

DOES TRANSPARENCY LEAD TO COPRODUCTION?

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ABSTRACT

Theory linking transparency to good governance predicts that greater disclosure will render public organizations more responsive by encouraging citizens to engage in processes that govern the delivery of public services. Yet, increasingly, empirical research indicates our theoretical understanding of this relationship is limited. We reason this is because extant theory overlooks mechanisms responsible for link transparency to citizen engagement. Accordingly, we predict that effects of transparency on citizen engagement depend on whether content is presented in ways that are conducive to citizen understanding. Specifically, we hypothesize that negatively framed information resonates more with citizens, thus contributing to greater understanding and, subsequently, engagement. We estimate the indirect effect of transparency on citizen engagement using a parallel encouragement experimental design and representative sample of US citizens (n=836). Counter to predictions, participants understood positively framed information better than negatively framed information. Further, understanding has a strong effect on engagement. Finally, we identify an indirect effect (via understanding) and no direct effects of transparency, ruling out alternative causal mechanisms.

KEYWORDS: *Transparency, Citizen engagement in coproduction, Good governance, Public services*

1. INTRODUCTION

Transparency reforms are often implemented with the intention of forging stronger relationships between citizens and the state. The expectation is that by enhancing transparency governments will be better able to meaningfully engage citizens in processes that govern the creation, implementation and delivery of public services (Hawkins, Brook, Hansen and Hoopes 2017; Mabillard and Zumofen 2016; Mason, Hillenbrand, and Money 2014). In this way, theory linking transparency to good governance argues that transparency plays a critical role in rendering public service provision more responsive.

Yet, Kosack and Fung (2014:66) note that the effects of transparency on citizen attitudes and behaviors are often “opaque and unpredictable.” In some instances empirical research finds that greater transparency results in greater engagement (Björkman and Svensson 2009), in others there is no discernable effect (Banerjee et al. 2007), and in some cases, even a negative effect (Porumbescu and Grimmelikhuijsen 2017). This growing body of mixed findings highlights a gap between transparency in theory and transparency in practice and therefore speaks to a need for theoretical refinement (Etzioni 2010; Fung 2013; Grimmelikhuijsen, Weske, Bouwman, and Tummers 2017).

This study contributes to a more robust theoretical understanding of the effects of transparency on citizen engagement in processes that govern the provision of public services. We do so by

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explicating factors that help to determine the effect of transparency on citizen engagement. We do so in two ways.

First, we identify a mechanism responsible for translating transparency into greater citizen engagement in processes that govern public service provision: citizens' understanding of the government information they are exposed to. Efforts to replicate and generalize effects across contexts require a basic awareness of why an effect occurred in the first place (Imai et al. 2010). In this way, shedding light on why an effect has occurred improves our ability to explain why the effects of transparency may differ across empirical contexts – if transparency did not impact citizen engagement, perhaps the reason is that individuals did not understand the government information they were exposed to.

Second, based upon the important role understanding plays, we demonstrate that the effects of transparency on citizen engagement are conditioned by the way the information is presented to the public – methods of conveying information that are easier to understand are more effective at stimulating engagement. By introducing presentational considerations to discussions of transparency, we refine our theoretical understanding of the effects of transparency by illustrating how the effects depend, at least in part, upon the way information is presented to the public.

Taken together, this study contributes to a more nuanced theoretical understanding of the effect of transparency on citizen engagement, by identifying mechanisms that are central to the process of translating transparency into citizen engagement, such as citizen understanding, and explicating conditions that contribute to the functioning of this mechanism.

When evaluating the effects of transparency, we focus on citizen engagement in a government initiated coproduction initiative. Coproduction is increasingly used to describe “a wide range of areas and activities that involve a wide range of actors” (Nabatchi, Sancino, and Sicilia 2017:766). Our focus lies with a specific form of coproduction, an individual's voluntary engagement in the co-delivery an education policy. Co-delivery of public services sees an individual citizen collaborating with those in government to improve the efficiency or quality of service provision (Osborne and Strokosch 2013). In this sense, co-delivery focuses on rendering existing services more efficient and responsive (Alford and O'Flynn 2012).

Our research design employs real effort experiments to identify processes responsible for shaping the impact of public disclosure on citizen engagement. In our experiment, the main presentational condition we account for is the framing (negative framing versus positive framing) of information communicating the implications of citizen engagement in a coproduction initiative. Citing a well-established negativity bias in the way individuals process information, we predict that negative frames are more effective in stimulating understanding of the importance of a coproduction initiative and that this understanding, in turn, will bolster engagement in a coproduction initiative (Rozin and Royzman 2001).

To examine the mechanisms we propose, we use a parallel encouragement design (Imai and Yamamoto 2013). This design-based approach to modeling mediation is uncommon in public administration research, yet is advantageous because it allows us to mitigate threats of confounding variables that may bias the relationship between the mediating and outcome variables. This allows us to produce estimates of indirect effects as if participants were randomly assigned to the mediating variable (Imai and Yamamoto 2013). In this way, this design based approach bolsters the causal validity of indirect effect estimates.

This paper proceeds as follows. In the next section, we overview the theory that informs the design of our experiment. Following this, we explain the experiment, data, and estimation strategy. We then outline results and conclude with a discussion of implications for research and practice.

2. CONCEPTUAL FRAMEWORK

Transparency

Government transparency is understood as information that enables external stakeholders to observe and evaluate the way a public organization functions (Meijer 2009; Piotrowski and Van Ryzin

2007; De Fine Licht 2014). Government transparency is complex and shaped by factors, such as politics (Berliner 2014), institutional arrangements (Meijer 2013), and administrative culture (Bolívar, Muñoz, and Hernández 2013), in addition to qualities of information being disseminated (Grimmelikhuijsen 2012). In this study, we focus upon the qualities of the information being disseminated – content, as well as presentation. We focus on these aspects of transparency are of greatest immediate relevance to evaluations of the effects of citizens’ use of government information and therefore are most relevant to the purposes of this study.

Different frameworks, outlining discrete forms of transparency, have been offered in an effort to identify the types of content necessary to shed a balanced light on the actions undertaken by government (see Cucciniello, Porumbescu, and Grimmelikhuijsen 2017). Guided by such frameworks, the form of transparency most relevant to the purposes of this study is policy transparency. Policy transparency refers to public disclosure of information detailing how a specific policy addresses an issue confronting a community (Grimmelikhuijsen 2012). This form of transparency communicates content to the public pertaining to a specific issue facing the community, the tools the policy will use to address this issue, how the policy will be funded, as well as projected consequences of the policy (Porumbescu 2017). By exposing citizens to such information, policy transparency offers the potential to improve citizen’s understanding of the policy’s importance, as well as to delineate opportunities for them to collaborate with government to address the particular social issue confronted by the policy (Alford 2002; Gaventa and Barrett 2012; Gurin 2014).

Citizen engagement in coproduction

Coproduction occurs when inputs used in the delivery of a public service are provided by actors who do not belong to the same organization (Ostrom 1996: 1073). Focusing upon inputs to public services provided by citizens in particular, others offer a more specific definition of coproduction: “a relationship between a paid employee of an organization and (groups) of individual citizens that requires a direct and active contribution from these citizens to the work of the organization” (Brandsen and Honigh 2015: 5). A final distinction in the literature pertains to whether citizen engagement in coproduction occurs voluntarily or is coerced (Brudney and England 1983; Tönurist and Surva 2017). In this study, we focus on citizens’ voluntarily engaging in a government coproduction initiative.

The citizen-based perspective on coproduction has attracted a great deal of attention from public management scholars (Vooberg, Bekkers, and Tummers 2015). In part, this is because drawing upon citizen inputs contribute to enhancing the sustainability, quality and efficiency of public service provision (Durose et al. 2013). Furthermore, citizen based coproduction also promises to enhance the responsiveness of public service delivery by directly incorporating citizens into the processes of designing, delivering and evaluating public services (Brudney and England 1983).

Citizen inputs can occur at various phases of the (public) service cycle. In turn, these inputs have different implications for public service provision. As such, to better understand implications of citizen coproduction for public service delivery, it is important to account for the phase in the service cycle citizen inputs occur. In this vein, Nabatchi and colleagues (2017:773) use the service cycle as a framework for synthesizing forms of coproduction identified by previous literature and arrive at four types of coproduction that can result from individual citizens collaborating with public organizations – co-commissioning, co-design, co-delivery, and co-assessment.

In this study, we focus on co-delivery. Co-delivery of public services can be considered a concurrent form of coproduction in that it focuses on improving a service that already exists (Nabatchi, Sancino, and Sicilia 2017). Perhaps one of the most common examples of co-delivery is parental involvement in schools (Pestoff 2006). Here, citizens volunteer their time to assist schools in providing education to students by engaging in activities, such as participating in parent-teacher association activities, planning school events, or mentoring students in after school programs.

Understanding: Linking Policy Transparency to Engagement

In this paper, citizen understanding refers to their comprehension of policy information (cf. Porumbescu, Bellé, Cucciniello, and Nasi 2017). An individual's ability to understand new information is a function of the qualities of the information individuals are exposed to (format and content), their cognitive capacity, and motivation to engage with material (Ames and Archer 1988; Hambrick and Engle 2002; Sweller 1994). All told, understanding is a complex phenomenon.

Literature on transparency and citizen engagement emphasizes the importance of citizens' understanding of policies and government, yet does not directly incorporate this variable into theoretical or empirical frameworks. Rather, exposure to government policy information, no matter the format and content, is used as a proxy for citizen understanding of government policies – the more exposure a citizen has, the better their understanding. Any subsequent differences in citizen attitudes or behaviors are then assumed to result from differing levels of citizen's policy understanding.

When considering implications of transparency for citizen – government relationships, the cursory treatment of citizen understanding in particular, and by extension causal mechanisms more broadly, impedes the development of robust theories that are capable of explaining why transparency policies work or not (see Imai, Keele, Tingley 2010). This is because, the presence or absence of an effect of transparency on engagement in one context cannot be systematically generalized to different contexts until we are aware of the conditions the observed effect was contingent upon (cf. Cook and Campbell 1979; Lynch 1982). An apt starting place for refining theoretical frameworks that attempt to explain the effects of transparency is to consider the qualities of government information that are capable of activating causal processes that underlie the effects of transparency².

Hypothesis 1: Policy Transparency and Policy Understanding

Research from educational and social psychology has long argued that the way information is conveyed will shape an individual's ability to understand the information they are exposed to (Flesch 1948; Kincaid et al. 1975; Paas, Renki, and Sweller 2004). The implication is that two different messages, with the exact same meaning, can result in two different levels of understanding. As such, presentation is just as important a determinant of understanding as the content itself (van Merriënboer and Sweller 2010).

In communicating policy information, one important presentational consideration pertains to the way a policy and its anticipated implications are framed. Specifically, the importance of a policy intending to bolster citizen engagement can be explained in terms of what will happen if the policy fails or succeeds in enhancing citizen engagement.

When trying to help citizens understand the potential impact of a policy, which method of presenting information is more effective: One that stresses losses, or one that stress gains? A potential answer to this question comes from research documenting negativity biases in the way individuals respond to information. As Rozin and Royzman (2001:297) explain, “in most situations, negative events are more salient, potent, dominant in combinations, and generally efficacious than positive ones.” Indeed, as Ito, Larsen, Smith, and Cacioppo (1998) show, the human brain responds much more sharply to negative information than positive. Given the differential effects of positive versus negative information on cognitive processing, these framing effects also have implications for an individual's ability to understand information (see Baumeister, Vohs, DeWall, and Zhang 2007).

Negative information has long been found to effectuate more rapid learning than positive events (Constantini and Hoving 1973). In part, this effect on learning, and therefore understanding, traces back to the potency of negative information – negative information resonates more with individuals than positive information, thereby bolstering motivation to understand the information (Smith, Cacioppo, Larsen, and Chartrand 2003). This is because the consequences of not understanding negatively framed information are perceived as more severe than the consequences of not

² While valuable work has illustrated how cognitive biases shape citizen responses to public service performance information, this vein of literature alone offers little insight into how to implement transparency initiatives that are capable of realizing a more informed and engaged public. This is because research dealing with cognitive biases tends to identify effects independent of citizen understanding of the information they are exposed to.

understanding positively framed information. Moreover, because negative information strikes individuals more sharply than positive information, negative information easier to recall (Robinson-Riegler and Winton 1996; Ohira, Winton, and Oyama 1998; Baumeister Bratslavsky, Finkenaur, and Vohs 2001).

In light of the evidence, we hypothesize that the use of negative frames to communicate policy information to the public will be more effective at improving citizen understanding of said policy when compared to the use of positive frames. In other words, we can expect that citizens' understanding of a policy will be greater when objectively equivalent information about said policy is negatively, rather than positively-worded.

H1: Negatively framing of policy information is more effective at improving policy understanding than positively framing policy information.

Hypotheses 2 and 3: Policy Understanding, and Engagement

Policy understanding can bolster engagement in coproduction by raising citizens' awareness of ways they can contribute to the success of the policy as well as to the wellbeing of themselves and their community (Thomsen 2015). In this way, greater policy understanding helps to establish a basis for citizen engagement in coproduction by shaping citizen motivations and enhancing their capacity to engage.

With respect to motivation, the better a citizen understands a policy the more aware they will be of why their engagement matters – of the contributions they can make to the success of the policy, as well as the specific consequences those contributions will have (Mees, Crabbé, and Driessen 2017). Research by Thomsen (2015) demonstrates that citizens are more likely to engage with a coproduction initiative when they are aware of what the consequences of their decision to act or not are, both for the policy as well as for themselves and their community (Thomsen 2015). The reasoning for this traces back to work on self-efficacy by Bandura who demonstrates that an individual's understanding of their capacity to contribute to advancing certain objectives, as well as their understanding of the value of the contributions they can make to a particular task trigger higher levels of self-efficacy as they relate to the aforementioned task (Bandura 1977: 198-199; Bandura 1993). In this sense, improved understanding of a coproduction policy and, by default an improved understanding of the consequences of one's engagement with the policy, can enhance perceptions of self-efficacy, thereby increasing intentions to engage in coproduction (Parrado, Van Ryzin, Bovaird, and Loeffler 2013).

A key impediment to citizen engagement in coproduction initiatives relates to capacity constraints (Warren, Rosentraub, and Harlow 1984). Greater policy understanding contributes to the alleviation of capacity constraints, by imbuing individuals with a greater awareness of the steps they can take to actively contribute to the success of the policy and to the improvement of their community (Alford 2009; Levine 1984). For example, using a field experiment, Jakobsen (2013:36) demonstrates that providing immigrants to Denmark with a "language suitcase" that included "a video tutorial on how parents can help their children learn Danish" significantly boosted parental engagement in a coproduction initiative targeting language education. These findings are echoed by Jakobsen and Andersen (2013), who show that the effect of knowledge enhancing interventions on engagement in coproduction and service outcomes are particularly impactful among disadvantaged groups of citizens.

All told, we predict that better policy understanding increases citizen engagement. Given that negative framing of policy information is predicted to increase policy understanding, we also hypothesize an indirect effect of transparency such that negatively framed policy information will increase policy understanding, which in turn will bolster policy understanding.

H2: Policy understanding will positively affect engagement in coproduction.

H3: Negatively framed policy information will indirectly increase engagement in coproduction, by first improving policy understanding.

3. METHOD AND DATA

Experimental Setting and Procedure

To examine our three hypotheses, we used a scenario-driven survey experiment. All participants were first told that rising costs of after-school program provision by public schools mean the school district may not be able to carry on providing this service to the community. They were then told that, in an effort to drive down the high costs and continue providing after-school programs, the School Board was implementing a policy that depends on different forms of voluntary citizen engagement to continue providing these programs. Education and school Boards were chosen in particular as they are one of the most common forms of local government in the United States, meaning that all participants will possess a general awareness of the function this unit of government serves. Furthermore, citizen engagement plays an important role in the provision of school services, such as afterschool programs (Davies 1987; Davis and Ostrom 1991; Jakobsen 2013; O'Donnell and Kirkner 2014).

After reading the same background information, participants were randomly assigned to a treatment. All treatments began by providing information about what engagement means within the context of this policy initiative (see appendix 2 for treatments). The treatments differed according to whether they detailed the implications of policy success or policy failure. Equivalency framing guided the design of the treatments such that policy success and failure affected the same areas, but in different directions. The effects were also balanced to ensure equivalency. For example, participants assigned to the positive treatment group were told that if the policy succeeded, student test scores were expected to be 12.2 points higher. For participants assigned to the negative treatment group, participants were told that if the policy failed, student test scores were expected to be 12.2 points lower.

Following exposure to treatments, participants were directed to complete the same survey, where they first answered questions regarding their understanding of the policy and then answered questions gauging their intentions to engagement in coproduction.

Participants

We use a sample that is representative of the general United States' population. Participants were 836 adults who were paid as part of a panel of survey response panel based in the United States operated and maintained by the online survey firm *Qualtrics*. Participants were invited by *Qualtrics* to participate in the study via email where they could follow a link leading to the stimuli and subsequent survey. Quota sampling was used to ensure that the resulting sample was representative of the general American population on parameters of gender, age, income, and education. Characteristics of the sample by treatment group can be found in appendix 1. An analysis of the treatment groups revealed successful randomization in that none of the differences found across the groups with respect to the aforementioned sampling parameters was significant at the .05 level.

Estimation Strategy

To examine hypothesis 1 we conducted a univariate analysis of variance (ANOVA).

To improve causal insight in our assessment of hypothesis two and three, we use a parallel encouragement experimental design, which allows us to gauge the effects of the mediator as if participants were randomly assigned to high values of the mediator and low values of the mediator. Therefore, approach lets us relax the restrictive sequential ignorability assumption, which holds that there can be no unobserved confounding variable biasing the relationship between the mediator and outcome variable (Imai, Keele, Tingley 2010; Pearl 2012).

In a parallel encouragement design, participants are randomly assigned to one of two experiments that are run simultaneously. In the first experiment, there is no encouragement, meaning that participants are not randomly encouraged to take different values of the mediator – values of the mediator are measured. In the second experiment, participants, in tandem with the delivery of treatment, are randomly encouraged to take high or low values of the mediator. As mentioned

earlier, randomly encouraging participants to take high or low values of the mediator mitigates concerns over confounding variables biasing the relationship between the mediator and outcome variables (VanderWeele 2015). This is a major advantage of this approach when compared to single experiment designs, in that even well-designed single experiments cannot rule out confounding variables biasing estimated indirect effects (Keele, Tingley, Yamamoto 2015).

An additional benefit of this design is that it can act as a conceptual replication, in that it permits us to examine direct and indirect effects across different operationalizations of the mediating variable (high values, low values, and measured values) (Fabrigar and Wegener 2016). The conceptual replication aspect of our design strengthens our ability to assert that the mediator is responsible for the pattern of effects we observe (Pirlott and MacKinnon 2015:5).

Across the different experiments, we use a potential outcomes framework to estimate direct and indirect effects (on the benefit of this estimation method see Imai, Keele, Tingley, and Yamamoto 2011: 767, or Gelman and King 1990 for a broader discussion of estimates derived using potential outcomes).

Measures of key variables

Policy Understanding (Mediating Variable): Our measure of policy understanding is informed by research from social psychology, political science and educational psychology. Studies from each of these disciplines assess the general construct of understanding by asking study participants to respond to a series of closed-ended questions about a particular issue or information they have just read (Prior 2006; Mangen, Walgermo, and Brønnick 2013; Wallot *et al.* 2014). More correct responses indicate greater understanding. Following this procedure, we measure policy understanding by asking all participants, irrespective of their treatment group, the same ten multiple-choice questions related to the prompt they read. We then summed their responses to create an additive index, where a score of ten corresponded to the highest possible level of policy understanding and a score of zero corresponded to the lowest possible level of policy understanding.

Time of exposure (encouragement): In our study, we encourage participants to assume different levels of policy understanding by altering the amount of time they were exposed to the treatment: i.e., *no assigned exposure time*; *short exposure (30 seconds)*; *long exposure (90 seconds)*. We find that our encouragement, time of exposure to policy information, has no direct effect on the outcome ($p = 0.619$). Those assigned to the shorter duration had lower levels of policy understanding ($m = 3.85$, $SD = 1.79$) than those assigned to the longer duration ($m = 4.82$, $SD = 2.14$), as well as those who were not assigned to an encouragement ($m = 4.54$, $SD = 2.14$). These differences in understanding and the absence of a significant effect of the encouragement on the outcome suggests that time of exposure is an acceptable encouragement (VanderWeele 2009; Imai, Keele, Tingley, Yamamoto 2011).

Engagement in Coproduction (Outcome Variable): To gauge participant engagement in coproduction we use a real effort approach (Brüggen and Strobel 2007). A common criticism of experiments of the type used in this study is that they lack external validity (Bracht and Glass 1968; Schram 2005). For example, whether a manipulation that causes variation in stated intentions to engage in coproduction will cause the same type of variation in terms of the actual effort a citizen is willing to invest in engaging is tenuous.

In real effort experiments participants are assigned tasks that require an investment of resources, such as time or energy (Rosaz and Villeval 2012). The idea is that asking participants to use resources (time or energy) and exert real effort, will offer a closer approximation to real life behavior than evaluating participants' stated intentions.

Based upon the real-effort framework, we evaluate participants' engagement in three types of coproduction initiatives. We use three types of initiatives to mitigate validity concerns that may arise from dealing with only a single coproduction activity. Participants were told that the government was unable to dedicate administrative resources needed to launch the program and that to overcome such constraints help from citizens was needed. The items were aggregated and standardized to facilitate interpretation.

In the first initiative, participants were asked to help the city classify locations for afterschool activities, using a set of GPS coordinates and Google Maps to match locations to corresponding after-school activities in a given city. Participants were provided with GPS coordinates for a location and then asked to enter those coordinates in Google Maps. Based upon what they saw using Google Maps, they were then asked to match the coordinates to the corresponding after-school activity. There were eleven different sets of GPS coordinates and afterschool activities. All of the coordinates provided corresponded to a specific activity. The higher the number of correct answers, the higher the level of coproduction.

In the second initiative, participants were asked to review calculations that form the basis for budgets allocated to different afterschool programs. Participants were provided with calculations and then asked to choose the right response from one of four possible answers. Here, twenty items were used. The higher the number of correct answers, the higher the level of coproduction.

For the third initiative, participants had to figure out the price of necessary afterschool program supplies based on their product numbers. For example, participants would be told to select the price for a math exercise with the product code XYZG4432118 from a list of ten similar product codes. Here, ten items were used. The higher the number of correct answers, the higher the level of coproduction.

4. RESULTS

Hypothesis 1 predicted that those assigned to the negatively framed policy information would have higher levels of policy understanding than those assigned to the positively framed policy information. When examining the entire sample ($n = 836$), we find that on average, those assigned to the positively framed policy information condition ($m = 4.59$, $SD = 2.12$) outperformed their peers assigned to the negatively framed policy information ($m = 4.25$, $SD = 2.01$) condition by .34 correct answers. A univariate ANOVA finds that this difference is significant ($F(1, 834) = 5.59$, $p = 0.018$). Mean values of policy understanding by treatment group can be found in appendix 1.

Table 1. Tests of between-subjects effects (Dependent variable: Policy Understanding)

	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power
<i>Corrected Model</i>	24.002	1	24.002	5.591	.018	.007	5.591	.656
<i>Intercept</i>	16340.127	1	16340.127	3806.029	.000	.820	3806.029	1.000
<i>Information Framing</i>	24.002	1	24.002	5.591	.018	.007	5.591	.656
<i>Error</i>	3580.547	834	4.293					
<i>Total</i>	19989.000	836						
<i>Corrected Total</i>	3604.549	835						

$R^2 = .007$ ($Adjusted\ R^2 = .005$)

Based upon these findings, we reject hypothesis 1. In fact, we uncovered consistent support for the opposite – positively framed information was more effective in stimulating greater policy understanding than negatively framed information. To examine hypotheses 2 and 3, we use the parallel encouragement design. We provide three types of estimates: one where participants are encouraged to take higher values of the mediator, a second where they were encouraged to take lower values of the mediator, and third where participants did not receive an encouragement.

Hypothesis 2 predicts that greater policy understanding will increase citizen engagement in coproduction. For participants who were encouraged to take lower values of the mediator, we find a lack of a significant effect of policy understanding on engagement ($B = .028$, $SD = .06$, $p = .625$). For participants who did not receive an encouragement, we find a significant effect of policy understanding on citizen engagement ($B = .114$, $SD = .05$, $p = .016$). For participants who were encouraged to take higher values of the mediator, policy understanding, we also find a significant

effect of policy understanding on participants' engagement in coproduction ($B = .127$, $SD = .04$, $p = .003$). This pattern of results is illustrated in table 2.

Table 2. Effect of Policy Understanding on Engagement

	Upward Encouragement		Measured Mediator (No Encouragement)		Downward Encouragement	
	Estimate	SE	Estimate	SE	Estimate	SE
<i>Intercept</i>	-0.613*	0.253	-0.388	0.265	0.043	0.267
<i>Policy Understanding</i>	0.127**	0.043	0.114*	0.047	0.028	0.058
<i>Policy Information Frame</i>	0.103	0.184	-0.245	0.201	-0.322	0.208
<i>Adjusted r^2</i>	0.013		0.021		0.002	

* $p < 0.05$, ** $p < 0.01$

These findings offer robust support for a relationship between objective policy understanding and citizen engagement – as levels of policy understanding increased, so too did levels of engagement. Moreover, we see that this effect was strongest in the group that was encouraged to assume the highest values of policy understanding, and weakens considerably as we move to the group encouraged to take lower values of policy understanding.

Hypotheses 3 predicts an indirect effect of policy information framing on participant engagement in coproduction, via the mediator, policy understanding. As before, we provide estimates of indirect and direct effects when values of the moderator are encouraged up, encouraged down, and when the moderator is measured (i.e., not encouraged).

When participants are encouraged to take low values of the moderator (i.e., higher levels of understanding), we find an absence of a significant indirect effect of policy information framing on citizen engagement ($B = -.004$, $p = .86$, $CI95\% -.049, -.026$). However, we do find a marginally significant direct effect of policy information framing on citizen engagement ($B = -.328$, $p = .09$, $95\%CI -.752, .080$). This means that, for the group with the lowest level of policy understanding, exposure to positively framed policy information increased levels of participant engagement, independent of policy understanding.

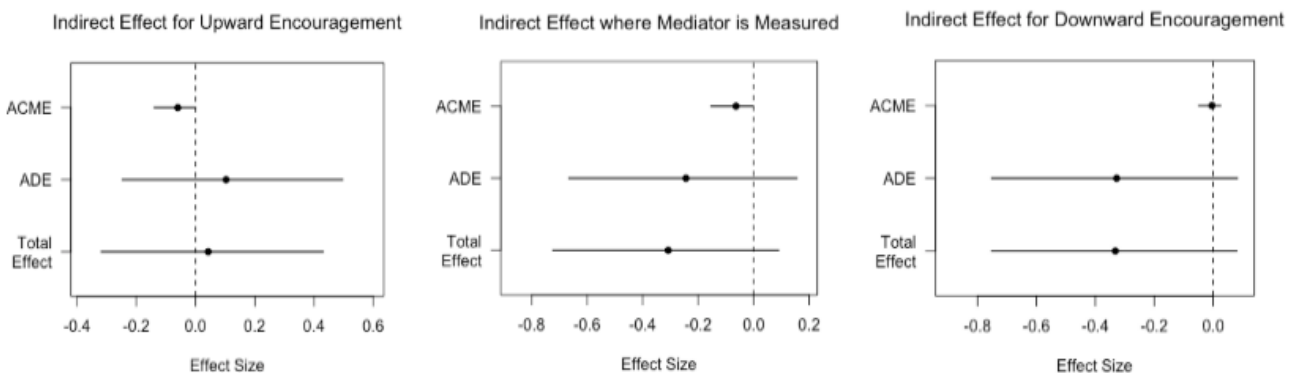


Figure 1. Indirect Effect of Policy Information Framing on Citizen Engagement

When participants did not receive the encouragement, we find a significant indirect effect of policy information framing on citizen engagement, via the mediator, policy understanding ($B = -0.062$, $p = 0.04$, $CI95\% -.159, -.001$). That is, exposure to the positively framed policy information increased levels of policy understanding, which in turn resulted in greater citizen engagement. Here, we do not find any evidence of a significant direct effect of policy information framing citizen engagement ($B = -.250$, $p = .19$, $CI95\% -.635, .121$). Thus, we find no evidence of a significant effect of policy information framing on citizen engagement occurring independent of the mediating variable, policy understanding.

When participants were encouraged to take higher values of the moderator, we find evidence of a significant indirect effect of policy information framing on citizen engagement, via policy understanding ($B = -.061$, $p < .05$, CI95% $-.140$, $-.002$). That is, exposure to positively framed policy information increased policy understanding, which in turn results in greater participant engagement. Here, we do not find evidence of a direct effect of policy information framing on citizen engagement ($B = .095$, $p = .63$, CI95% $-.258$, $.446$). Thus, we find no evidence of policy information framing affecting citizen engagement independent of policy understanding.

By replicating our analysis across different manipulations of our mediator, we offer robust evidence in support of policy understanding as a mechanism responsible for linking policy information to engagement in co-production. Furthermore, by examining the effects across different levels of the mediator, we rule out causal pathways independent of policy understanding. Indeed, as understanding increased, the direct effect of policy information framing on participant engagement disappeared. All told, using this conceptual replication, we offer convergent evidence of policy understanding mediating the relationship between the framing of policy information and participant engagement in coproduction initiatives. Moreover, these results suggest that a single mechanism - policy understanding - is responsible for translating the effect of the treatment, policy information framing, on engagement in coproduction.

5. DISCUSSION

The intention of this study is to refine theory linking transparency to citizen engagement by mapping out processes and conditions responsible for translating transparency policies into citizen engagement. As a step in this direction, we focus on citizen understanding as a central mechanism and information framing as a key condition. We posit that the framing of policy information will hold important downstream consequences for policy understanding, and consequently, citizen engagement.

We address the relationship between transparency and engagement in particular because, despite theories on good governance stressing the importance of transparency contributing to a more informed and subsequently engaged citizenry, to date there is scant empirical evidence in support of this claim (Campos and Evans 2013; Cucciniello, Porumbescu, and Grimmlikhuijsen 2017). Further, with respect to engagement, we focus on citizen engagement in coproduction. This facet of engagement is increasingly relevant given the growing consensus over a need for more flexible service delivery arrangements (REFERENCES). The results of our analyses yield three key contributions.

First, our findings offer insight into ways of strengthening the effect of government transparency on citizen understanding. As we show, participants exposed to the positively framed policy information exhibited higher levels of policy understanding than those exposed to the negatively framed policy information. From this perspective, positive framing of policy information appears to be more effective at engendering an informed public, when compared to negatively framed policy information. This finding is novel because it adds nuance to debates over whether transparency is really able to engender a more informed citizenry in that it shows such an effect is contingent upon way the information is presented. Ostensibly, the small effect on policy understanding alone may lead to a conclusion that, despite being significant, the impact of presentation (or framing) is trivial. However, despite the small difference between positively and negatively framed policy information, it is nevertheless substantive given the important role policy understanding plays in linking policy information to citizen engagement in coproduction.

A second key finding pertains to the relationship between policy understanding and engagement in coproduction. Specifically, through the use of an encouragement, we detect a causal effect of policy understanding on engagement in coproduction. This means that, on average participants who understood the policy better exhibited higher levels of engagement than those who understood the policy worse. While the consequences of an informed citizenry are often the subject of speculation, such speculation is seldom subjected to empirical evaluation. Our findings substantiate arguments

pertaining to the benefits of an informed citizenry by providing causal insight into the role policy understanding plays in stimulating citizen engagement with government, at least within the confines of coproduction initiatives.

Third, our findings contribute to transparency research by explicating the conditions that underlie successful implementation of transparency policies intending to connect citizens to government. We do this by broadening our analysis, such that we do not only assess the effect of transparency on engagement, but also offer insight into the causal processes responsible for the effect. In doing so, we demonstrate that the effects of transparency hinge upon citizens' ability to understand the information they are exposed to and that this effect, in turn depends upon the way information is presented. Moreover, we also uncover little evidence of alternative pathways through which transparency effects engagement. All told, the transformative capacity of transparency traces back to identifying methods of making government information better understood. By offering insight into when (conditions) and why (mechanism) transparency fosters citizen engagement, our findings contribute to refining our theoretical understanding of the effects of transparency.

Before discussing the implications of this study, it is helpful to review some limitations that lay a foundation for future research. A first limitation of this study pertains to external validity. Specifically, the mechanisms we focus on address coproduction in a narrow policy domain – education. However, studies suggest that citizens' responses to policy information will vary by domain (Tetlock 2003; De Fine Licht 2014; Porumbescu et al. 2017). As such, future research is needed to determine the extent to which the mechanism identified in this study will translate into other policy domains. Second, we use one specific manipulation of transparency – policy information framing – and this rendered a significant effect on the mediator, policy understanding. Given our manipulation, a concern is whether we can expect to generate similar findings using alternative manipulations of transparency. To this end, future research using alternative methods of manipulating transparency is needed. Finally, this study also focuses on the role of policy transparency as a means of soliciting citizen engagement. This means the effects stem from a specific type of content. To better understand the contours of the relationship between transparency, citizen understanding and citizen engagement, additional research investigating the effects of different forms of transparency is also needed.

6. IMPLICATIONS AND CONCLUSION

The limitations of this study notwithstanding, important implications for research and theory are identified. A first key implication is that implementation of transparency enhancing initiatives must pay more attention to the way government conveys information to the public. While freedom of information legislation establishes basic guidelines for ensuring public *access* to certain types of content, our findings indicate that the question of how to present this content plays an important role in determining the *impact* of this information. Given the lack of guidelines, how content will be presented is, in large part, at the discretion of public officials. Yet, as the number of platforms that can be used to increase transparency, our findings point to need for public administration scholars to pay more attention to the role of presentation as it relates to the implementation transparency enhancing initiatives. More broadly, the overarching implication is that attempts to theorize the effects of transparency must move beyond focusing on content alone, especially in light of the plethora of diverse tools governments are now using to push information into the public sphere.

A second key implication relates to the way we conceptualize the effects of transparency on citizens. Specifically, attempts to develop theories that explain the effects of transparency must view transparency as part of a process. With respect to citizens, this is because the value transparency creates comes not solely from the outcomes it produces but the way these outcomes are produced. Namely, the outcomes of transparency, however defined, are valuable because they are believed to stem from a base of knowledge and understanding. In this sense, evaluating the effects of transparency without directly accounting for the role of understanding, can bias the

development of theory linking transparency to good governance for the reason that much of what we know to be good governance traces back to the presence of an informed citizenry.

While extant theory positions transparency as a critical feature of effective democratic governance, it provides little insight into how to leverage transparency to effectuate a more engaged citizenry. As Kosack and Fung (2014:66) note, this is of concern in that, these “ambiguities temper the enthusiasm for the potential of transparency to improve governance and hamper wider adoption of transparency as a tool by the broader governance reform community.” Our findings help to refine theory that ties transparency to good governance by offering robust empirical insight into the conditions that underlie the effectiveness of transparency as a tool for fostering greater citizen engagement. Namely, if transparency is to enhance engagement, governments must identify methods of presentation that are conducive to understanding.

If we do not account for the role of understanding (and potentially other mechanisms) in linking transparency to different facets of good governance, then our understanding of this relationship remains arbitrary.

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Appendix 1: Sample Characteristics

	Negative Information X Upward Encouragement (n = 153)	Negative Information X No Encouragement (n = 150)	Negative Information X Downward Encouragement (n = 114)	Positive Information X Upward Encouragement (n = 140)	Positive Information X No Encouragement (n = 140)	Positive Information X Downward Encouragement (n = 139)
Gender%						
Female	62.1	56.4	50	59	64.7	50
Age %						
18-24	15.7	10.7	8.8	4.3	12	10
25-34	14.4	13.6	16.7	18.7	20	27.1
35-44	17.6	15.7	14.9	20.9	19.3	17.9
45-54	25.5	17.1	28.1	12.2	15.3	14.3
55-64	17	19.3	18.4	21.6	19.3	16.4
65-74	9.2	19.3	10.5	17.3	12	12.9
75+	0.7	4.5	2.7	5	2	1.4
Income %						
> \$15,000	17	10.7	12.3	11.5	12	13.6
\$15,000 - 29,999	11.1	18.6	16.7	18	17.3	13.6
\$30,000 - 49,999	20.3	27.9	14	20.9	20.7	19.3
\$50,000 to 74,999	19	12.9	14.9	22.3	16.7	17.9
\$75,000 to 99,999	8.5	13.6	7	3.6	16	7.9
\$100,000+	24.2	16.4	35.1	23.7	17.3	27.9
Political Affiliation %						
Republican	23.5	30.7	27.2	32.4	26	31.4
Democrat	37.3	30.7	39.5	41	38	37.1
Independent	30.7	32.9	23.7	19.4	30.7	27.1
Other	8.5	5.7	9.6	7.2	5.3	4.3
Education %						
High School or less	22.2	20.7	19.3	21.6	23.3	25
Some college	28.1	31.4	25.4	26.6	27.3	25.7
Associates degree	9.2	12.1	9.6	8.6	14.7	5.7
Bachelor's degree	23.5	20.7	29.8	31.7	21.3	29.3
Graduate degree	17	15	15.8	11.5	13.3	14.3
Mediating and outcome variables (Mean Values)						
Policy understanding	4.63 (SD =2.07)	4.26 (SD = 2.18)	3.77 (SD = 1.59)	5.05 (SD = 2.21)	4.81 (SD = 2.07)	3.91 (SD = 1.94)
Engagement (standardized)	.051	-.08	-.157	.017	.097	.040

Appendix 2: Materials

Negatively Framed Information

A joint analysis done by the City Finance Committee and Plain Valley School Board indicates that if not enough citizens sign up, the following is likely to result:

1. School day attendance, parent satisfaction with the Plain Valley School District and trust in government will be lower than they would otherwise be.
2. Reading test scores will be 12.2 points lower, math test scores will be 23.1 points lower, and science test scores will be 2.3 points lower.
3. City officials, in consultation with 32 local business leaders, anticipate that there will be 230 fewer new jobs, which would otherwise result from indirectly rejuvenating the local economy by attracting new businesses to the community.
4. Taxes for citizens will be higher because the failure of this initiative will preclude after-school program savings, which City officials in the finance department anticipate would otherwise allow the city to lower taxes for citizens after the first 2.5 years of operations.
5. Drug-related crimes will be 35 percentage points more because the failure of this initiative will preclude the reduction in this type of crimes that City officials expect as a result of the improved mentoring students would receive through to the after-school program.
6. The city has 53,549 school-aged children. Of these children, 27.4% are elementary school age, 38.8% are middle school age, and 33.8% are high school age. None of these children are expected to benefit from this policy without sufficient support from citizens.

Positively Framed Information

A joint analysis done by the City Finance Committee and Plain Valley School Board indicates that if enough citizens sign up, the following is likely to result:

1. School day attendance, parent satisfaction with the Plain Valley School District and trust in government will be higher than they would otherwise be.
2. Reading test scores will be 12.2 points higher, math test scores will be 23.1 points higher, and science test scores will be 2.3 points higher.
3. City officials, in consultation with 32 local business leaders, anticipate that there will be 230 new jobs, which will result from indirectly rejuvenating the local economy by attracting new businesses to the community.
4. Taxes for citizens will be lower because City officials in the finance department anticipate that after-school program savings will allow the City to lower taxes for citizens after the first 2.5 years of operations.
5. Drug-related crimes will be 35 percentage points less because the success of this initiative will cause a reduction in this type of crimes that City officials expect as a result of the improved mentoring students would receive through to the after-school program.
6. The city has 53,549 school-aged children. Of these children, 27.4% are elementary school age, 38.8% are middle school age, and 33.8% are high school age. All of these children are expected to benefit from this policy with sufficient support from citizens

Example of Item asking participants to enter GPS coordinates

Q45 At present, there are a total of 11 possible locations the city can allocate to the program. The city is asking citizens to help match available spaces to 7 of the different after-school programs it intends to offer. The coordinates of the 11 locations the city offers are provided below. Please cut and paste the coordinates we provide into google maps (<https://www.google.com/maps>) and match each of the locations to an appropriate activity. You may need to zoom in or zoom out. In some cases, coordinates are not precise. If coordinates are near a space that you believe is suitable for one of the seven afterschool programs, please match that coordinate to the appropriate activity.

If coordinates provided do not correspond to an activity please select 'none.'

Soccer (1)	Chess (2)	Gardening (3)	Tennis (4)	Rowing (5)	Theater (6)	Math (7)	Football (8)	None (9)
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42.287396,
-
83.772533
(Q45_1)

Example of Item asking participants to review budget calculations

Q46 The city is asking citizens to help reviewing the program budget to avoid any budget errors. Please tick CORRECT or INCORRECT for each of the budget items below. Please get hold of a calculator to perform this task.

		.
	CORRECT (1)	INCORRECT (2)
\$ 2,978 x 7,967 = \$ 23,725,726 (Q46_1)		

Example of Item asking participants for help in identifying afterschool supplies

B. After school program

1. Exercise book

Model	Price
XYZG4432119	\$12.91
XYZG4442119	\$13.11
XYZV4433119	\$12.22
XYZG4432139	\$12.21
XYXV4432219	\$13.71
XYZG4432118	\$13.91
XYZG4532119	\$13.22
XYZG3432119	\$13.33
XXZG4432119	\$13.18
XYZW4437119	\$12.98

Q48 Please select the price of the exercise book Model XYZG4432118:

\$12.22 (1)

\$12.21 (2)

\$13.71 (3)

\$13.91 (4)

\$13.22 (5)

Appendix 3: Alternative Model Specifications

In addition to the potential outcomes framework, the product of coefficients method can also be used to estimate indirect effects (see Hayes 2009). Below we provide the results of a moderated mediation analysis to demonstrate how the indirect effects vary according to the level of encouragement participants were randomly assigned to. Results do not differ substantively – the general pattern of effects holds and there was no significant direct effect ($B = -0.09$, $SE = .069$, $p = 0.203$).

	Indirect Effect	SE	95% CI Lower	95% CI Upper
Upper Encouragement	-0.032	0.015	-0.069	-0.008
No Encouragement	-0.024	0.011	-0.049	-0.007
Downward Encouragement	-0.016	0.012	-0.069	0.004

Number of bootstrap samples for bias corrected bootstrap confidence intervals: 5,000.