CORRUPTION AND VIOLATIONS OF CONSERVATION RULES:

A survey experiment with resource users

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ABSTRACT

Small-scale corruption in government administrations that govern natural resources is believed to have a negative impact on conservation management. Yet, while corruption is said to obstruct the implementation of conservation policies, for instance as bribery may enable poaching in protected reserves, it is an underexplored area of research. This study investigates the effect of corruption, others' compliance behavior, and support for regulations on rule-violating intentions. In a between-subjects experiment, a sample of resource users active in South African small-scale fisheries (N = 201) answered questions about rule-violating intentions after reading one of four scenarios, each depicting a different situation of corruption among officials that enforce regulations and compliance behavior of other resource users. The results show that resource users are more likely to state rule-violating intentions when corruption among inspectors is widespread. Moreover, there is an interaction effect with support for conservation regulations, suggesting that the effect of corruption is stronger among individuals who do not support such rules. These findings lend further support for the proposition that to improve the effectiveness of conservation policy, more effort is needed to reduce bribery among government officials, such as rangers and inspectors that enforce natural resource regulations.

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Introduction

A necessary condition for sustainable management of natural resources is not only that there are some institutionalized rules of usage and access, but also that these rules are adhered to by users (Ostrom 1999). Current research therefore holds that noncompliance to regulations, such as poaching, constitutes a severe obstacle for efficient conservation (Dietz et al. 2003). If efficiently managed, protected areas may be a successful conservation strategy (Nolte et al. 2013). However, the problem facing many protected reserves (terrestrial as well as marine) is that their supervision is far from ideal. There is a general suspicion that reserves in low-income countries are often only "paper parks", protected only on paper (see Edgar et al. 2014; Halpern 2014). Especially, the role of corruption—the misuse of public power for private gain in government authorities—has been said to be a factor contributing to the weak management of such conservation efforts (e.g., Robbins 2000). However, more research is needed on the relationship between corruption in authorities enforcing conservation regulations and the extent to which these rules are adhered to. Smith and colleagues (2015) recently noted that current research on natural resource management may need to shift its focus: "The impact of corruption on conservation outcomes is often ignored" (p. 953).

Research suggests that perceptions of corruption among citizens negatively affect their intent to follow rules (Levi et al. 2009; Sundström 2012). Yet, there are some knowledge gaps with regards to this process. Since such perceptions may in fact be a cue for opinions of how other people follow or violate rules (Tyran and Feld 2006), this effect may be a proxy for the tendency to avoid free-riding rather than a direct effect in itself. Thus, it is not clear if there is an independent effect from corruption perceptions on rule-violating intentions. Moreover, studies have not investigated if the effect from corruption is stronger among certain individuals. Specifically, since the literature suggests that attitudes to the regulations that govern a certain resource are one important factor that determines intentions to follow or break rules (e.g., Jagers et al. 2012), it is reasonable to

assume that users who are less supportive of regulations are also more affected by corruption perceptions.

The purpose of this article is, first, to examine if there is a direct effect from corruption on rule-violating intentions, independent of others' compliance behavior and, secondly, to investigate if this effect is moderated by an individual's support for regulations. To meet this aim, this study empirically explores the effect of corruption, others' compliance behavior and support for regulations on rule-violating intentions. In a between-subjects experiment, a sample of resource users active in South African small-scale fisheries (N = 201) answered questions about intentions to violate rules after reading one of four scenarios, each depicting a different situation of corruption among public inspectors and compliance behavior of other resource users.

This article proceeds as follows: The next section deals with theory and previous empirical findings. Section three describes methods and data. The fourth section then reports the results. The final section concludes by discussing these findings in relation to the existing literature and suggests avenues for future research.

Corruption and rule violations: Theoretical expectations and empirical findings

This article focuses on small-scale corruption, sometimes termed bureaucratic or petty corruption. In a context of natural resource management, such actions may occur when a resource user gives a bribe to an enforcement agent in order to violate existing conservation rules without sanctions. Rule violations are here used interchangeably with the term noncompliance. As stated by Arias (2015), compliance to conservation rules is a concept that may be viewed as a dichotomy, yet in practice the term refers to "the degree of adherence to rules, as when a person breaks some rules but not all, or respect most of the rules but not always" (p. 134). Following the literature, an assumption is that violations of formalized conservation rules are important to study because re-

sources are more likely to be managed sustainably if a majority of resource users abide by usage and access regulations (Platteau 2008).

Research identifies that corruption affects outcomes in natural resource management and conservation in two direct as well as two indirect ways: First, it may influence policymakers to refrain from enacting stricter legislation, for instance, to regulate pollution or the harvesting of a certain resource (Fredriksson et al. 2004). Second, it could decrease the effectiveness of existing legislation during their phase of implementation, as bribery may hamper law enforcement (Smith and Walpole 2007). The first indirect (and positive) effect pertains to the suppressing effect from corruption on economic development that, in turn, may create an overall lower pressure on environmental resources in a society (Damania et al. 2003). The second indirect effect is the possibility of political business cycles in which decision-makers, seeking political support, may send signals to bureaucratic actors to let rule violations go unsanctioned during electoral times (Min and Golden 2014).

Numerous empirical studies have focused on the aggregate relationship between national levels of corruption and different indicators of natural resource management and environmental goods—generally showing that corruption negatively affects ecological outcomes but also presenting some conflicting patterns that mainly relate to how sustainability is measured (see Halkos et al. (2015) for a recent overview of the empirical findings in this cross-sectional literature). Notably, Barrett and colleagues (2006) highlight that these studies are generally limited by the fact that they hardly can capture the complexity of this relationship using nation-level indicators. Contrasting to that macro-oriented literature, the present study examines this relationship on the micro-level and does so by specifically focusing on the impact from corruption on the abidance to conservations rules during their implementation.

A handful of studies illustrate empirically how the impact from corruption on conservation management may take shape within different localities in regions as disparate as Africa, Asia,

and Latin America; collusion with agents in forestry departments enable certain resource users to benefit from logging activities while others are excluded from such practices (Robbins 2000; Miller 2011); bribes to customs officers to circumvent trade bans on endangered species and thus enable smuggling of animals and plants across national borders (Smith et al. 2003; Wyatt 2013); illegal payments to government fisheries inspectors enable fishermen from distant coastal localities to encroach on resource regimes they are not allowed to access and to overharvest such local marine resources (Young 2001); the hiring of "ghost employees" to protect terrestrial reserves and pocket this money instead of employing actual rangers (Cavanaugh 2012); the lax enforcement of conservation rules by such government inspectors (Smith and Walpole 2007); the providing of loggers with "legal" contracts (Gore et al. 2013); and the actual involvement of corrupt public inspectors in poaching activities (Sundström 2015). Such actions obviously have severe consequences for natural resource management on the aggregate. Yet, there are knowledge gaps in this body of research. Importantly, it was recently noted that "the connections between corruption and conservation remain an under-researched aspect of conservation scholarship" (Hanson and McNair 2014, p. 313).

With the specific focus on the relationship between small-scale corruption and violations of rules, this study follows the tradition of a large literature that studies the factors contributing to why people obey the law (Levi 1997; Tyler 2006). Writings on compliance often stress factors of rationality—that rule obedience is a calculus of the expected gain from breaking such rules in relation to the costs and probability of getting caught and facing sanctions (e.g., Becker 1968). According to this view "an individual commits a crime if the expected utility from committing the crime exceeds the utility from engaging in legitimate activity" (Kuperan and Sutinen 1998, pp. 310–311). Other veins of research on compliance stress that abidance to rules is a matter of factors related to morality, trust towards other agents, and the expectations of how other people act (see Scholz 1998; Murphy 2004; Hatcher and Gordon 2005).

Researchers focusing on such features of trust heuristics and the expectation of other agents see compliance intentions affected by expectations about both horizontal and vertical relationships: The horizontal aspect denotes the relationship between citizens, and the vertical aspect conveys the relationship between citizens and agents in state authorities (see Sjöstedt 2014). Regarding the relationship between citizens, a common understanding founded in research on reciprocity is that people evaluate others' behavior in their assessment on whether or not to comply with rules (Torgler 2007). Here, perceptions of freeriding are crucial, as most people likely do not want to be the only "sucker" in the group following (costly) rules (Tyran and Feld 2006, p. 137). In line with this reasoning,. Similarly, another widely held understanding in the literature is that, pertaining to the vertical relationship between citizens and government agents, trust and trustworthiness matter: "The more trustworthy citizens perceive governments to be, the more likely they are to comply with or even consent to its demands and regulations" (Levi and Stoker 2000, p. 491). Here, the role of corruption comes into play, since bribery is believed to have a negative impact on such perceptions (Rothstein 2011). Researchers therefore suggest that compliance intentions are shaped by perceptions of corruption in state authorities (Levi et al. 2009). These authors conclude that "corruption undermines citizens' willingness to comply with the law" (p. 359). The suggested negative impact from corruption on rule abidance is also supported by studies taking a more rationalist view on human behavior: Such scholars identify that corruption will lower citizens' tendencies to follow rules, since the bribe will often be less costly than facing sanctions from noncompliance, such as fines: "Bribery dilutes deterrence because it results in a lower payment by an offender than the sanction for the offense" (Polinsky and Shavell 2000, p. 2). One of the few studies that has examined this question empirically confirms that corruption perceptions have a negative impact on compliance intentions (Sundström 2012).

To summarize, the literature seems to lend support for the reasoning that corruption has an undesirable effect on a citizen's willingness to follow rules. Yet, there are some notable gaps in

our knowledge: In this literature it is not clear how the two factors—the possibly corrupt behavior of inspectors and the possibly rule–violating behavior of other people—relate to each other when individuals make decisions over whether to violate rules. For instance, it is possible that perceptions of corruption are in fact only a proxy for a perception of others' compliance behavior since widespread bribery could mean that other people cheat the rules on a general basis. Previous studies have not examined if there is an independent effect from corruption among public inspectors if one takes into account the rule-violating actions of other resource users. I therefore pose the following hypothesis:

H1: Corruption among public inspectors has a direct encouraging effect on rule-violating intentions, also taking into account whether or not other resource users follow the rules.

Moreover, research is in need of disentangling this relationship. Here I draw on writings that suggest that compliance behavior among resource users is determined by whether or not one believes that the existing rules are legitimate and founded on notions of fairness (see Jentoft 2000; Gezelius 2004). With regards to marine natural resource regulations, studies have also shown that an important factor for support of regulations is the extent to which they are perceived as being founded on a scientifically accurate assessment of fish stocks (Jagers et al. 2012). These authors state that "regulatory measures must be meaningful to fishers, and they must be experienced as fair ... Legitimacy also sits in the eyes of the fishers, the ones who have to live with regulations and who, at the end of the day, can determine and control how effective they actually are" (p. 975). Given the supposed importance of support for regulations, it is likely that the negative effect from corruption on willingness to follow regulations will not affect all individuals in the same way but rather be moderated by support for existing regulations. This reasoning lends me to pose the following hypothesis:

H2: The effect of corruption among public inspectors on rule-violating intentions is moderated by a resource user's support for existing regulations and therefore the effect of corruption is stronger among individuals with a lower support for the rules.

The purpose of this article is to examine these theoretical predictions empirically. The next section describes the context in which this study is performed and outlines the details of this investigation.

Methods and data

Context

The study focuses on the case of marine fisheries regulations in South Africa as a context where participants can relate to the presence of corruption as well as the costs of abiding by regulations that limit their potential income. The formal regulations governing these fisheries, contained in the South African Marine Living Resources Act, outline which actions are illegal, such as fishing in protected reserves or using certain equipment (Republic of South Africa 1998). The responsible authority for enforcing such regulations is the Department of Agriculture, Forestry and Fisheries. This authority employs public inspectors to monitor the compliance behavior of actors in the small-scale fisheries sector through land-based operations.

This sector has a history of both bribery and rule violations among its actors. Fishermen are known to pay bribes (monetary and nonmonetary) to inspectors from this authority to avoid sanctions for noncompliance (see Hauck and Kroese 2006; Hauck 2008; Hauck and Fernández-Gallardo 2013; Sundström 2013).[1] Moreover, support for the regulations is perceived as low among

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[1] For a discussion on how the marine regulations and their implementation in South Africa differ from neighboring states in the region, see Sjöstedt and Sundström 2013; Sjöstedt and Sundström 2014.

fishermen, and rule violations in this sector are widespread (e.g., Raemaekers and Britz 2009; Pramod 2011).

Participants, design, and material

The sample consisted of 201 small-scale fishermen that were approached on landing sites and harbors along the south and west coasts of South Africa by a survey team trained by the author during May and June 2014. These individuals were most often sampled when preparing their nets or equipment before entering the water, as to ensure that they had sufficient time to complete the questionnaire. They were promised anonymity and participation was voluntary with no paid compensation. After the survey was completed all participants were debriefed. For a description of the sample characteristics, see Appendix 1.

An experimental design gauged the impact from corruption on compliance perceptions. Since this approach permits the isolation of certain factors, the experimental approach has benefits that are absent in an observational study. As pinpointed by Ostrom, "experiments thus allow one to test precisely whether individuals behave within a variety of institutional settings as predicted by theory" (1998, p. 5). With the terminology outlined by Harrison and List (2004), the design utilized the strength of having a nonstandard subject pool. In situating this attempt in the broader literature, the study therefore joins prior attempts to include resource users as experimental participants (see Cardenas and Ostrom 2004; Cardenas and Carpenter 2008; Gelcich et al. 2013). The advantage with such an approach is that the external validity is potentially higher than if a similar study is conducted with a standard subject pool, for example, college students in a university laboratory.

Each participant filled out a questionnaire indicating socioeconomic characteristics and attitudes to regulations of the fisheries sector. An index measuring support for regulations was created from five items: if violations risk the reputation of fishermen, if regulations promote sustainability, if rules are founded on correct stock estimates, if regulations are fair and just, and if

breaking rules is considered a disloyal action toward fellow fishermen (Cronbach's alpha = .93), measured on a 1–7 rating scale (ranging from "strongly agree" to "disagree strongly").

The experiment had a 2 (Corruption description: inspectors often take bribes to be blind to rule violations vs. seldom take bribes) X 2 (Compliance description: other people often violate rules vs. seldom violate rules) between-subjects design. The dependent variable was rule-violating intentions. The participants were randomly assigned one of four questionnaires, outlining one scenario in which the two factors were manipulated. The first scenario stated, "Imagine the following situation: If you are caught for violating fisheries regulations there is a high probability that you can pay an inspector a gift or a small amount of money in order for any criminal charges or fines to disappear. Also, you should consider that among your fellow fishermen it is very common that they are noncompliant." In the second scenario, a similar text was posed, yet described a situation where there is a high probability that inspectors may take bribes to let violations go unnoticed, but other fishermen are described as rarely violating rules. The third scenario described that there is a low probability that inspectors may take bribes to let violations go unnoticed and other fishermen as often violating rules. Finally, in the fourth scenario there was a low probability that inspectors take bribes to let violations go unnoticed and other fishermen are described as rarely violating rules. For a visualization of the four different versions of the questionnaire, see Figure 1. A number of controls were performed to test if these groups differ in terms of socioeconomic characteristics. Appendix 2 shows that there are no significant differences in the distribution of a number of observable factors over the treated groups, thus indicating that the treatments were given at random.

FIGURE 1, FOUR VERSIONS OF THE QUESTIONNAIRE: A VISUALIZATION OF THE EXPERIMENTAL DESIGN

		Corruption	
		Common	Uncommon
Rule violations — Common		**Group 1** Corruption is common Rule violations are common	**Group 3** Corruption is uncommon Rule violations are common
Rule violations — Uncommon		**Group 2** Corruption is common Rule violations are uncommon	**Group 4** Corruption is uncommon Rule violations are uncommon

After reading the scenario, the participants answered questions that assessed their rule-violating intentions. An aggregate index was created using three items regarding rule-violating intentions, measured on a 1–7 rating scale: How willing one is, in general, to follow the regulations of this sector (ranging from "very willing" to "not at all willing"), how many times in the coming month one would follow regulations (ranging from "on all of the occasions" to "on none of the occasions"), and to what extent would one consider violations of rules in this sector (ranging from "do not consider violations at all" to "consider violations very frequently"). The components of this index correlate highly (Cronbach's alpha = .82).

The ensuing analysis also includes a number of control variables that earlier studies pinpointed as important. First, it is reasonable to assume that fishermen that have been active for a long time in this sector may differ from fishermen that recently got access to this resource, as such actors may not be as dependent on this income (Eggert and Lokina 2010). A variable measuring the *years of fishing experience* (ranging from zero and up) was therefore created. Another variable that may be of interest is the income of a fisherman, since this may be crucial for understanding the extent to

which an individual needs revenue. Here, the relative standing of individuals in the community was thought to especially matter (Velez et al. 2012). An item gauging *income relative to other fishermen* was created from the question, "What statement best describes your income level in relation to other fishers in your community" (five response categories range from "lower than most fishers" to "better off than most fishers"). It is analyzed as a dummy variable with "lower than most fishers" serving as the reference category. Finally, an individual's prosocial or *altruist value orientation* has been pinpointed in research to predict cooperative behavior in terms of resource usage, for instance, if an individual tends to abide to rules (Ostrom et al. 1999). To gauge the concept of altruist tendencies within the range of social value orientation—defined as "one's stable preferences for distributions of important resources between others and oneself" (Van Lange 1999, p. 337)—the survey utilized a method developed and established in the field of psychology (for a review, see Rusbult and Van Lange 2003). The procedure included a set of choices following one introductory question. The aim of these items is to divide respondents (based on their responses) into one of three categories: Altruist (or Prosocial), Egoist, or Competitor. The participant chose among three hypothetical self-other distribution options. Nine versions of such choices outline if the individual preferred a situation where "you" get *x* of a resource whereas "other" gets *y,* which may be smaller or equal to *x*. The altruist response is the one where the participant maximized the combined payoff for other and self. Following this literature, "altruist social orientation" is the dichotomous coding for individuals (denoted by 1 in the data) who chose six or more prosocial outcomes in these nine distributive scenarios (see Van Lange 1999; Fetzer Institute 2014).

Results

Across the four different groups, the participants that received the corruption stimuli (groups 1 and 2) have a considerably higher mean value of rule-violating intentions than participants that did not receive this treatment. Table 1 shows numerically how the mean values in such intentions differ

across the four groups, and Figure 2 illustrates these patterns through boxplots. Group 1, the participants that received both the corruption stimuli and the compliance stimuli, has the overall largest average mean value of rule-violating intentions. However, the impact of the compliance stimuli is apparently moderate to nonexistent since Groups 3 and Group 4 almost has the same mean values in this regard. To examine if there is an interaction between the two factors of corruption and compliance we turn to a framework of a two-way ANOVA.

TABLE 1, THE AVERAGE WILLINGNESS TO VIOLATE RULES AMONG THE DIFFERENT GROUPS

	Group 1 Inspectors are corrupt, other fishermen often violate rules	Group 2 Inspectors are corrupt, other fishermen seldom violate rules	Group 3 Inspectors are not corrupt, other fishermen often violate rules	Group 4 Inspectors are not corrupt, other fishermen seldom violate rules
Mean	3.43	3.32	2.31	2.29
SD	1.44	1.35	0.79	0.60

Comment: The variable "rule-violating intentions" is an aggregate index that runs from 1 (low intentions to violate rules) to 7 (high intentions to violate rules).

FIGURE 2, RULE-VIOLATING INTENTIONS IN THE FOUR DIFFERENT GROUPS

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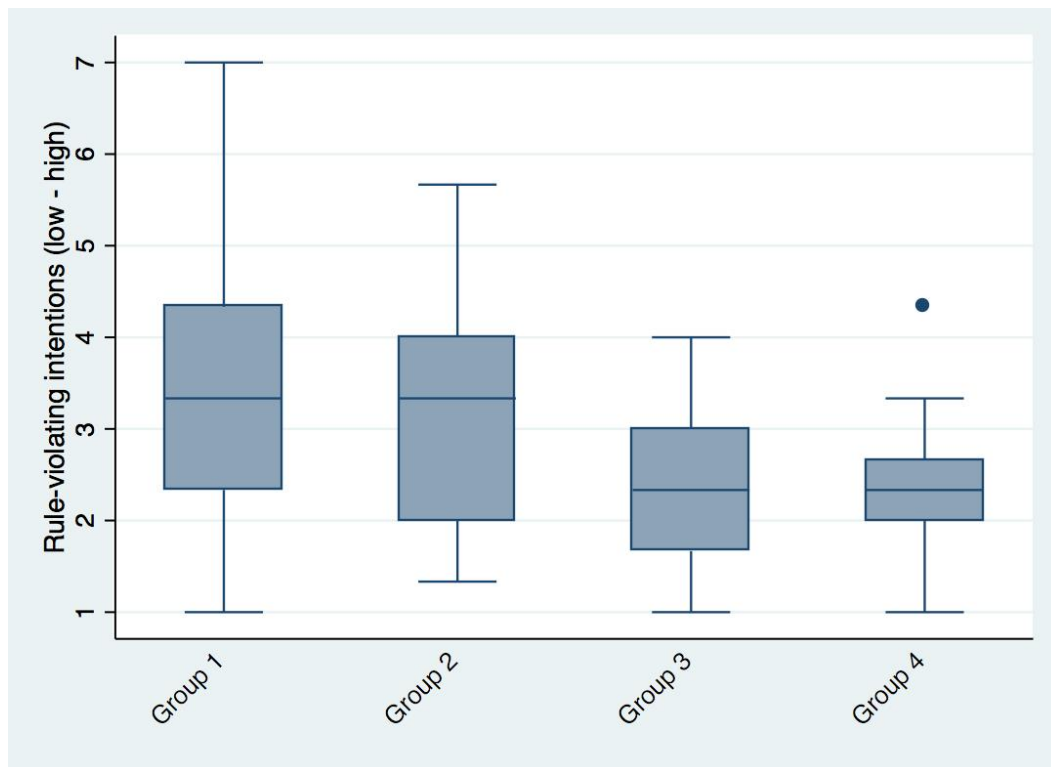
We proceed to run a two-way ANOVA on the sample of 201 participants to investigate the effect of perceived government corruption and other citizens' compliance on rule-violating intentions. There are simple main effects from the corruption stimuli, $F(1, 197) = 47.83$, $p = .000$, $\eta^2 = .20$. However, there is no significant interaction between the effects of the two treatments on rule-violating intentions, $F(1, 197) = 0.16$, $p = .686$. Moreover, there are no differences in main effects from the compliance stimuli ($p = .746$). We then examine if there are interactions between the corruption stimuli and support for regulations by using an OLS regression framework.

As can be seen in Table 2, the first model using OLS regression confirms the trends of the two-way ANOVA: The corruption treatment has an independent effect that is statistically significant ($p = .000$). The size of the coefficient implies that rule-violating intentions are roughly one point greater among participants that received the corruption treatment than those that received the no corruption scenario. When the index of rule support is introduced in the second model the measure of corruption is still significant, albeit with a smaller coefficient. The variable *rule support* in Model 2 is significant and implies that a one-point increase on this scale, that is, toward less support of regulations, would render an average effect of an almost 0.5 point increase on the scale of rule-violating intentions. Model 3 includes an interaction term between rule support and the corruption stimuli, which is statistically significant. When this variable is included, the explanatory power of the model, expressed by the adjusted R-squared, increases (comparing the R-squareds in Models 2 and 3)—implying that the model with an interaction term explains a larger share of the variation among an individual's rule-violating intentions.

TABLE 2, THE DETERMINANTS OF RULE-VIOLATING INTENTIONS. OLS REGRESSION (*B*-VALUES)

	Model 1	Model 2	Model 3	Model 4
Corruption treatment	1.08*	0.58*	-0.59	-0.69
	(0.16)	(0.14)	(0.36)	(0.36)
Compliance treatment	0.05	0.16	0.14	0.08
	(0.16)	(0.12)	(0.12)	(0.12)
Rule support (index)		0.48*	0.14	0.07
		(0.05)	(0.11)	(0.10)
Corruption*Rule support			0.42*	0.45*
			(0.12)	(0.12)
Altruist social orientation				Yes
Years of fishing experience				Yes
Income relative to other fishermen				Yes
Constant	2.28*	0.98*	1.88*	2.41*
	(0.13)	(0.17)	(0.33)	(0.34)
N	201	201	201	201
Adj. R-squared	.20	.46	.50	.55

*Comment: * p < .001. Standard errors are reported in parentheses. None of the variables included as controls (indicated as a "yes") are significant. The variable of relative income is a set of four dummy variables with one excluded category as the reference.*

The interaction effect between corruption and rule support remains statistically significant also in the fourth model, when socioeconomic and attitudinal control variables are included. Thus, the interaction term illustrates how the effect of the corruption stimuli changes, dependent on a one-step increase in the variable rule support. Its positive direction indicates that the less an individual tends to support rules, the stronger the effect is from the corruption variable. In the fourth model the interaction effect has the coefficient of 0.45. In this model the coefficient from corruption, -0.69, should be interpreted as being the effect when rule support is set as zero and it is predicted to increase by 0.45 for each increase of one point in rule support. To further interpret the coefficient from this interaction term we analyze the conditional marginal effects. These effects, illustrated in Figure 3, show at what levels of rule support this impact is significant. The figure predicts the effect of corruption at different values of rule support and the related confidence intervals. This effect is significant at the 95% level for values of rule support over about 2.5. Hence, the impact of the corruption treatment is the strongest among individuals with the lowest support for rules.

FIGURE 3, MARGINAL EFFECTS OF CORRUPTION AND RULE SUPPORT, BASED ON MODEL 5 IN TABLE 2
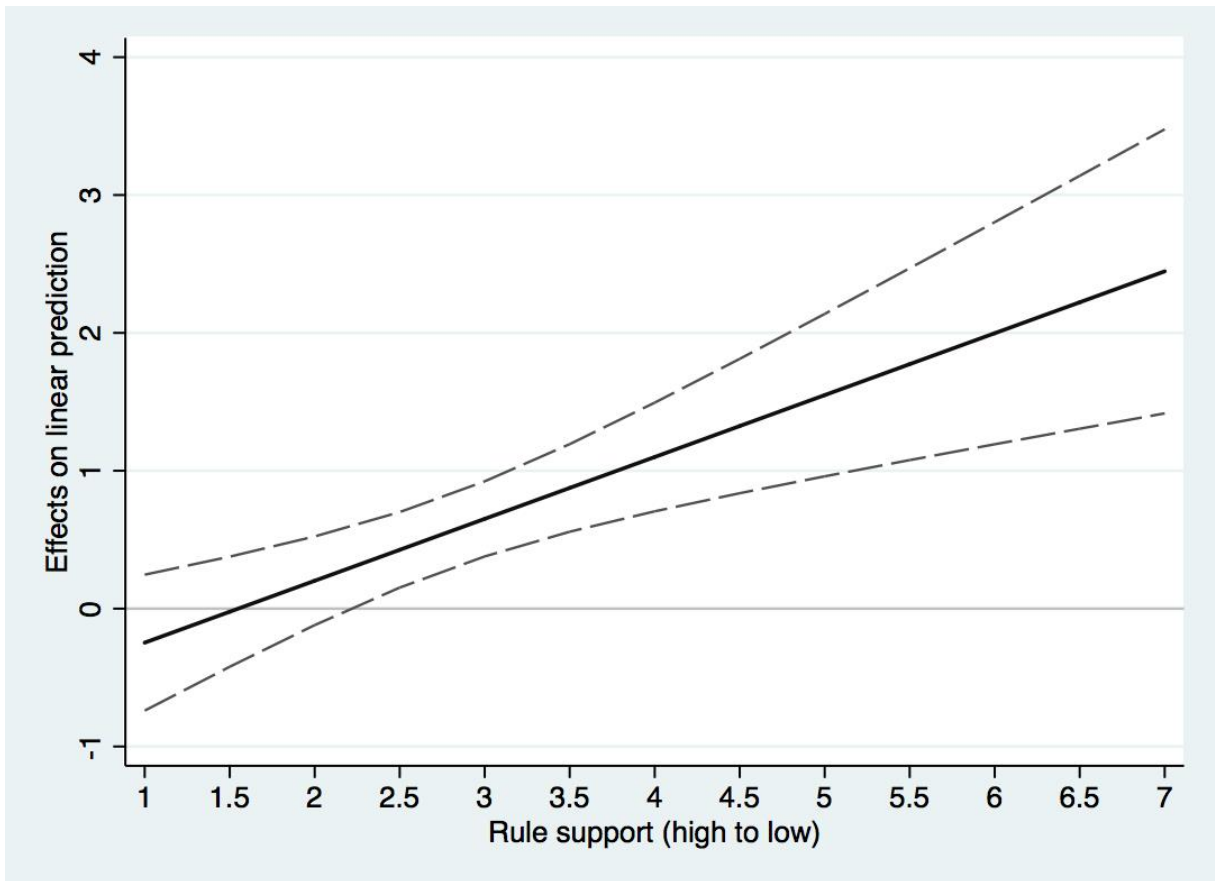
It should be noted we made sure to investigate if there is multicollinearity in the model above. Collinearity diagnostics indicate that the variables are not problematic in terms of tolerance and that Variance Inflation Factors are within secure boundaries. Moreover, we also found that the full model is robust for a number of alternative specifications, for instance, if one let another category of social value orientation (i.e., egoist or competitive tendencies) be denoted as 1 and the others as 0. Moreover, several models were explored that included interaction terms between the compliance treatment and the corruption treatment, an interaction term with rule support and compliance and, finally, a three-way interaction effect between these two treatments and rule support. Importantly,

in none of these models is the compliance treatment, or interaction terms that include this variable, significant. Thus, contrary to expectations in the literature, no effect from other resource users' compliance behavior was found in the analysis. One possibility is that the theoretical predictions in this regard simply do not have empirical support in this context. Another possible explanation for this rather surprising finding may be that the problem lies in how this concept was operationalized and measured: It is possible that the scenario should perhaps have been designed to induce stronger perceptions of rule violations among other resource users. Further research would benefit from fine-tuning such scenarios and treatment variables and from empirically examining if the results here hold when measured in a slightly different way.

Some further limitations of this study deserve mentioning. This investigation was performed in one context with specific features. It is possible that if the same study were carried out in another locality, perhaps with resource users active in a different type of harvesting, the results may differ. As often is the case with experimental studies, the results from this research should be further examined, possibly through the replication of this design in other contexts.

Conclusions

Media reports anecdotally mention corruption as being one of the key problems for management in conservation efforts of protecting key species and areas (e.g., New York Times 2013). To illustrate, bribery among rangers is believed to facilitate the poaching of endangered mammals (The Guardian 2013). Yet, this issue is still underexplored empirically by systematic research, and several authors have called for a more extensive focus on corruption in the conservation scholarship (Agrawal 2007; Hanson and McNair 2014; Smith et al. 2015).

This study's empirical findings illustrate the independent effect from corruption on rule-violating intentions among resource users active in the South African small-scale fisheries. With an experimentally designed survey—that can isolate the causal impact from certain variables in a way

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that observational studies cannot—these results suggest that resource users are more likely to violate rules when corruption is widespread. Moreover, the study provides further theoretical insights into the process in which corruption perceptions deter the willingness to follow rules. That is, an interaction effect with support for regulations lends backing for the intuitive reasoning that there are differences between resource users in this regard: The effect from corruption on rule-violating intentions is stronger among individuals who are less supportive of regulations.

Future research would benefit from performing similar experimental studies in other settings and with different participants. As discussed, these studies may specifically gain from exploring different survey items that tap into compliance intentions to see if this may fine-tune such findings. Moreover, larger surveys that target resource users that ask specific as well as open-ended questions about corruption and rule-violating behavior would enable researchers to get a better understanding of this pertinent relationship.

The implications from this study lend further support to the suggestion that to improve the effectiveness of conservation practices, through increased rule compliance, more effort is needed to reduce bribery among government officials. Thus, this implies that the conservation community would benefit from further engagement in efforts to induce anti-corruption programs. One such notable example is, for instance, Transparency International's Forest Governance Integrity Program that targets corruption and illegal logging in the forestry sector (Transparency International 2011). This work may be used as a case to analyze further and apply to other conservation sectors.

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Appendix 1: Sample characteristics: Socioeconomic features of participants, percentage (*N*)

Age	Under 18 year	18–24 years	25–50 years	Over 50 years
	5.5 (11)	13.9 (28)	54.7 (110)	25.9 (52)
Sex	Male	Female		
	77.6 (156)	22.4 (45)		
Religion	Christian	Muslim	Other	None
	52.2 (105)	44.3 (89)	3 (6)	0.5 (1)
Marital status	Single	Married	Divorced/Widowed	
	33.8 (68)	54.2 (109)	12 (24)	
Fishing income	Subsistence for some months	Subsistence for more than six months	Subsistence for the whole year	Financial surplus to save and invest
	10 (20)	33 (66)	47.5 (95)	9.5 (19)

Appendix 2: Randomization controls: Distribution of observable factors over treated groups

	Group 1	Group 2	Group 3	Group 4	All groups	Sign *F* value
Age (four categories)	3.04	3.00	2.94	3.06	3.01	0.88
Sex (two categories)	1.20	1.26	1.20	1.24	1.22	0.84
Religion (four categories)	1.42	1.48	1.63	1.54	1.52	0.32
Marital status (three categories)	1.86	1.78	1.75	1.78	1.79	0.85
Fishing income (four categories)	2.59	2.50	2.57	2.60	2.57	0.92

Comment: Age has four categories ("Under 18," "18–24," "25–50," "50 and above"). Sex has two categories ("Male", "Female"). Religion has four categories ("Christian," "Muslim," "None," "Other"). Marital status has three categories ("Single," "Married," "Divorced/Widowed"). Fishing income denotes, "What best describes [a participant's] income that [he/she] gets from fishing" and has four categories ("Subsistence for some months," "Subsistence for more than six months," "Subsistence for the whole year," "Financial surplus to save and invest").