level of PSM is a surprisingly influential driver of people's likelihood to collaborate: We find that higher levels of PSM are strongly and negatively associated with *PPP survival* ($\beta_6=-0.35$, $p=0.000$). This

⁵ Appendix A.2 presents further analysis to investigate the prevalence of sample-size induced artificial inflation of model estimates. Results show that the results are *not* substantially biased by artificial inflation.

⁶ An alternative and equally valid interpretation would be that respondents in the role of private sector agents are significantly more likely to maintain the PPP under risk.

means that high-PSM individuals are substantially more likely to defect from the PPP than low-PSM individuals.

H2 predicts that the relationship between sector affiliation and the likelihood of PPP survival is moderated by respondents' sector-specific associations. We analyzed the dynamics of this moderation effect by estimating a second mixed-effects logistic regression model including interaction terms between sector-specific treatment and the two compound affective valence scores derived from respondents' associations with the sector with which they were affiliated to in the experimental scenario (Model *II* in Table 2). The model is well-specified (Wald $Chi^2(13)=146.13, p<0.000$) and posthoc analysis showed that multicollinearity was not an issue. Model *II* shows that sector-specific associations strongly and statistically reliably predict PPP survival ($\beta_3=-1.69, p<0.000$). The relationship is negative, which means that both pronounced public and private sector attitudes have a detrimental effect on the likelihood of respondents' will to uphold beneficial long-term collaboration with cross-sectoral partners. Under both treatment conditions, interaction effects with revealed public or private sector associations, respectively, are negative and robust (public: $\beta_5=-1.88, p<0.000$; private: $\beta_6=-1.40, p<0.000$). Explicitly stated attitudes toward the public sector were positively associated with PPP survival ($\beta_3=0.28, p<0.000$) while those toward the private sector had no significant association with PPP survival ($\beta_4=-0.10, p=0.119$).

[Table 2 here]

An inspection of the marginal effect plots of sector-specific associations on PPP survival within their respective 95%-confidence intervals by treatment (Figure 5) reveals that both positive and negative associations with the public sector result in a parabolic moderation effect on the marginal likelihood of PPP survival. In contrast, sector-specific associations with the private sector do not have a similar complex moderation effect but have a linear marginal effect on the

likelihood of PPP survival with a positive slope. Since results show that the valence of sector-specific associations moderates the strength of the relationship between sector affiliation and PPP survival, *H2* is supported.

[Figure 5 here]

DISCUSSION AND CONCLUSION

This study expands on previous research on PPPs by exploring the micro-level of individual decision-making in such partnerships. More specifically, our interest is on how associations with the involved sectors interfere with the decisions to continue or withdraw from the partnership. The results are broadly in line with assumptions of bounded rationality in administrative behavior (Simon 1945). Normative choice theory predicts that rational actors should defect at the first possible node to minimize behavioral uncertainty and cash in any amount larger than zero (Aumann 1998). In contrast, hardly any participant actually defects at the first node, which indicates that respondents adopt mixed strategies that do not reflect classic assumptions about human choice. Rational agents' likelihood to defect should also grow linearly with each round since the incentive to terminate the partnership grows with each round (Aumann 1998). In contrast, the smoothed hazard function has a flattened negative parabolic slope with peak hazard in round seven (see Figure 5). The form of this slope can be interpreted as an indicator of how actors' trust in their partner erodes as incentives to defect grow up to a certain threshold, which is typical behavior in strategic alliances with potentially conflicting interests to defect (Kawagoe and Takizawa 2012; Krockow, Pulford, and Colman 2015). Also, it is logical to find that the relative defection hazard decreases in the final rounds of the PPP

because for the remaining agents a learning effect regarding their partners' intention may have set in.⁷

The more detailed findings from the experiment provide evidence for a signaling paradox: Public sector agents are more likely to terminate the PPP and follow risk strategies that are a higher threat to PPP survival than private sector agents even when their partner only sends positive signals for collaboration. For public sector agents, the information cue of knowing that they collaborate across sectoral boundaries with a private sector agent increases the likelihood of terminating the PPP early to the severe disadvantage of their partners' shared profit. At the same time, the decision to withdraw from the partnership goes at the expense of public welfare because the mutually beneficial PPP project is unilaterally terminated. Public agents' assumptions about their private sector partners hence compromise public actors' role as benevolent providers of services to the benefit of society. This result is in line with the predictions of prior qualitative research by Scharle (2002), Klijn and Teisman (2003), Kets and Sandroni (2014), and Bryson, Crosby, and Stone (2015), substantiating these lines of reasoning with first experimental quantitative results.

Nevertheless, this result is striking because it shows that, in the context of PPPs, private sector affiliation functions as a signal strong enough to evoke negative assumptions about partners' intentions to collaborate. Trust erodes even in the face of explicit information indicating that there is no reason for partners to defect. This finding resonates with prior empirical research by Calanni et al. (2014) and with conceptual ideas about the adverse effect of 'otherness' on collaboration efficiency by Kets and Sandroni (2014) and Gurevitch's (1988). Furthermore, our findings are in line with prior PA and PM research arguing that organizations' (dis)ability to

⁷ An alternative interpretation could be that – knowing that the experiment would only last up to a maximum of ten rounds – respondents primed to act as private sector agents are led to behave more myopically and thus fail to engage in rational analysis of their utility maximizing choice options based on evaluating also their partner's strategic discretion.

coordinate and collaborate effectively across sectoral boundaries often reside on the micro-level, i.e., within the individual members (Lewis and Weigert 1985; Klijn and Teisman 2003; Calanni et al. 2014; Bryson, Crosby, and Stone 2015). PPP survival is, thus, vulnerable to individual idiosyncrasies.

Why do public sector agents terminate the partnership earlier than private sector agents? The information to which participants were exposed does not provide a rational explanation for this behavior. Rather, there are several possible interpretations. The main treatment effect may be due to respondents' assumptions about differences between the public and the private sector in terms of property rights (Bing et al. 2005; Wang et al. 2018). Private sector agents are likely to assume that they negotiate on behalf of the company owners to whom they are responsible and who have direct control. In contrast, public sector agents may assume that they negotiate with taxpayers' money, with less tight controls and less clear responsibilities. The experimental scenario may have elevated the impression of more obscured property rights in the public than in the private sector because it states that the federal government provides a subsidy for the PPP (which operates at the local level). Accordingly, public sector agents may be more likely to accept losses, even at the expense of public welfare, because they expect less serious consequences for themselves.

Since the main treatment effect, however, disappears once we consider interactions with sector-specific associations, alternative explanations are required. One explanation is a potential effect that we call *anti-private sector bias*, the opposite of the anti-public sector bias that has recently been discussed in PA/PM (e.g., James and Moseley 2014; Marvel 2015; Olsen 2015; Marvel 2016; del Pino, Calzada, and Días-Pulido 2016). Despite neutral signals, people may assume that private sector agents are more likely to defect than public sector partners. Hence, when acting in the role of a public sector agent, they may defect themselves in order to minimize

losses to public welfare. This escalation of strategic choice would be odd and tragic because it is only these negatively biased assumptions about the private sector that eventually cause losses to public welfare as a result of a terminated PPP. However, it is not irrational for public actors to assume that private sector partners may act more selfishly because the latter are not obliged to serve the public interest. Prior empirical research using the centipede game shows that the expectation of a small chance that the other partner will be an altruist indeed affects negotiation behavior (McKelvey and Palfrey 1992). Arguably, a private sector agent is less likely to conform to this expectation than a public sector agent. The bias in the anti-private sector bias is thus a consequential bias in strategic choice based on an erroneous interpretation of agents' anticipation that private partners will defect even against their own best interest.

Our results show that sector-specific associations are influential drivers of strategic behavior in PPPs, adding a non-calculative, more affective component to the interpretation. The findings indicate within-sector favoritism, which means that positive associations with one's own sector lead to a higher likelihood of terminating the collaboration with agents from the other sector. The general tendency to prefer members of the ingroup is well-documented in group psychology (Tajfel et al. 1979). However, the effect differs not only in strength – with a slightly stronger effect in the case of public sector agents – but also in type. While the emotional valence of private-sector associations has a linear positive effect on the likelihood of PPP survival, the effect of public-sector associations is parabolic. This means that holding either very negative or very positive associations toward the public sector is beneficial to the likelihood that people will opt to uphold the PPP until completion. This finding is in line with prior experimental research from economic psychology by Arora et al. (2012), who show that lower levels of emotional involvement lead to lower levels of trust in partners and, consequently, decrease collaboration efficiency in social good games.

Among the control variables, PSM exhibits the most interesting effect. People reporting high levels of PSM are more likely to terminate the PPP early than people with lower levels. This is surprising because highly public service motivated people are especially likely to self-select into the public sector presumably in the prospect of using their motivation to help others and contribute to the greater good (Crewson 1997; Vandenabeele and Skelcher 2015; Esteve et al. 2016). High PSM is usually regarded as a robust indicator for a higher likelihood of trusting and being trusted (Tepe 2016). Yet, the data shows that PSM increases the likelihood of defection, thus threatening the survival of the PPP. One reason for this association could be that high-PSM individuals hold a general preference in favor of the public sector. They may be concerned about the involvement of private, profit-maximizing firms in the provision of public goods and services (Crewson 1997),⁸ and they may doubt the actual contribution of the partnership to public welfare, the more so when they expect the private partner to avoid losses. As a consequence, high-PSM individuals may be more willing to withdraw from the partnership in order to prevent society from future harm. In contrast, low-PSM individuals may have more sympathy with private firms. Such actors may try to prevent private firms from financial disasters and thus continue the partnership for a longer period of time. The simplified scenarios that negotiation games typically offer may aggravate such doubts. Still, the adverse effect of PSM is very puzzling and calls for further research because it may provide evidence for a dark side of PSM (Schott and Ritz 2018).

⁸ The current study was conducted with a sample of German graduate students who are accustomed to the European continental tradition of public administration, which comprises a relatively strict legal and organizational distinction between the sphere of the public and the private sector. Studies conducted in countries with other administrative traditions might find a dissimilar effect of sector-affiliation on PPP collaboration efficiency.

Practical implications

Since our study shifts attention to the micro-level behavior within PPPs, the results bear implications for practitioners primarily at the hitherto under-researched level of individual actors. First, public sector practitioners may want to select employees for partnering with private firms who do not bring high levels of affective and motivational involvement with the public sector to their job. This implication is extraordinary because it is in contrast to what the literature on PSM almost unanimously suggests for a wide range of public sector jobs (Christensen, Paarlberg and Perry 2017). Our study provides evidence that lower levels of involvement are beneficial for building a longer lasting partnership with private actors. This does not imply, however, that public employees should not be highly involved with and passionate toward the cause of the PPP. On the contrary, high levels of commitment to the PPP, if reciprocated by the private partners, are likely to foster a shared culture within the partnership and trustful relationships across sectoral boundaries.

Second, and related to the previous point, public managers and policy makers in charge of PPPs should consider using relational governance as a complement to formal contracts (Poppo and Zenger 2002). For example, communicating the mutual benefits created through the partnership as well as promoting a shared set of values are among the practical measures of team management (Tompkins 2005). Transformational and symbolic management techniques, such as providing rituals, stories, mission statements, and visible artifacts, both in the initial phases and throughout the lifetime of the PPP, can help create and maintain emotional attachment and diminish the risk of partner alienation (Schein 1992; Huxham and Vangen 2005; Tompkins 2005). This kind of partnership management will resonate best when partners share their resources in a joint organization, especially if the organizational design provides co-working spaces, flat hierarchies and collaborative organizational structures, processes, and events. In

short, everything that makes the partners less alien – less *other* and *strange* – will help reduce the adverse effects of sector-specific attitudes and help reinforce the micro-foundations of successful collaboration in PPPs under risk.

Limitations and future research

As with any research, our study is subject to limitations. First, the empirical evidence is based on decisions made by graduate university students. Yet, we are confident in our findings because prior empirical research by Falk et al. (2013) and Mullinix et al. (2015) shows that student and non-student samples hardly differ in behavioral experiments incorporating social preferences. Furthermore, the population of future bureaucrats and managers is an especially characteristic and interesting target group for PA/PM research. Nevertheless, future studies are encouraged to assess the external validity of our findings by replicating our experiment with public and private sector executives, particularly those who self-selected into PPPs and thus have high levels of involvement.

Second, we conducted our research in Germany and it is not clear to what extent the findings generalize to other settings. For example, attitudes toward and associations with the public and private sector may differ from the Anglo-Saxon world, where most research on the anti-public sector bias has been conducted so far. Due to the statist tradition in continental Europe (Kuhlmann and Wollmann 2019), associations with the public sector may be more positive, and associations with the private sector more negative, than in Anglo-Saxon countries. It should also be noted that overall attitudes towards large infrastructure projects realized in PPPs may be negatively affected by recent media coverage of negative examples in Germany, notably the construction of an airport in Berlin, the relocation of a train station in Stuttgart, and the

construction of an opera house in Hamburg. These restrictions call for replications of our study in other cultural settings.

Third, given that our discussion above has offered several interpretations of the findings, further research may narrow the range of possible explanations. More variations in the experimental manipulations will be helpful in this endeavor. For example, future studies are encouraged to investigate within-sector collaborations in both the private and public sector and compare the results with findings for cross-sectoral collaborations in PPPs. This would provide an even more nuanced picture of framing and signaling effects since in PPP settings, almost by definition, the role framing of one partner (as public or private) implies a simultaneous framing of the other partner (as the opposite). This limited our possibilities to causally attribute the observed effects to the framing of either the self or the other. Consequently, further research is needed to examine how the special incentive structures in PPPs affect strategic behavior.

Despite these limitations, our study provides new insights into attitudinal and behavioral mechanisms in PPPs. The results reveal that sector-specific associations can have adverse consequences for the likelihood of pursuing and upholding mutually beneficial PPPs. They give strong reason to further explore how the survival of PPPs is contingent on the attitudes of, and trust among, those who operate these partnerships at the micro-level.

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Table 1: Correlations, reliabilities, and descriptive results

	1	2	3	4	5	6	7	8	9	10	11	12
Study variables												
1. PPP survival	–											
2. Public sector affiliation ^a	-.04*	–										
3. Public sector associations (revealed)	.05**	-.11**	–									
4. Public sector attitude (explicit) ^b	-.01	-.03*	.09**	–								
5. Private sector attitude (explicit) ^b	-.03†	.02	.00	.04**	–							
Control variables												
6. Risk propensity (revealed)	-.02	.09**	-.01	.04**	.06†	–						
7. Trust in others (explicit)	.06**	.03†	.03*	-.01	.07**	.03†	–					
8. Uncertainty avoidance (explicit)	-.06**	.02	.07**	.00	.06**	-.01	-.10**	–				
9. PSM (explicit)	-.02	.02	-.03*	.01	-.07**	.03*	-.02	.04**	–			
10. Female ^a	-.02	-.03†	.02	.01	-.01	.03*	-.04*	-.07**	.08**	–		
11. Age ^a	.04**	.01	-.01	-.05**	.05**	.11**	.15**	-.04*	.06**	-.08**	–	
12. Numeracy	.08**	.01	.02	-.02	.01	-.03†	-.05**	.01*	-.11**	-.19**	-.04†	–
<i>M</i>	8.62	.55	.40	2.83	2.76	3.59	2.54	2.54	3.48	.61	24.7	4.70
<i>SD</i>	2.90	.50	.91	1.44	1.46	3.16	.66	.66	.70	.49	4.93	1.40
<i>range</i>	0–10	1 / 0	–1.83– 2.60	1–7	1–7	.33–15.31	1–5	1.30–5.30	1.85–5.80	1 / 0	17–51	0–6

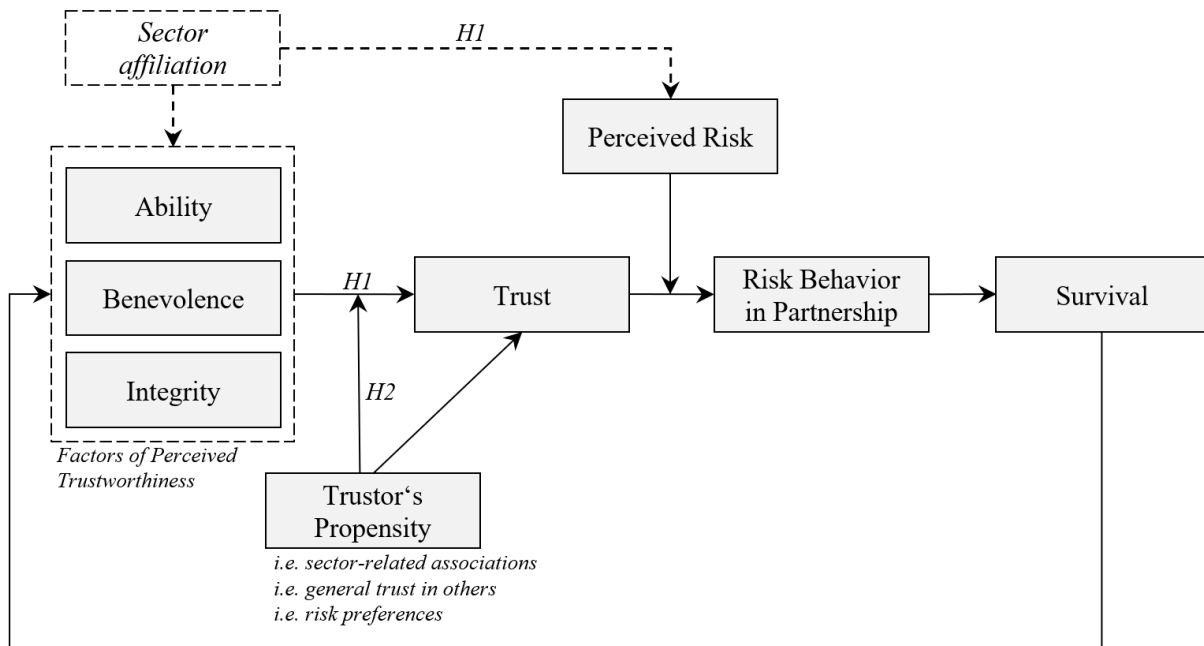
Notes: † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$; ^a distribution in treatment groups controlled for balance with between-group two-tailed t -tests, all n.s.; ^b stated attitudes centered for normalization.

Table 2: Mixed-effects logistic regression analysis on *PPP survival*

	<i>Model I</i>					<i>Model II</i>				
	β	<i>p</i>	<i>SE</i>	<i>[95% CI]</i>		β	<i>p</i>	<i>SE</i>	<i>[95% CI]</i>	
Treatment effect										
Public sector affiliation (i.e., <i>collaborating with a private sector partner</i>)	-.26*	.049	.13	-.52	-.00	-.15	.300	.14	-.43	.13
Subject-level effects										
Sector-specific associations	.08	.146	.06	-.03	.19	-1.69**	.000	.22	1.25	2.11
Public sector attitude	.24**	.000	.07	.11	.38	.28**	.000	.07	.15	.42
Private sector attitude	-.08	.212	.06	-.21	.05	-.10	.119	.07	-.23	.03
Two-way interactions										
Public sector treatment x public sector associations						-1.88**	.000	.24	-2.36	-1.40
Private sector treatment x private sector associations						-1.40**	.000	.21	-1.81	-1.00
Control variables										
Risk aversion (revealed)	-.07**	.000	.02	-.10	-.03	-.06**	.000	.02	-.10	-.03
PSM (explicit)	-.35**	.000	.09	-.53	-.17	-.33**	.001	.10	-.52	-.13
Trust in others (explicit)	.32**	.005	.11	.09	.54	.39**	.001	.11	.17	.61
Uncertainty avoidance (explicit)	-.14†	.096	.08	-.31	.03	-.09	.285	.09	-.26	.08
Numeracy	.04	.397	.04	-.05	.12	.04	.410	.04	-.05	.12
Female	-.17	.179	.13	-.42	.08	-.27*	.032	.12	-.51	-.02
Age	-.01*	.394	.02	-.04	.02	-.01	.451	.02	-.05	.02
Intercept	4.16**	.000	.66	2.87	5.46	3.95**	.000	.71	2.56	5.33
<i>Obs.</i>	4,338					4,338				
<i>N</i>	482					482				
<i>Wald Chi² (df)</i>	84.95**					146.13**				
<i>df</i>	11					13				
<i>AIC</i>	2,065.63					2,000.74				
<i>BIC</i>	2,142.13					2,089.99				
<i>-2*Log Likelihood</i>	2,041.63					1,972.74				

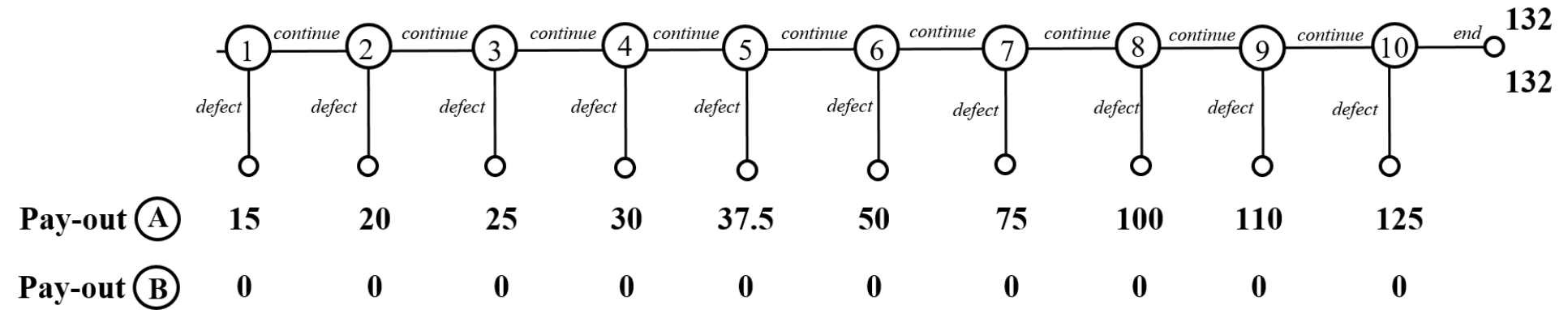
Notes: Clustered at individual level for conditional contribution, robust standard errors; explicit attitudes centered. Model I: main effects; Model II: combined model with interaction effects. † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

Figure 1: Theoretical model of trust in PPPs



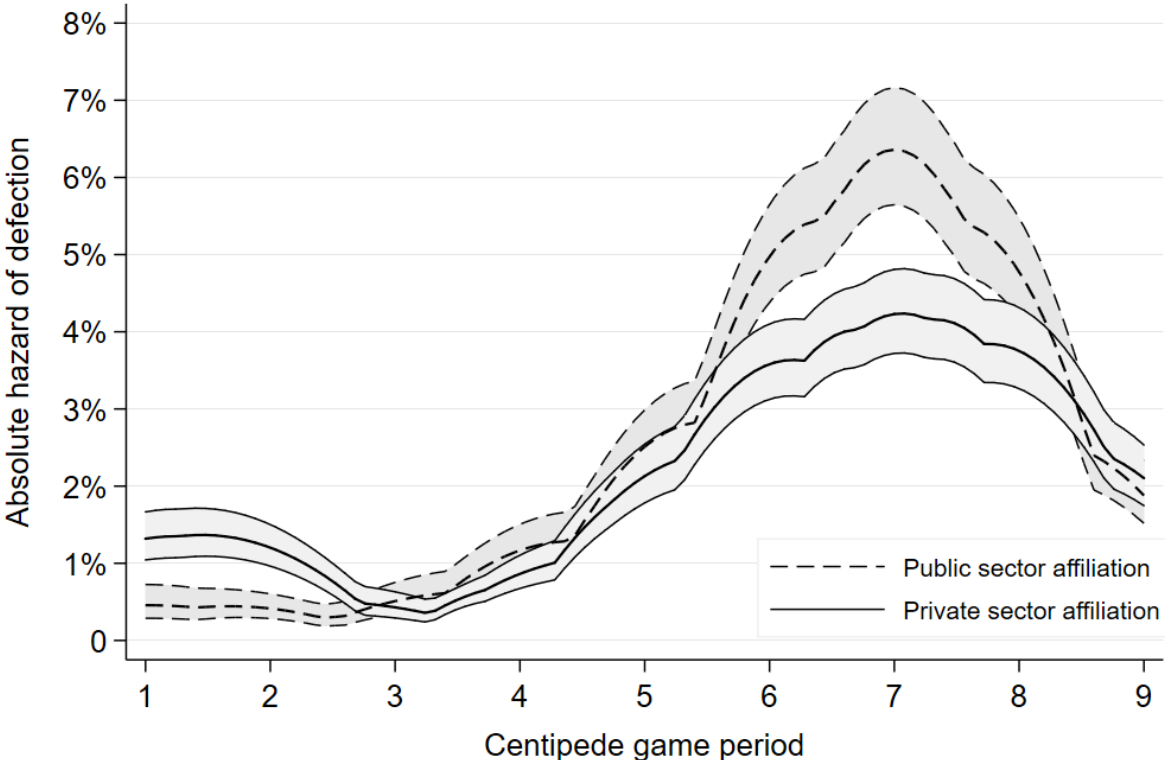
Note: Adapted from Mayer et al.'s (1995, 715) general model of trust and trustworthiness.

Figure 2: Extrinsic game structure



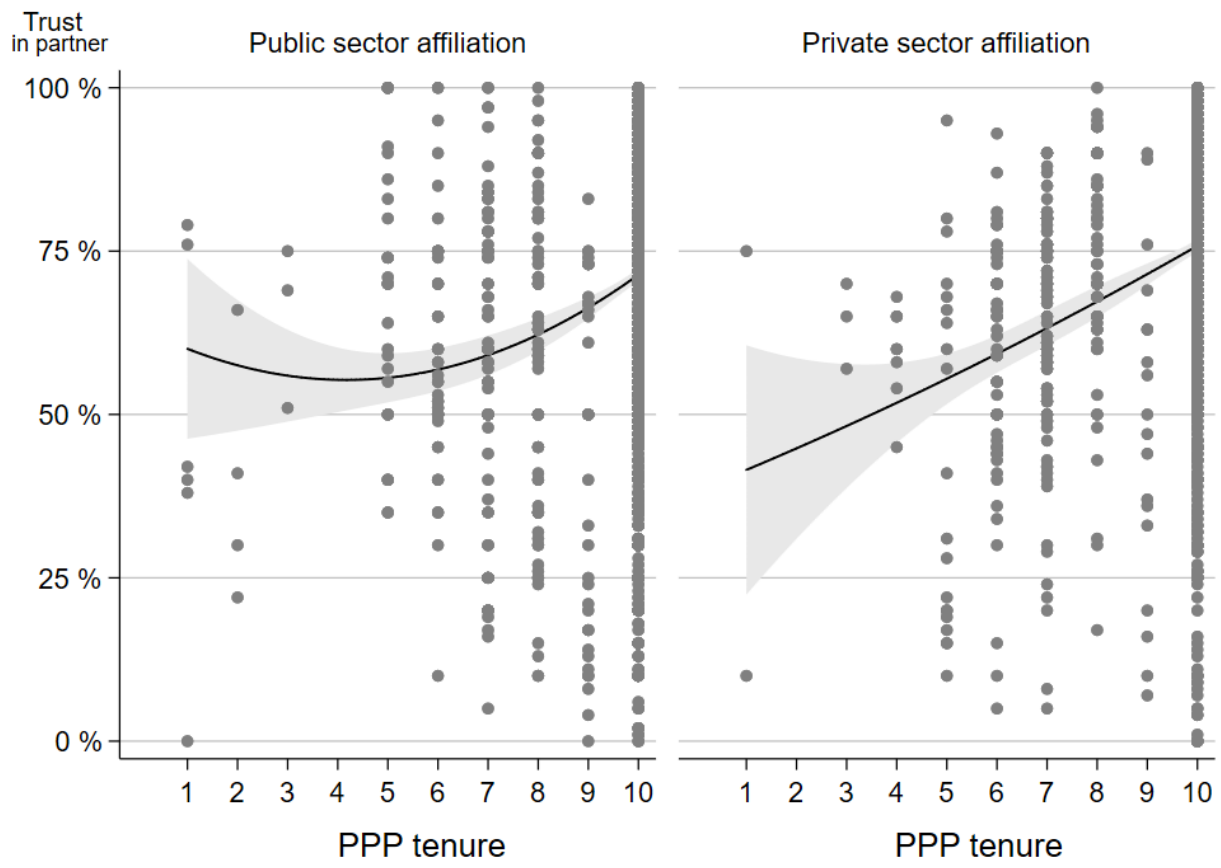
Note: Hypothetical pay-outs in million €.

Figure 3: Smoothed hazard function on PPP survival by treatment



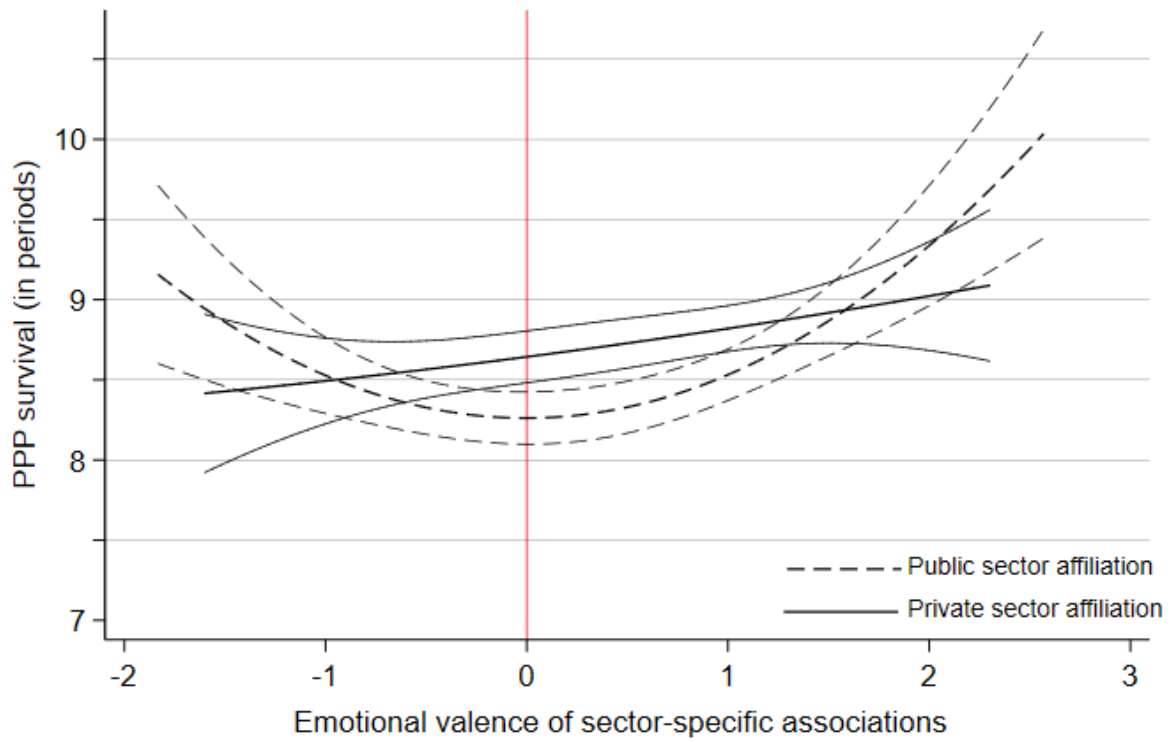
Note: Absolute hazard smoothed functions of partners’ defection in per cent by game period and by treatment; kernel density estimated with Epanechnikov kernel to minimize the mean squared error.

Figure 4: Trust in partners by treatment-based sector affiliation



Note: Shaded areas indicate 95%-CIs; grey dots denote exit nodes in centipede game.

Figure 5: Marginal effects plot of sector-specific associations on PPP survival by treatment



APPENDIX (Supplementary online material)

A.1 Experimental setup and treatment stimuli. English translation, original German codebook upon request.

1	General introduction
2	<p>Introduction to performance rating task [all study participants]:</p> <p>‘Please consider the following scenario:</p> <p>As a result of a generous subsidy from the federal government, new building land has been laid out in your home town a few years ago, on which a new large town district is to be built. This project is considered to be very positive for future urban development by all stakeholders.</p> <p>However, in spite of the federal funding granted, the investment costs for the construction of roads and for the development of the site are very high so that the city cannot bear these costs for the development of the neighborhood on its own and, consequently, has established a long-term partnership with a large construction company from the private sector. It has been contractually agreed that costs and returns of this project are going to be shared equally.</p> <p>This partnership has been working very well for several years and to mutual benefit. But suddenly, an unforeseeable problem arises for which none of the two partners are to blame: There are rumors that the Federal Government’s funding program will be terminated early in the coming years. Consequently, the partnership is now in much more distress. If the neighborhood development was not completed, the whole project could lead to disastrous financial losses.</p> <p>Unfortunately, no special clause was agreed upon for such a case, so that if one of the two partners now decided to withdraw prematurely from the project, this would leave behind the other partner with all the liabilities and without means of penalty for the other partner.</p>
3	<p>Vignettes and explicit sector specific associations [prime]: Study participants randomly receive one of two vignette treatments, followed by up to 10 rounds of deciding on whether they wished to continue the partnership.</p>
A	<p>[Public Sector Treatment]</p> <p>Imagine that you are a civil servant in the higher service of the city administration. This means that you decide whether the collaboration with the private company should to be maintained.</p> <p>Please think carefully about the role you are taking on in this experiment. Imagine how it is to work in the public sector, how it feels like. What are the immediate</p>

	<p>associations that come to your mind in relation to the public sector and to the people working in the public organizations?</p> <p>Please specify at least 3 attributes:</p> <p><i>[open response]</i></p> <p><i>[open response]</i></p> <p><i>[open response]</i></p> <p>As a reminder, you are a civil servant in the higher service of the city administration, this means that you are in the position to decide whether the collaboration with the private company is to be maintained or terminated.</p> <p>So far, the collaboration has been very fruitful and, at this moment, the changes in policy are only rumors. You also know that it is an advantage for both the city you represent and the partner company from the private sector to continue the partnership.</p> <p>A glance at your calculations shows you that the partnership project must last only another 10 planning periods in order to generate the maximum total return for all participants. Then each of the two partner organizations would receive € 132 million funding, but only if the partnership is maintained until the end of the 10 planning periods.</p>
<p>B</p>	<p>[Private Sector Treatment]</p> <p>Imagine that you work as a senior manager in the private sector construction firm. This means that you decide whether the collaboration with the city administration should to be maintained.</p> <p>Please think carefully about the role you are taking on in this experiment. Imagine how it is to work in the private sector, how it feels like. What are the immediate associations that come to your mind in relation to the private sector and to the people working in private companies?</p> <p>Please specify at least 3 attributes:</p> <p><i>[open response]</i></p> <p><i>[open response]</i></p> <p><i>[open response]</i></p>

	<p>As a reminder, you are a senior manager working at the private construction firm, this means that you are in the position to decide whether the collaboration with the city administration is to be maintained or terminated.</p> <p>So far, the collaboration has been very fruitful and, at this moment, the changes in policy are only rumors. You also know that it is an advantage for both the firm you represent and your public sector partner (the city) to continue the partnership.</p> <p>A glance at your calculations shows you that the partnership project must last only another 10 planning periods in order to generate the maximum total return for all participants. Then each of the two partner organizations would receive € 132 million funding, but only if the partnership is maintained until the end of the 10 planning periods.</p>
<p>4</p>	<p>Centipede Game Trials: [maximum of 10 rounds, depending on respondents' decision whether or not to continue the partnership; partner descriptions adapted to prior role framing treatment.]</p>
<p>1</p>	<p>Please decide under these conditions (planning period 1 of 10):</p> <p>If you decide to terminate the partnership now, your organization ([the city administration/the private construction company]) will receive an amount of € 15 million and your partner ([the private construction company/the city administration]) € 0 million.</p> <p>If you work together until the end, your organization will receive € 132 million and your partner will also receive € 132 million.</p> <p>Please note that your partner can also decide at any time to terminate the partnership without prior notice! This would mean that your organization ([the city administration/the private construction company]) will receive € 0 million and your partner ([the private construction company/the city administration]) will receive € 15 million.</p> <p>Do you want to maintain the partnership?</p> <p><input type="checkbox"/> yes</p> <p><input type="checkbox"/> no.</p> <p>How likely is it that your partner will also wish to maintain the partnership?</p> <p>[slider: 0 --- 100] %</p>
<p>2</p>	<p>Thank you very much!</p> <p>Your partner has also decided to maintain the collaboration.</p>

	<p>Meanwhile some time has passed and you have to decide again (planning period 2 of 10):</p> <p>If you decide to terminate the partnership now, your organization ([the city administration/the private construction company]) will receive an amount of € 20 million and your partner ([the private construction company/the city administration]) € 0 million.</p> <p>Please note that your partner can also decide at any time to terminate the partnership without prior notice! This would mean that your organization ([the city administration/the private construction company]) will receive € 0 million and your partner ([the private construction company/the city administration]) will receive € 20 million.</p> <p>If you work together until the end, your organization will receive € 132 million and your partner will also receive € 132 million.</p> <p>Do you want to maintain the partnership?</p> <p><input type="checkbox"/> yes</p> <p><input type="checkbox"/> no.</p> <p>How likely is it that your partner will also wish to maintain the partnership?</p> <p>[slider: 0 --- 100] %</p>
<p>3</p>	<p>Thank you very much!</p> <p>Your partner has also decided to maintain the collaboration.</p> <p>Meanwhile some time has passed and you have to decide again (planning period 3 of 10):</p> <p>If you decide to terminate the partnership now, your organization ([the city administration/the private construction company]) will receive an amount of € 25 million and your partner ([the private construction company/the city administration]) € 0 million.</p> <p>Please note that your partner can also decide at any time to terminate the partnership without prior notice! This would mean that your organization ([the city administration/the private construction company]) will receive € 0 million and your partner ([the private construction company/the city administration]) will receive € 25 million.</p> <p>If you work together until the end, your organization will receive € 132 million and your partner will also receive € 132 million.</p> <p>Do you want to maintain the partnership?</p>

	<p><input type="checkbox"/> yes</p> <p><input type="checkbox"/> no.</p> <p>How likely is it that your partner will also wish to maintain the partnership?</p> <p>[slider: 0 --- 100] %</p>
<p>4</p>	<p>Thank you very much!</p> <p>Your partner has also decided to maintain the collaboration.</p> <p>Meanwhile some time has passed and you have to decide again (planning period 4 of 10):</p> <p>If you decide to terminate the partnership now, your organization ([the city administration/the private construction company]) will receive an amount of € 30 million and your partner ([the private construction company/the city administration]) € 0 million.</p> <p>Please note that your partner can also decide at any time to terminate the partnership without prior notice! This would mean that your organization ([the city administration/the private construction company]) will receive € 0 million and your partner ([the private construction company/the city administration]) will receive € 30 million.</p> <p>If you work together until the end, your organization will receive € 132 million and your partner will also receive € 132 million.</p> <p>Do you want to maintain the partnership?</p> <p><input type="checkbox"/> yes</p> <p><input type="checkbox"/> no.</p> <p>How likely is it that your partner will also wish to maintain the partnership?</p> <p>[slider: 0 --- 100] %</p>
<p>5</p>	<p>Thank you very much!</p> <p>Your partner has also decided to maintain the collaboration.</p> <p>Meanwhile some time has passed and you have to decide again (planning period 5 of 10):</p> <p>If you decide to terminate the partnership now, your organization ([the city administration/the private construction company]) will receive an amount of € 37.5 million and your partner ([the private construction company/the city administration]) € 0 million.</p>

	<p>Please note that your partner can also decide at any time to terminate the partnership without prior notice! This would mean that your organization ([the city administration/the private construction company]) will receive € 0 million and your partner ([the private construction company/the city administration]) will receive € 37.5 million.</p> <p>If you work together until the end, your organization will receive € 132 million and your partner will also receive € 132 million.</p> <p>Do you want to maintain the partnership?</p> <p><input type="checkbox"/> yes</p> <p><input type="checkbox"/> no.</p> <p>How likely is it that your partner will also wish to maintain the partnership?</p> <p>[slider: 0 --- 100] %</p>
<p>6</p>	<p>Thank you very much!</p> <p>Your partner has also decided to maintain the collaboration.</p> <p>Meanwhile some time has passed and you have to decide again (planning period 6 of 10):</p> <p>If you decide to terminate the partnership now, your organization ([the city administration/the private construction company]) will receive an amount of € 50 million and your partner ([the private construction company/the city administration]) € 0 million.</p> <p>Please note that your partner can also decide at any time to terminate the partnership without prior notice! This would mean that your organization ([the city administration/the private construction company]) will receive € 0 million and your partner ([the private construction company/the city administration]) will receive € 50 million.</p> <p>If you work together until the end, your organization will receive € 132 million and your partner will also receive € 132 million.</p> <p>Do you want to maintain the partnership?</p> <p><input type="checkbox"/> yes</p> <p><input type="checkbox"/> no.</p> <p>How likely is it that your partner will also wish to maintain the partnership?</p> <p>[slider: 0 --- 100] %</p>

<p>7</p>	<p>Thank you very much!</p> <p>Your partner has also decided to maintain the collaboration.</p> <p>Meanwhile some time has passed and you have to decide again (planning period 7 of 10):</p> <p>If you decide to terminate the partnership now, your organization ([the city administration/the private construction company]) will receive an amount of € 75 million and your partner ([the private construction company/the city administration]) € 0 million.</p> <p>Please note that your partner can also decide at any time to terminate the partnership without prior notice! This would mean that your organization ([the city administration/the private construction company]) will receive € 0 million and your partner ([the private construction company/the city administration]) will receive € 75 million.</p> <p>If you work together until the end, your organization will receive € 132 million and your partner will also receive € 132 million.</p> <p>Do you want to maintain the partnership?</p> <p><input type="checkbox"/> yes</p> <p><input type="checkbox"/> no.</p> <p>How likely is it that your partner will also wish to maintain the partnership?</p> <p>[slider: 0 --- 100] %</p>
<p>8</p>	<p>Thank you very much!</p> <p>Your partner has also decided to maintain the collaboration.</p> <p>Meanwhile some time has passed and you have to decide again (planning period 8 of 10):</p> <p>If you decide to terminate the partnership now, your organization ([the city administration/the private construction company]) will receive an amount of € 100 million and your partner ([the private construction company/the city administration]) € 0 million.</p> <p>Please note that your partner can also decide at any time to terminate the partnership without prior notice! This would mean that your organization ([the city administration/the private construction company]) will receive € 0 million and your partner ([the private construction company/the city administration]) will receive € 100 million.</p>

	<p>If you work together until the end, your organization will receive € 132 million and your partner will also receive € 132 million.</p> <p>Do you want to maintain the partnership?</p> <p><input type="checkbox"/> yes</p> <p><input type="checkbox"/> no.</p> <p>How likely is it that your partner will also wish to maintain the partnership?</p> <p>[slider: 0 --- 100] %</p>
<p>9</p>	<p>Thank you very much!</p> <p>Your partner has also decided to maintain the collaboration.</p> <p>Meanwhile some time has passed and you have to decide again (planning period 9 of 10):</p> <p>If you decide to terminate the partnership now, your organization ([the city administration/the private construction company]) will receive an amount of € 110 million and your partner ([the private construction company/the city administration]) € 0 million.</p> <p>Please note that your partner can also decide at any time to terminate the partnership without prior notice! This would mean that your organization ([the city administration/the private construction company]) will receive € 0 million and your partner ([the private construction company/the city administration]) will receive € 110 million.</p> <p>If you work together until the end, your organization will receive € 132 million and your partner will also receive € 132 million.</p> <p>Do you want to maintain the partnership?</p> <p><input type="checkbox"/> yes</p> <p><input type="checkbox"/> no.</p> <p>How likely is it that your partner will also wish to maintain the partnership?</p> <p>[slider: 0 --- 100] %</p>
<p>10</p>	<p>Thank you very much!</p> <p>Your partner has also decided to maintain the collaboration.</p> <p>Meanwhile some time has passed and you have to decide again (planning period 10 of 10):</p>

	<p>If you decide to terminate the partnership now, your organization ([the city administration/the private construction company]) will receive an amount of € 125 million and your partner ([the private construction company/the city administration]) € 0 million.</p> <p>Please note that your partner can also decide at any time to terminate the partnership without prior notice! This would mean that your organization ([the city administration/the private construction company]) will receive € 0 million and your partner ([the private construction company/the city administration]) will receive € 125 million.</p> <p>If you work together until the end, your organization will receive € 132 million and your partner will also receive € 132 million.</p> <p>Do you want to maintain the partnership?</p> <p><input type="checkbox"/> yes</p> <p><input type="checkbox"/> no.</p> <p>How likely is it that your partner will also wish to maintain the partnership?</p> <p>[slider: 0 --- 100] %</p>																																																						
5	<p>Probability discounting questionnaire (Madden et al. 2009), 30 binary choice tasks</p> <p>‘The following questions relate to making economic choices. Please imagine that you only have the following <u>two independent alternatives</u> to choose from. For example:</p> <ul style="list-style-type: none"> - Alternative A: will yield a return on investment of € 40 in 50% of all cases, and will yield a return an investment of € 0 in 50% of all cases. - Alternative B: will yield a risk-free return on investment of € 20. <p>Please make sure to take a close look at the two alternatives offered in each task and please select the one alternative that you think is the best choice.’</p> <p><i>Followed by 30 systematically varied choice tasks:</i></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Task No.</th> <th style="border-bottom: 1px solid black;">Secure Option</th> <th colspan="3" style="border-bottom: 1px solid black;">Probabilistic Option</th> </tr> <tr> <th>Reward</th> <th>Probability</th> <th>Reward</th> <th>Expected Value</th> </tr> </thead> <tbody> <tr><td>1</td><td>€20</td><td>10%</td><td>€80</td><td>€8</td></tr> <tr><td>2</td><td>€20</td><td>13%</td><td>€80</td><td>€10</td></tr> <tr><td>3</td><td>€20</td><td>17%</td><td>€80</td><td>€14</td></tr> <tr><td>4</td><td>€20</td><td>20%</td><td>€80</td><td>€16</td></tr> <tr><td>5</td><td>€20</td><td>25%</td><td>€80</td><td>€20</td></tr> <tr><td>6</td><td>€20</td><td>33%</td><td>€80</td><td>€26</td></tr> <tr><td>7</td><td>€20</td><td>50%</td><td>€80</td><td>€40</td></tr> <tr><td>8</td><td>€20</td><td>67%</td><td>€80</td><td>€54</td></tr> <tr><td>9</td><td>€20</td><td>75%</td><td>€80</td><td>€60</td></tr> </tbody> </table>	Task No.	Secure Option	Probabilistic Option			Reward	Probability	Reward	Expected Value	1	€20	10%	€80	€8	2	€20	13%	€80	€10	3	€20	17%	€80	€14	4	€20	20%	€80	€16	5	€20	25%	€80	€20	6	€20	33%	€80	€26	7	€20	50%	€80	€40	8	€20	67%	€80	€54	9	€20	75%	€80	€60
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	10	€20	83%	€80	€66
	11	€40	18%	€100	€18
	12	€40	22%	€100	€22
	13	€40	29%	€100	€29
	14	€40	33%	€100	€33
	15	€40	40%	€100	€40
	16	€40	50%	€100	€50
	17	€40	67%	€100	€67
	18	€40	80%	€100	€80
	19	€40	86%	€100	€86
	20	€40	91%	€100	€91
	21	€40	40%	€60	€24
	22	€40	46%	€60	€28
	23	€40	55%	€60	€33
	24	€40	60%	€60	€36
	25	€40	67%	€60	€40
	26	€40	75%	€60	€45
	27	€40	86%	€60	€52
	28	€40	92%	€60	€55
	29	€40	95%	€60	€57
	30	€40	97%	€60	€58
6	Tolerance for uncertainty (Dalbert 1999) , eight-item 6-point Likert type scale				
	<ul style="list-style-type: none"> - ‘I like to try out new things even though this might not necessary lead to any specific outcome.’ - ‘I only occupy myself with with tasks that I can solve.’ (r) - ‘I like sudden surprises.’ - ‘I like to just wait and see what happens.’ - ‘I like work processes to be structured and steady.’ (r) - ‘I am just waiting for something exciting to happen.’ - ‘I feel really comfortable when everything goes haywire around me.’ - ‘I like to know what to expect.’ (r) 				
	[1=‘totally disagree’ to 6=‘totally agree’].				
7	PSM (Kim et al. 2012) , 12-item 7-point Likert type scale				
	<ul style="list-style-type: none"> - ‘I am interested in those public programs that are beneficial for my country or the community I belong to.’ - ‘Sharing my views on public policies with others is attractive to me.’ - ‘Seeing people getting benefits from a public program where I would have been deeply involved in would bring me a great deal of satisfaction.’ - ‘I consider public service my civic duty.’ - ‘Meaningful public service is very important to me.’ 				

	<ul style="list-style-type: none"> - 'I would prefer seeing public officials do what is best for the whole community even if it harmed my interests.' - 'It is difficult for me to contain my feelings when I see people in distress.' - 'I am often reminded by daily events how dependent we are on one another.' - 'I feel sympathetic for the plight of the unprivileged.' - 'Making a difference in society means more to me than personal achievements.' - 'I am prepared to make enormous sacrifices for the good of the society.' - 'I believe in putting duty before self.' <p>[1='totally disagree' to 7='totally agree'].</p>
8	<p>Explicit attitude about the public sector, single 7-point Likert-type item: 'If you think about the public sector in general your thoughts are...' [1='very negative' to 7='very positive'].</p>
9	<p>Explicit attitude about the private sector, single 7-point Likert-type item: 'If you think about the private sector in general your thoughts are...' [1='very negative' to 7='very positive'].</p>
10	<p>Trust in others (Yamagishi and Yamagishi 1994), six-item 5-point Likert type scale</p> <ul style="list-style-type: none"> - 'Most people are basically honest.' - 'Most people are trustworthy.' - 'Most people are basically good and kind.' - 'Most people are trustful of others.' - 'I am trustful.' - 'Most people will respond in kind when they are trusted by others.' <p>[1='totally disagree' to 5='totally agree'].</p>
11	<p>Socio-demographic questionnaire:</p> <ul style="list-style-type: none"> - year of birth - gender - citizenship - field of study - level of education - prior work experience in years in the public and private sector - intent to apply to the public and private sector.

12	<p>Numeracy (Weller et al. 2013), adapted, seven open response questions</p> <ul style="list-style-type: none"> - ‘If the chance of getting a disease is 10%, how many people would be expected to get the disease? Out of 1000? _____ people.’ [solution: 100] - ‘If the chance of getting a disease is 20 out of 100, this would be the same as having a _____% chance of getting the disease.’ [solution: 20] - ‘Imagine that we roll a fair, six-sided die 1000 times. Out of 1000 rolls, how many times do you think the die would come up as an even number?’ _____ [solution: 500] - ‘In a lottery, the chances of winning a \$10.00 prize are 1%. What is your best guess about how many people would win a \$10.00 prize if 1000 people each buy a single ticket from this lottery?’ _____ people. [solution: 10] - ‘In a tombola, the chance of winning a car is 1 in 1000. What percent of tombola tickets win a car?’ _____% [solution: 0.1] - ‘In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake?’ _____days [solution: 47] - ‘A bat and a ball cost €1.10 in total. The bat costs €1.00 more than the ball.’ _____ [solution: 5 cents]
13	Acknowledgement, debriefing, and end of study

A.2 Additional analysis on artificial inflation bias

The empirical evidence presented in the current study relies on a relatively large number of observations ($Obs.=4,338$) nested in a sample of $N=482$ respondents. Larger sample sizes are generally regarded as beneficial to regression analysis because a higher number of respondents increases power and, hence, reduces the likelihood of committing type II (β) errors, i.e., falsely accepting a null hypothesis (Banerjee et al. 2009).

Yet, large sample size can also cause artificial inflation of p -values resulting in models that identify statistically significant but inconsequential effects. In very large samples, p -values quickly cross the threshold levels typically interpreted as statistical significance – $p<0.05$; $p<0.01$; $p<0.001$ – see Lin et al. (2013) for an extensive discussion.

Consequently, we test our empirical results for inflation bias by drawing a random sample of our data (controlled for treatment balance) and re-run the multi-level mixed effects regression analysis. We repeat this procedure and, by each step, systematically halve the number of drawn observations until we reach the minimum sample-size to detect statistically significant effects in between-group mean comparisons, i.e., $Obs.>172$ (Ellis 2010).

Table A.2.1 presents the results of this step-wise procedure. The test reveals that the results presented in the main body of the current study are largely robust against artificial inflation. Especially the results regarding respondents' revealed *risk aversion*, *uncertainty avoidance*, and their *explicit attitude toward the public sector* remain stable. In contrast, the treatment effect – *public sector association* (i.e., collaborating with a private sector partner) – becomes sign-indicative and exhibits considerable variation if sample sizes are reduced. This indicates that although the partners' sector does function as a cue for the trustworthiness of a partner, the main drivers of whether or not people decide to defect from the PPP are still their individual dispositions and attitudes, predominantly their level of *PSM* ($\beta_3=-0.35$, $p<0.000$), their *general trust in others* ($\beta_7=0.32$, $p=0.005$), their *revealed risk propensity* ($\beta_3=-0.07$,

$p < 0.000$) and their *attitude toward the public sector* ($\beta_3 = 0.24$, $p < 0.000$). We already discuss this *caveat* in more detail in the discussion section of the main study and are, hence, confident in our findings.

TABLE A.5.1: Regression results on the likelihood of *PPP survival*

	<i>Model I</i>	<i>Model II</i>	<i>Model III</i>	<i>Model IV</i>	<i>Model V</i>
Treatment effect					
Public sector affiliation (i.e., <i>collaborating with a private sector partner</i>)	-.258* (.049)	-.162 (.369)	-.074 (.780)	-.305 (.464)	-.101 (.891)
Subject-level effects					
Sector-specific associations (revealed)	.082 (.146)	.110 (.164)	.107 (.367)	.032 (.858)	.383 (.170)
Public sector attitude	.241** (.000)	.186† (.055)	.318* (.038)	.539* (.028)	1.144* (.025)
Private sector attitude	-.080 (.212)	-.114 (.183)	.001 (.996)	.197 (.297)	.304 (.402)
Control variables					
Risk aversion (revealed)	-.069** (.000)	-.019† (.061)	-.088** (.009)	-.144** (.000)	-.178** (.001)
PSM (explicit)	-.350** (.000)	-.209 (.119)	-.167 (.366)	.499 (.129)	.457 (.261)
Trust in others (explicit)	.317** (.005)	.224 (.170)	.431† (.085)	-.015 (.963)	.185 (.769)
Uncertainty avoidance (explicit)	-.141† (.096)	-.264* (.029)	-.182 (.359)	-.509† (.072)	-.816† (.074)
Numeracy	.035 (.397)	.082 (.118)	.058 (.477)	.121 (.348)	.282† (.098)
Female	-.171 (.179)	-.223 (.206)	.012 (.963)	-.020 (.961)	.729 (.197)
Age	-.013 (.394)	.003 (.895)	.002 (.943)	.053 (.287)	.023 (.787)
Intercept	4.162** (.000)	3.392** (.001)	2.711† (.064)	1.572 (.452)	2.225 (.558)
<i>Obs.</i>	4,338	2,170	1,085	543	272
<i>N</i>	482	482	482	482	(482)
<i>Wald Chi</i> ² (11)	84.95**	35.35**	25.44**	24.82**	21.69*
<i>p</i>	.000	.000	.008	.010	.027
<i>AIC</i>	2,065.63	1,090.78	528.48	229.50	103.80
<i>BIC</i>	2,142.13	1,158.97	588.35	281.07	147.07
<i>-2*Log Likelihood</i>	2,041.63	1,066.78	504.48	205.50	79.80

Notes: Multi-level mixed effects regression estimates clustered at subject level for conditional contribution; heteroscedasticity-robust standard errors; direct effects models (p -values in parentheses); † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$. The estimates of Wald's χ^2 (df), AIC, and BIC indicate that models IV and V are substantially biased and should not be selected.

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