No sense of ownership in weak participation: a forest conservation experiment in Tanzania

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Abstract

Sense of ownership is often advocated as an argument for local participation within the epistemic development and nature conservation communities. Stakeholder participation in initiating, designing or implementing institutions is claimed to establish a sense of ownership among the stakeholders and subsequently improve the intended outcomes of the given institution. Theoretical and empirical justifications of the hypothesis remain scarce. A better understanding of the effects of local participation can motivate more extensive and stronger participation of local stakeholders and improve institutional performance. This paper applies theories from psychology and behavioral economics to sense of ownership. The empirical investigation is a framed field experiment, in the context of tropical forest conservation and payments for environmental services in Tanzania. The results lend little support to the hypothesis in this context. The participation treatment in the experiment is weak, and a possible explanation is that sense of ownership is sensitive to the participation form.

Keywords: participation; sense of ownership; forestry; Tanzania; framed field experiment

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1. Introduction

A common argument for participation of local stakeholders within the epistemic development and nature conservation communities is that participation directly improves institutions' ability to deliver effective, efficient or equitable outcomes.[1] Dubbed "sense of ownership," the argument hypothesizes that local stakeholders sense ownership of institutions they are involved in initiating, designing and/or implementing. This subsequently increases stakeholder support and thus institutional performance. The argument is found both among project proponents[2] and in the academic literature (e.g., Lachapelle, 2008; Reed, 2008; Marks and Davis, 2012). Schultz *et al.* (2011, p. 662) summarize the hypothesis as "people are more likely to support and implement decisions they have participated in making", and Buchy and Hoverman (2000, p. 19) argue that "people, feeling a sense of ownership, will be more compliant to bear the costs." A Google Scholar search reveals 162 articles in ten top development journals mentioning "sense of ownership" (1990-2016).[3]

Despite its popularity, the hypothesis lacks a precise definition. Details remain fuzzy how participation induces sense of ownership (SoO) and how it in turn improves institutional performance, controlling for other positive aspects of participation, such as access to local knowledge. One reason is inadequate theoretical tools. "Sense" implies a psychological mechanism, which is rarely explored in the relevant literature. Another reason is challenges in empirically identifying SoO effects. Participation and SoO as elusive concepts makes comparative studies difficult, and persistent biases in observations makes more quantitative investigations difficult. Several scholars note that research assessing

[1] The paper uses the term institution in the understanding of North (1990) as rules that define and/or constrain human interaction. Section 4 presents the institution for empirical investigation.

[2] For instance, "[...] broad ownership of a decision makes it more likely that implementation will be supported by a range of stakeholders" (Richards *et al.*, 2004, p. 11); "Ownership is an inherently appealing concept. In plain language, people should be involved in determining their own destiny, and if they are, they are more likely to support management efforts designed to move in this direction" (Manning and Ginger, 2007, p. 190); "[p]romoting participation helps build ownerhsip [sic] and enhances transparency and accountability, and in doing so enhances effectiveness of development projects and policies" (World Bank, 2016).

[3] World Development (44); Journal of International Development (20); Third World Quarterly (18); European Journal of Development Research (15); Journal of Development Studies (15); Development and Change (13); Development Policy Review (11); Sustainable Development (7); Environment and Development Economics (6); Oxford Development Studies (4) [August 8, 2016].

the effects of stakeholder participation on institutional performance is scarce (Agrawal, 2007; Reed, 2008; Schultz *et al.*, 2011; Mansuri and Rao, 2013b).

Viewing participation as a means, understanding SoO can help initiate, design and implement more efficient, effective and equitable institutions. Viewing participation as an end, finding empirical support for SoO can motivate more and stronger participatory approaches among policy makers.

This paper applies psychology and behavioral economics for a theoretical understanding of SoO, and proposes three possible drivers: biased information processing, associative self-anchoring and cognitive dissonance (Section 3). Economic experiments can help improve our empirical understanding by testing drivers and controlling for possible confounding factors. Since SoO may be context specific, a specific form of participation is explored through framed field experiments in the relevant context of forest conservation in Tanzania (Section 4). The results (Section 5) are discussed and related to development and nature conservation efforts (Sections 6-7). To explore the participation-SoO link, the following section presents a typology of participation.

2. Participation

2.1. Definitions and classifications

Over the last 40 years, participation has become a core element in the implementation of development and nature conservation institutions in developing countries (Cohen and Uphoff, 1980; Cornwall, 2008; Lie, 2015). The World Bank, for instance, spent USD 85 billion on participatory projects during the last decade alone (Mansuri and Rao, 2013b).

Despite the long focus on and the positive aspects of participatory approaches, empirical investigations often find questionable implementations. In some cases, "participation" is merely a buzzword in project documents with few real-world implications (Baland and Platteau, 1996; Cornwall and Brock, 2005; Leal, 2007; Reed, 2008; Ribot *et al.*, 2010; Lie, 2015). Another reason for varying practices is varying definitions of participation, depending on context and objective (Lawrence, 2006; Cornwall, 2008).

This paper views participation as the process where stakeholders make choices that determine (or co-determine) new institutions. The stakeholders of interest are local individuals who are affected by the institution and the choices (Freeman, 1984; Reed, 2008). I focus on localized and not societal wide participation (cf. Agrawal and Ostrom, 2001).

There are numerous classifications of participation. I focus on two dimensions: degree of involvement and timing. The ladder of Arnstein (1969), and later extensions by others (Reed, 2008), ranks participation by degree of stakeholder involvement and power, where the top rung is majority or full control of decisions. Figure 1, presented in Subsection 2.3, outlines a simplified ranking from weak to strong participation. Weak participation is consultation, where stakeholders inform decision makers, but have no direct influence over decisions. A medium level of participation is consent, where stakeholders may veto decisions and thus make constrained choices, with impact. Lastly, strong participation is control, where stakeholders are in the driving seat and make choices under few, if any, constraints, as in Arnstein's top rung.

Stakeholders may be involved at different time stages. First, the initiative can arise from the stakeholders or externally. Mansuri and Rao (2013a) distinguish between *organic* participation, where social movements from below initiate the process, and *induced* participation, where the initiative is external (but stakeholders are later involved within the set agenda). Second, stakeholders may participate in designing institutions (i.e., setting the rules). Third, stakeholders may participate in implementing initiatives from stage one according to the rules set in stage two. The involvement and time dimensions with three stages/degrees each are depicted in the two leftmost columns of Figure 1.

While these categories are not exhaustive and demarcations blur, such a typology can be useful to understand participation as a means. It particularly allows for applying theories from behavioral economics to explain possible positive effects of participation.

2.2. Why participation may matter

From a project proponent's perspective, participation of local stakeholders can be a means to improve an institution's *effectiveness* (achievement of the set objectives),

efficiency (costs of achieving the objectives) and/or *equity* (fair distribution of costs and benefits). Institutional performance refers to the ability to deliver these three *E*s according to given objectives. This instrumental significance of participation is advocated in many settings, e.g., in organizations (Pierce *et al.*, 2001), in medicine (Hickey and Kipping, 1998) and in marketing (Krugman, 1966).

Similar arguments have also been made related to development and nature conservation institutions (Bardhan, 2000; Chatterley *et al.*, 2013). Buchy and Hoverman (2000, p. 16) argue for "participation as a management tool" in Australian forestry and Tanzania's participatory forest management (PFM) has arguably been somewhat successful in reaching its goal of sustainable forest use (Brockington, 2007; Lund and Treue, 2008; Treue *et al.*, 2014). Mansuri and Rao (2013b, p. 6), in their extensive review, conclude that "greater community involvement seems to modestly improve resource sustainability and infrastructure quality", but that the benefits are unequally distributed.[4]

Participation effects have also been explored in laboratory experiments. In public good experiments, participants have been shown to be more likely to follow norm behavior under a sanctioning mechanism when the mechanism is chosen through a referendum than when it is imposed externally (Tyran and Feld, 2006; Sutter *et al.*, 2010; Markussen *et al.*, 2013). Dal Bó *et al.* (2010) investigate the "endogeneity premium effect," by allowing participants to vote on their preferred treatment in prisoners' dilemma games, but discard the votes in some sessions and exogenously impose the treatment. By comparing those who voted for the policies in the sessions that chose the policy and in the sessions that had the policy imposed, they control for the selection effect. They find that choosing has a positive impact, and that the effect is both due to the selection effect and a mere choice effect. A potential issue with the design is the comparison between participants who vote and subsequently choose a policy and participants who vote, but whose vote is disregarded and the policy (they voted for) is implemented exogenously. In addition to having the policy imposed, participants in the latter sessions know that their vote is discarded. Merely having one's vote discarded could affect behavior, for instance by

[4] Possible negative effects of local participation are not discussed (see Baland and Platteau, 1996; Cooke and Kothari, 2001; Brockington, 2007; Lund and Saito-Jensen, 2013).

reducing the policy's credibility and thus the ability to coordinate behavior. These studies are also in abstract form and conducted in laboratories, ignoring possible context-relevant effects (Henrich *et al.*, 2001; Harrison *et al.*, 2007; Maddux *et al.*, 2010).

[Table 1]

Table 1 summarizes key arguments advanced for participation having positive effects on institutional performance in five mechanisms. First, by involving local stakeholders in project design, local knowledge that may be hidden to external "experts" is accessed, thus creating locally adapted institutions that rely on deeper knowledge and more updated information (both in setting objectives and creating measures). Second, the process of including local stakeholders is empowering, which helps to better sustain the institution (as stakeholders are better equipped with skills, power, knowledge, etc.). Third, as participation requires some degree of openness in the decision making process it improves the transparency and holds the project proponents more accountable, which help create more efficient institutions. Fourth, dialogues between stakeholders and project proponents, and among stakeholders, reduce the number and intensity of conflicts, and thus reduce the costs related to solving such conflicts. Fifth, local participation induces a sense of ownership among the stakeholders, as described in Section 1.

2.3. A typology

Summarizing Subsections 2.1 and 2.2, participation, at the initiative, design and/or implementation stage, can improve institutional effectiveness, efficiency and/or equity through one or more of the five listed mechanisms (Figure 1). The effect of the mechanism(s) on institutional performance may vary by stage, level of participation and context.

[Figure 1]

Sense of ownership (SoO), although often unspecified, could also apply to any of the three stages and outcomes. Stakeholders may sense ownership of the idea to be initiated, of the design process, or of the implementation. These may affect the effectiveness, efficiency and/or equity differently, and may also interact with the context and the other

mechanisms. Section 4 aims to test the effect of participation (choice) in the design stage, inducing a SoO among local stakeholders, which improves institutional effectiveness.

3. Sense of ownership - a behavioral perspective

SoO implies a psychological effect, as participation in itself increases institutional performance. Theoretical support for SoO may thus be found in the related literature.

A useful distinction is between *real* and *symbolic* ownership (Etzioni, 1991). While the former strictly applies to objects and often relates to legal property rights, the latter mostly refers to non-objects, which can be "owned" by multiple parties simultaneously. Symbolic ownership is an attribute of our minds, while real ownership also exists outside our minds. Sense of ownership, as interpreted here, induces symbolic ownership (of a project, policy, etc.) to stakeholders.

Related literature within behavioral economics and psychology tend to focus on real ownership and differences in appreciations depending on whether a good is owned or not (Thaler, 1980; Kahneman *et al.*, 1991). The tendency to value a good more if it is owned is referred to as the endowment effect. Similar discrepancies have also been identified for more abstract goods, such as clean air, local tree density, job health risk and work effort (Horowitz and Mcconnell, 2002; Norton *et al.*, 2012). Reasons (drivers) for the discrepancies are disputed, and Morewedge and Giblin (2015) summarize several that are posited. Three of these may relate to SoO: (i) biased information processing, (ii) associative self-anchoring, and (iii) cognitive dissonance.

Biased information processing: Owners are in another framing than non-owners and thus weigh attributes of the good in question differently (Carmon and Ariely, 2000; Johnson *et al.*, 2007). This difference in weighting is biased towards considering the good more favorable when owned. Related to SoO, stakeholders who participate become owners and thus focus more on the positive aspects of the given institution than non-owners do, and this favorable evaluation spurs support for the given institution.

Associative self-anchoring: choosing or owning establishes an association, and as one in general evaluates oneself positively (or wants to do so, Benabou and Tirole, 2002),

one values what one chooses more favorably (Gawronski *et al.*, 2007; Weiss and Johar, 2013). That we tend to implicitly self-evaluate ourselves positively implies that we non-consciously think of our self-concept and self-esteem in positive terms (Bosson *et al.*, 2000; Greenwald and Farnham, 2000; Gawronski *et al.*, 2007; Stieger *et al.*, 2012). To elicit this, the related literature suggests the Initial Preference Task, which asks individuals to rate letters on a scale of likability or attractiveness (Stieger *et al.*, 2012). The consistent finding that individuals rate letters in their names more favorable than non-name letters indicates positive implicit self-evaluation. SoO may thus occur through (positively self-evaluated) stakeholders' association between themselves and the institution.

Choosing implies choosing away something else, creating a potential cost of regret. To compensate for this, *cognitive dissonance* predicts that one increases the perceived value of the chosen alternative and/or decreases the perceived value of the unchosen alternative(s) (Festinger, 1957; Morewedge and Giblin, 2015). Stakeholders' participation, forces more support for the institution because stakeholders mentally justify that they made the right choices. This effect is stronger the more equal the alternatives are valued, pre-choice.

The following presents an experimental study aiming to test the effect of choice on institutional performance in a specific context, and to test each of the three posited psychological mechanisms described above through framed field experiments.

4. Experimental study

4.1. The context: REDD+ and Tanzania

REDD+ (Reducing Emissions from Deforestation and forest Degradation, and enhancement of forest carbon stocks in developing countries) is an umbrella term for actions aimed to reduce carbon emissions from forest use in developing countries (Angelsen, 2009). It is seen as a relatively quick and cheap approach to mitigate climate change (Stern, 2006), with increasing attention and funds being received at the global level since its launch in 2007. More than USD 9.8 billion was pledged in aggregate between 2006 and 2014, with Norway as one of the most prominent donors (Angelsen, 2016).

The core idea of REDD+ is payment for environmental services (PES), i.e., forest users (countries, communities, individuals) are compensated for reduced emissions from estimated baselines (Angelsen, 2009). In implementing the forest conservation initiatives, however, a wide range of policies are likely to be applied, such as participatory forest management (PFM), where local communities are (to varying extents) responsible for the management (Angelsen, 2009; Green and Lund, 2015). In fact, the UN-REDD Programme (2011, p. 5) emphasizes that "stakeholder participation and engagement is critical to developing viable REDD+ strategies and implementation frameworks."

Tanzania has a population crucially dependent on local forest use, in particular as a source of fuel wood (World Bank, 2008; TNRF, 2009), and has one of the highest deforestation rates in Africa (FAO, 2011). The country is one of the most active REDD+ countries in Africa, with the first bilateral REDD+ agreement with Norway signed in 2008 (Angelsen, 2009). Although local REDD+ pilot projects include result-based incentives, the Tanzania-Norway agreement is not performance based and have strong elements of traditional aid cooperation (Angelsen, 2016). Most land in Tanzania is under control of the government or under various community tenure regimes, from *de facto* open access to well-enforced customary arrangements (Treue *et al.*, 2014). Pilot projects, enacted through local NGOs, are therefore heterogeneous, where different payment modalities have been tried, often in tandem with PFM (URT, 2012; Lund *et al.*, 2017).

4.2. Study area and sampling

During the period September-November 2014, we conducted experiments and surveys in three regions of Tanzania: Geita in the tropical northwest of the country, Kilimanjaro in the northeast and Lindi in the arid southeast of the country. In each of the three regions, we selected five villages in collaboration with district authorities or local NGOs. The villages vary in key attributes, as summarized in Appendix I. The geographical and village attribute distributions aim to make the results more generalizable.

Within each village, we randomly selected 32 participants by drawing from the village registry (an already existing list of the households in the village, but which often needed

to be updated). Each participant was then randomly assigned to a specific session with a predetermined treatment. The invitation stated that they would be compensated with a small, unspecified amount of money. With eight participants in 60 experimental sessions the total sample is 480 participants.

Appendix I presents descriptive statistics at the individual level and compares the mean values for the treatment and control groups. No significant differences across groups indicates successful random treatment assignment.[5] As described in related studies (Handberg and Angelsen, 2015, 2016), the sampling technique creates variations among participants, including in forest use. In this sample, 84% of the participants state to collect forest products themselves.

4.3. Experimental design

We conducted a framed field experiment, meaning that the sample (local forest users) and the framing (local forest use and conservation) are relevant (Harrison and List, 2004). The design draws on Cardenas (2004) and Handberg and Angelsen (2015). In each session, the eight participants are collectively endowed with a stock of 80 cardboard trees. Each tree, depicted in Handberg and Angelsen (2015), privately pays TZS 100 (USD 0.06) to the participant who harvests it.[6] In each of nine rounds, the participant privately decides how many trees to harvest, with five trees being the upper limit.[7] The participant has to physically tip each tree to indicate harvest, observed by an enumerator, who takes note and replants the harvested forest, such that the next participant faces the same forest size (decisions are made as if simultaneous). At the end of the harvest round, the aggregate number of trees harvested is revealed to the participants and removed from the forest. Thereafter, the forest grows by two trees for every ten trees standing. The sessions lasts

[5] See questionnaire in Appendix V for a better understanding of the variables.

[6] Daily wage for casual labor in rural Tanzania roughly corresponds to 15 trees. The payoffs are accumulated and paid at the end of the session. Participants received no show-up fee, but a minimum payment of TZS 2000 was practiced.

[7] At forest stocks below 40 trees, the upper limit is determined by $\lfloor \frac{S_t}{8} \rfloor$, i.e., the forest stock (S_t) divided by the number of participants and rounded down to nearest whole number. The information is given in the form of the upper limit table given in Appendix V. The maximum forest size is 160 trees.

for nine rounds, or until the forest depletes to less than eight trees. The number of rounds and all other parameters are made known to the participants.[8]

4.4. Treatments

In a 2x3 between-groups design, the sessions were randomly selected into *choice* (192 participants) and *no-choice* (192 participants), in addition to a control group (96 participants). Under the two treatment groups, sessions were again randomly selected into three sub-group treatments, 20%, 60% and 100% PES (with 64 participants, i.e., eight sessions, in each group).

In the *choice* treatment, participants were asked to choose one of two additional payment schemes (in addition to the TZS 100 per tree harvested) before the first round: (i) sell 40 of the trees immediately for TZS 50 each, implying a private payment of TZS 250 before the session starts, with an initial forest size of 40 (instead of 80) trees, or (ii) receive 20/60/100 TZS for each tree *not* harvested in each round, i.e., the difference between the upper limit and the harvested amount of trees. One of the three payments (20%, 60% or 100%, measured relative to the value of a harvested tree) was presented at random (with examples for clarification), creating the three sub-treatment groups.[9] As the payments are incentives for decreasing forest use, scheme (ii) simulates a payment for environmental services (PES) scheme, and is presented as such. The participants were given three minutes to discuss privately with each other, before an anonymous referendum was held. The scheme was then chosen by majority vote.

In the *no-choice* treatment, participants had scheme (ii) imposed exogenously (with one of the three payment levels). These participants also communicated in private for three minutes before the first harvest round.

In the control group, the participants experienced no PES scheme, but they also communicated in private for three minutes before the first round.

Besides SoO, Table 1 presents four potential mechanisms through which participation

[8] See Appendix V for participant instructions.

[9] For instance, harvesting three trees with an upper limit of five trees and 60% PES implies a private earning of: $TZS\ 100 * 3 + TZS\ 60 * (5 - 3) = TZS\ 420$ in the given round.

can improve institutional performance. The presented experimental design controls for these potential confounding effects. First, local knowledge was not used to select the treatment best suited, as all sessions chose the superior scheme (ii). This also ensures that *choice* has no direct impact on payoffs. Second, participants under *choice* are not given information or benefits that empower them more than others. Third, there are no additional transparency under *choice* than under the other two groups. Fourth, participants in the *choice* and *no-choice* treatment groups and in the control group are all allowed to communicate in private, thus creating the same conditions for dialogue.

As presented in Section 3, the treatment relies on the assumption that choosing is an integral part of participation and that it is the choice that creates sense of ownership, and on the assumption that the participants perceive it as an actual choice. The latter will be discussed in Section 6.

4.5. Theoretical predictions

As presented in the related designs of Handberg and Angelsen (2015, 2016), the social dilemma is whether to maximize own payoffs by harvesting the maximum amount of trees each round, or harvest fewer trees to improve the total payoff.

Under both 0% and 20% PES, the optimal decision for a payoff maximizing participant is to harvest the maximum number trees which are allowed in each round, independent of the choices of the other participants in the session (the Nash equilibrium). Under 60% PES, the optimal decision depends on the beliefs the participant has about the decisions of the other participants in the same session. If a participant believes the others to be either selfish (harvest close to maximum) or strongly pro-social (harvest close to nothing), the optimal decision is to harvest the maximum amount of trees allowed in each round. If the participant believes that the mean decision of the others is close to neither corner, the optimal decision is to harvest less. Under 100% PES, there is no incentive to harvest any trees, independent of the choices of others. These predictions are presented in full in Handberg and Angelsen (2016).

Choosing PES scheme or having the same scheme imposed should not affect the

harvest decision of the participants, as the parameters are identical. SoO, however, suggest that participants who choose the PES scheme are more positive to the intention of the scheme and should thus harvest less (increase effectiveness). The theory and previous studies presented in Section 3 thus suggest that the payment schemes should perform better when chosen than when imposed. In this experimental setting:

H1 Participants harvest more trees under *no-choice* than under *choice*

Biased information processing predicts that participants who choose the PES scheme, evaluate PES more favorable than others, which makes the PES scheme more effective among participants in the *choice* group. In the post-experiment interview, we indirectly asked the participants about their perceptions of the PES concept (questions 24-26, Appendix V). On a scale from 1 to 5, where 5 is strongly agree and 1 is strongly disagree they responded to the following statements: "it is right that those who benefit from the clean air that our forests produce, contribute to conserving the forest" (normative evaluation), "it is not proven that paying for living trees decreases deforestation" (factual evaluation), "paying for living trees makes other forest use considerations less important; like tradition, culture and religion" (PES and crowding-out). The hypothesis is thus:

H2 *Choice* induces more positive participant evaluations of PES schemes and the treatment effect is stronger among these participants

Associative self-anchoring predicts that the positive effect is stronger the more positive the participant evaluates themselves. In the post-experiment questionnaire, we asked about the participants' first, intuitive reaction to four letters, which they rated on a scale from one to five (strongly dislike, dislike, ambivalent, like, strongly like) (question 32, Appendix V). Participants were (orally) presented with the letters E and R, then the first letter in their stated first name and one letter not in their stated names. The theory predicts that the participants on average rate the letter in their first name more favorable than the letter not in their name. Similarly, participants with names which includes E and/or R, should on average rate the letter(s) more favorable than participants whose name does not include the letter(s). The theory predicts that participants who highly rate letters in their own name (in absolute terms or relative to the rating of other letters),

should have a stronger sense of ownership. The treatment effect should thus be stronger among these positive implicit self-evaluators, implying the following hypothesis:

H3 The *choice* effect on harvest rates (relative to *no-choice*) is stronger among participants with higher implicit self-evaluation

Cognitive dissonance predicts that the positive effect is stronger the more equal the options are, as the potential for cognitive dissonance is stronger here. This implies that the effect of *choice* is stronger the lower the PES level is. The specific hypothesis is:

H4 The *choice* effect on harvest rates (relative to *no-choice*) is stronger among participants that experience the low PES level (20% vs. 60 or 100%)

A plausible outcome measure for forest conservation is decrease in extractive forest use. The following will therefore consider reduction in number of harvested trees as the measure of success of the payment scheme. As the upper limit is relative to the forest size, analyses at absolute numbers could create biases. A harvest rate [0-1] indicating the number of harvested trees relative to the upper limit is therefore used.[10]

5. Results

5.1. Sense of ownership

Table 2 summarizes the individual mean harvest rates by the treatment and control groups. Here and in the following, the 17 participants voting for scheme (i) are excluded.[11]

[Table 2]

Without the PES scheme, the mean harvest rate is lower than the Nash equilibrium ($0.57 < 1$).[12] The mean harvest rates under the two treatment groups (aggregating the three PES levels) are both significantly lower than the mean harvest rate under the

[10] For instance, harvesting two trees from a forest of 39 trees (upper limit of four) and harvesting one tree from a forest of 17 trees (upper limit of two) implies the same harvest rate: 0.5.

[11] The observations are removed as the three presented theories predict an effect only for those who choose the scheme that is implemented. For impact assessment purposes, it could be interesting to analyze the effect in aggregate. Appendix IV shows that although nay-sayers harvest significantly more, including them produces similar results and the same conclusions.

[12] The harvesting is still unsustainable, as the forest stock decreases through the nine rounds in eleven sessions (of twelve) and depletes in six of these.

control group, but they are not significantly different from each other (p=0.488). The test thus lends no support for H1.[13]

5.2. Biased information processing

The biased information processing hypothesis predicts that participants who chose the PES scheme should evaluate PES more favorable than participants who had the scheme imposed. The three elicited PES evaluations - normative evaluation, factual evaluation, and PES and crowding-out - ranks PES perception from 1 to 5. Table 3 summarizes the evaluations separately by the choice treatment. It reveals that there are no significant differences between the group's mean evaluation in neither of the three statements. There is therefore no support for the first requirement of H2, and the hypothesis is rejected.

[Table 3]

5.3. Associative self-anchoring

The associative self-anchoring hypothesis predicts that (i) the participants' mean implicit self-evaluation should be positive, and (ii) that the treatment effect is stronger for participants with positive implicit self-evaluation than for others. Table 4 presents the mean implicit self-evaluation of the participants. The table reveals that participants evaluate the letters E and R more favorable if it is the first letter in their stated first name. The participants also evaluate the first letter in their first stated name more favorable than a letter not in their name (see Appendix III for the distribution of letters). The finding is not as clear in their evaluations of E and R when their stated names include the letters elsewhere to when their names do not include the letters; R is evaluated more favorable, but E is not. Taken together, the data supports previous findings in that people tend to evaluate letters in their own name more favorable than other letters, which supports prediction (i).[14]

[13] All tables report analyses at the participants level to retain the number of observations, relative to session level analyses. To control for group and stock dynamics, standard errors are clustered at the experimental session level. As the harvest rates are not normally distributed, all mean comparisons in the paper are bootstrapped t-tests, with 9999 repetitions (Davidson and MacKinnon, 2000).

[14] 24% of the participants stated to be illiterate. Since the letters were presented orally and all participants knew their own name, I assume that literacy is not required for the association.

[Table 4]

Table 5 tests for associative self-anchoring by the interaction effect of the choice treatment and positive implicit self-evaluation on individual mean harvest rates. Model (1) defines positives as those who value the letter in their name positively (like or strongly like on the five-point Likert scale) while the remainders constitute the negatives and neutrals (strongly dislike, dislike or ambivalent). Model (2) defines positives as those who value the first letter in their name more favorable than the letter not in their name, and the others as negatives and neutrals.

[Table 5]

With no significant impact on mean harvest rates of the choice in Table 5, neither among the positives nor among the neutrals/negatives, there is no support for H3.

5.4. Cognitive dissonance

The cognitive dissonance hypothesis predicts that the treatment effect is stronger the lower the PES level is, as this implies that the two payment schemes presented to the participants are more similar.[15] Table 6 reports the mean harvest rates by the three payment levels under *no choice* and *choice*.

[Table 6]

Investigating the means by the three payment levels reveals that the participants respond to increasing the PES payment. Comparing the means within each PES level reveals no significant impact of the choice treatment at any of the three PES levels, thus leaving no support for H4. Appendix II robustness tests by regressing harvest rates on PES and *choice* treatments in interaction, with controls. Further tests, exploring first round harvest rates to avoid the round dynamic of the experiment, are also presented in Appendix II. All robustness tests produce similar results and the same conclusions as here.

[15] The number of participants voting for the inferior payment scheme under the three payment levels would be an indication of the equality of options. When presented with the 20% payment level, 8 (of 64) participants voted for the other payment scheme, while 4 (of 64) and 5 (of 64) participants voted for the other payment scheme when presented with the 60% or 100% payment scheme respectively.

6. Discussion

In the presented framed field experiment there is no significant impact on institutional effectiveness (measured as decreased forest use) of allowing participants to choose a PES scheme relative to imposing the same scheme. Examining the data by three theories explaining the possible effect - biased information processing, associative self-anchoring and cognitive dissonance - finds little impact of the choice treatment. The following subsections discuss the results in light of being context specific, internally or externally invalid, and sensitive to the participation form.

6.1. No significant sense of ownership in this context

One explanation is that SoO does not apply in the context of incentive based forest conservation among local forest users in Tanzania. The SoO hypothesis might underestimate the rationality of Tanzanian forest users; they support good policies and oppose what are considered bad policies, independent of the source of origin or design.

The specific context of the empirical test is important. Tanzania has a history of decentralized forest management, also at the village level (Blomley and Ramadhani, 2006; Lund and Treue, 2008). The sampled participants should thus be familiar with participation in the three stages of Figure 1. Still, choices tend to be made by village leadership, such as the forest committee, not directly by the forest users (Lund and Treue, 2008). Unfortunately the sub-sample of village leaders is too small for clear inference.

The treatment also investigates the hypothesis in the context of incentive based forest conservation. The PES scheme is a particular institution that leaves more freedom to the forest user than for instance a command and control institution. Previous experimental studies find a dividend of democracy in more constraining institutions (Tyran and Feld, 2006; Dal Bó *et al.*, 2010; Sutter *et al.*, 2010; Markussen *et al.*, 2013). No observed effect in this context does not necessarily imply that there is no effect under other institutional arrangements. Furthermore, although there are REDD+ pilot projects in Tanzania, the initiative is unknown to most forest users. Inability to properly relate to the chosen PES scheme in the experiment might reduce the impact of SoO.

Lastly, the treatment seeks to test for participation in the design stage. SoO could for instance apply stronger in the initiative stage than in the design stage, and could also have stronger impact on efficiency or equity than effectiveness.

6.2. External validity and design issues

In addition to external validity more broadly, a necessity for rejecting the SoO hypothesis in this context is treatment validity, i.e., that participants' response to the treatment is predictive for real life responses of participation in designing PES schemes (Handberg and Angelsen, 2015).

The treatment relies on the assumptions that choice is an integral part of local participation and that the potential SoO works through choice. The latter assumption is supported by theories within psychology and behavioral economics, and these specific theories are tested. The former assumption is supported by scholars on participation (e.g., Arnstein, 1969; Pretty, 1995; Cornwall, 2008; Reed, 2008) who emphasize that participation should involve local stakeholders in decision-making processes.

Although the participants are presented with a choice, the choice treatment could be too weak, which may lead to a type II error. Allowing the participants to choose between two payment schemes, where one is inferior to the other, has the desirable attribute that it controls for selection effects. The cost is that the treatment presents a rather easy choice; only minor cognitive efforts are necessary to infer that one is preferred over the other. The participants can feel (rightly so) that they make no real choice.

An additional caveat is that the harvest rates are low, even under no and low PES. This limits the improvement potential of the choice treatment. Still, mean harvest rates under 60% and 100% PES are significantly lower than the mean under 20% PES, indicating that some potential exists.

6.3. Weak vs. strong participation

Related to the weak treatment caveat, SoO may depend on the degree of real influence the stakeholders exercise through their choice. The ranking in Figure 1 defines control as strong participation, and consent and consultation as weaker forms of participation.

The choice in the experiment is informed and free, but one option is clearly superior to the other. An obvious choice leaves little power to the stakeholder. The choice is also limited to the two payment schemes, meaning that the degree of participation is arguably closer to "consent" than "control." The lack of support for the SoO hypothesis could thus be due to the treatment's weak form of participation. Under 20% PES, the choice should be perceived as less obvious since the options are more similar than under 60% and 100% PES. A decreasing difference in mean harvest rates by *choice* and a reversal of difference would indicate an effect of *choice* when the options of the choice are more equal, but the trend here is not significant (Table 6). Both cognitive dissonance and associative self-anchoring predict stronger choice effects with higher cognitive efforts.

The lack of a clear overall treatment effect (and positive findings of others, presented in Subsection 2.2) could thus be an argument for stronger participation. Weak participation, such as participatory rhetoric without actual participation, could then be not only immoral, it could also, from a project proponent's viewpoint, be a cost with no benefits. In contrast, strong participation might not only be an end in itself, but also have positive effects on institutional performance.

Participation simply as a management tool is arguably a contradiction in terms. Strong participation implies stakeholders' opportunity to change the rules of the game, without strict constraints by proponents. SoO may require strong participation to have a real impact and improve institutional performance.

7. Conclusion

Participation of local stakeholders in initiating, designing or implementing institutions is often claimed by scholars and practitioners to improve institutional effectiveness,

efficiency or equity, through at least five possible mechanisms. Sense of ownership, as one of these mechanisms, is often advocated within the development and nature conservation communities. Theoretical and empirical justifications remain scarce. Possible theoretical support is found within psychology and behavioral economics, and a few lab experiments on the effects of democracy give empirical support.

The presented experimental study tests the effect of participation in the design stage on institutional effectiveness, through the sense of ownership hypothesis. The results lend no support to the hypothesis in the context of incentive based forest conservation among local Tanzanian forest users.

One possible explanation for the lack of support is that the experiment represents a weak form of participation. An implication is that weak participation is not only problematic when viewing participation as an end, but also as a means to improve institutional performance. The finding questions the view that (weak) participation is a low-cost strategy to establish sense of ownership among local stakeholder, and thus improve performance. The often-observed weak participation of local stakeholders in development and nature conservation institutions in developing countries could thus have little value except pleasing donors and the public.

At a societal level, participation is normally either advocated as an end in itself (e.g., Sen, 1999) or as a means to achieve other ends, such as economic security (e.g., Arnstein, 1969; Sen, 1999). For project proponents on strict budgets with specific goals, these arguments might not motivate stronger participatory approaches. From the perspective of a project proponent, the latter argument is a positive externality and the former is normative. A better understanding of the sense of ownership hypothesis (and other mechanisms) can help proponents initiate, design or implement more effective, efficient or equitable institutions. In addition, revealing such positive effects of participation creates incentives for stronger and more extensive participation of local stakeholders. Research exploring positive effects of local participation on institutional performance thus incentivizes proponents to integrate participation in designing and implementing institutions, and to facilitate local initiatives.

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Tables

Table 1. Mechanisms through which participation may improve institutional performance

Mechanism	Argument	References
Knowledge	More and better knowledge creates better institutions	(Ostrom, 1990; Chambers, 1994; Pretty, 1995; Rodrik, 2000; Dietz *et al.*, 2003; Reed, 2008; Schultz *et al.*, 2011)
Empowerment	Stakeholders are better equipped	(Bamberger, 1991; Buchy and Hoverman, 2000)
Transparency & accountability	Improves governance	(Ribot, 2008; Schultz *et al.*, 2011)
Dialogue	Facilitating dialogue reduces conflicts	(Innes, 1996; Conley and Moote, 2003)
Sense of ownership	Stakeholder support increases through involvement	(Buchy and Hoverman, 2000; Reed, 2008; Dal Bó *et al.*, 2010; Schultz *et al.*, 2011; Marks and Davis, 2012)

Table 2. Mean individual harvest rates

Group	Mean		N
Control	0.570	(0.060)	96
No-choice	0.328	(0.044)	192
Choice	0.291	(0.031)	175

Session clustered standard errors in parentheses.

Table 3. Participants' PES evaluation by the choice treatment

Statement	No-choice	Choice	p-values
Normative evaluation	2.333 (0.110)	2.200 (0.110)	0.380
Factual evaluation	3.526 (0.082)	3.600 (0.075)	0.865
PES and crowding-out	3.453 (0.072)	3.377 (0.082)	0.577
N	192	175	

Standard errors in parentheses. p-values produced by Wilcoxon ranksum tests.

Table 4. Mean implicit self-evaluations by letter

	If first letter/in name	If letter not in name	p-values
E (as first letter)	4.172 (0.205), N=29	3.601 (0.054), N=451	0.002
R (as first letter)	4.690 (0.087), N=29	3.506 (0.056), N=451	0.000
E (in name)	3.629 (0.067), N=299	3.646 (0.085), N=181	0.921
R (in name)	3.775 (0.081), N=200	3.436 (0.071), N=280	0.001
Random letter	4.366 (0.048), N=479	3.613 (0.055), N=479	0.000

Standard errors in parentheses. p-values produced by Wilcoxon ranksum tests. Random letter refers to two letters randomly chosen among those in the participant's name and those not in the name.

Table 5. Testing for associative self-anchoring

	(1) Absolute positive		(2) Relative positive	
Choice	-0.104	(0.096)	-0.091	(0.067)
Positive	-0.094	(0.074)	-0.084	(0.049)
Choice*positive	0.068	(0.080)	0.086	(0.059)
Constant	0.323***	(0.055)	0.297***	(0.030)
R^2	0.103		0.107	
N	367		367	

Dependent variable: individual mean harvest rate through the session. Session clustered standard errors in parentheses. ***,**,*: significant at the 1, 5 or 10% level. Includes village dummies (not reported).

Table 6. Mean individual harvest rates by PES level

Group	20%		60%		100%	
No-choice	0.523	(0.057)	0.337	(0.059)	0.125	(0.028)
Choice	0.424	(0.048)	0.310	(0.023)	0.145	(0.025)
p-values	0.214		0.672		0.611	
N	120		124		123	

Session clustered standard errors in parentheses.***,**,*: significant at the 1, 5 or 10% level.

Figure

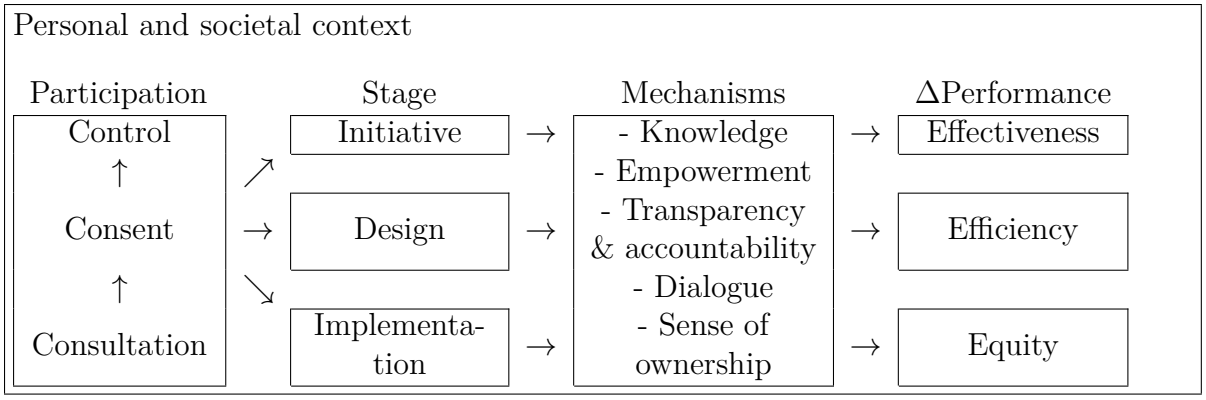

Figure 1. Participation as a means