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Perceived influence over marine conservation: Determinants and implications of empowerment

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Abstract

Understanding empowerment is integral to facilitating sustainable use policies and requires assessing potential drivers. However, critical applications are rare in conservation. Using the island of Príncipe (São Tomé and Príncipe) as a case study, we undertook household surveys ($N = 869$) to assess potential drivers of psychological empowerment towards conservation, measured as the perceived abilities of people to individually or collectively influence marine conservation outcomes, accounting for gender. Law enforcement, collective influence, freedom of choice and action, environmental condition and living in coastal community were key variables for understanding perceived personal influence. In particular, no-fishing areas and raising awareness about sustainable practices were recommended by those with higher self-perceived influence. Such information on target groups and factors to promote is essential for facilitating empowerment towards conservation and laying robust foundations for resource comanagement, especially given the role communities can play in the face of limited state capacity and enforcement.

KEYWORDS
coastal communities, conservation social science, fisheries comanagement, Gulf of Guinea, psychological empowerment, small island developing states, small-scale fisheries, sustainable development goals

1 | INTRODUCTION

Local communities are essential for championing robust pathways that consider local needs and priorities, and promoting the long-term persistence of conservation programs, particularly when enforcement is challenging (Alexander, Epstein, Bodin, Armitage, & Campbell, 2018; Bennett et al., 2019). This has led to increasing focus on understanding and facilitating the role of individuals in collaborative actions to modify environmentally damaging activities (Amel, Manning, Scott, & Koger, 2017), requiring understanding of what might act as catalyst for conservation action. Empowerment has thus become a popular concept in conservation (Petriello, Redmore, Sène-Harper, & Katju, 2020; Walpole & Wilder 2008), given its role as enabler of effective action (Wali, Alvira, Tallman, Ravikumar, & Macedo, 2017).

Empowerment can be effective in improving resource management, poverty alleviation, and wellbeing (Anand & Lea 2011; Jentoft, 2005) and understanding its drivers can guide policy to enhance them. For example, empowerment of resource users due to devolution of governance rights creates benefits from these policies (Berkes, 2010), and empowerment of women can result in increased household income (Duflo, 2012). Natural resource users' empowerment has increasingly gained more focus in research (e.g., Fröcklin, Jiddawi, & De la Torre-Castro, 2018; Wiber, Charles, Kearney, & Berkes, 2009) and international policy; the focus on gender equality and women's empowerment is explicit across all Sustainable Development Goals (SDGs; Koehler, 2016) and the empowerment of fishing communities and promotion of participatory systems, such as comanagement, are at the core of Food and Agriculture Organization's *Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication* (Food and Agriculture Organization of the United Nations, 2015).

Within conservation, empowerment remains a generally unclear and imprecise claim (Petriello et al., 2020). This concept is, however, widely used in the social sciences literature and is generally perceived as a multidimensional enabling process to enhance the abilities of people to influence processes affecting their lives; related outcomes include improved autonomy, decision making, and advocacy skills (Koberg, Boss, Senjem, & Goodman, 1999). While empowerment can incorporate a wide range of dimensions, such as economic, political, and organizational (for detailed discussions about definitions and indicators, see Ibrahim and Alkire (2007) and Petriello et al. (2020)), psychological empowerment is particularly important, but often given less attention in community development initiatives (Alsop, Bertelsen, & Holland, 2006). Research on psychological empowerment recognizes the importance of motivational contexts, since the capacity of individuals to make different choices requires a change in their psychological assets (e.g., capacity to envisage change; Alsop et al., 2006).

Psychological empowerment relates to an individual's internal states of enabling (Cho & Faerman 2010) and it includes components such as self-efficacy (i.e., the belief in one's abilities to achieve desired outcomes; Bandura, 2000), perceived competence, locus of control (i.e., the degree to which an individual believes having control over the outcome of events, as opposed to external forces beyond their control; Lefcourt, 2014), and desire for control. According to the social cognitive theory, perceptions of self-efficacy influence people's choices, including the goals they choose to pursue, how long they persevere in the face of obstacles, and the outcomes they expect (Bandura, 1999). In this study, we thus focus on individual

belief in personal and collective ability to influence marine conservation as a measure of psychological empowerment towards conservation. Given widespread focus on establishing comanagement approaches in small-scale fisheries (Evans, Cherrett, & Pemsl, 2011), understanding individuals' perceptions regarding their ability to influence conservation is at the core of assessing how to motivate people towards producing positive environmental change, but remains largely unexplored.

Using marine conservation and small-scale fisheries in Príncipe (São Tomé and Príncipe) as a case study, we identify key determinants of psychological empowerment towards conservation, and explore potential management implications. In light of recent efforts to enhance protection of the marine environment, this information is essential for promoting factors that facilitate empowerment as well as laying robust foundations for comanagement of natural resources and help countries fulfil international development and biodiversity commitments.

2 | METHODS

2.1 | Study area

The Democratic Republic of São Tomé and Príncipe (STP) consists of two small oceanic islands in the Gulf of Guinea, located ~220 km off the coast of Central Africa. STP has ca. 198,000 inhabitants (Instituto Nacional de Estatística, 2017) with population unevenly split between islands (Príncipe, with an area of only 142 km^2, has around 8,300 inhabitants). Based on an agrarian economy, STP sees reliance on subsistence farming and fisheries, with 66% of the population below the 30 STN (Sao Tomean dobras; around $1.4) per day national poverty line (Instituto Nacional de Estatística, 2010). Artisanal fishing employs 10% of the working population (fishers, generally men, and fish traders, generally women) and, according to national household surveys, fish consumption rates are among the highest globally (57.8 kg capita^{-1} year^{-1}; Belhabib, Sumaila, & Pauly, 2015), accounting for >60% of consumed animal protein (Béné & Heck 2005). Degradation of marine ecosystems, declines in fish stocks, and changes in fisheries practices suggest ongoing social–ecological changes in STP (Maia et al., 2018), with subsequent livelihood impacts (e.g., fishers migrating from São Tomé to Príncipe due to declining fish stocks).

Historically, Príncipe has received relatively little marine conservation attention with poor planning, low capacity, and limited monitoring and enforcement being major barriers to effective management (Nuno, Metcalfe, Godley, & Broderick, 2015), as well as lack of community-developed regulations. In parallel to artisanal fishing,

industrial commercial fishing is conducted exclusively by foreign fleets. Both fisheries might be causing declines in stocks but the country's low capacity for monitoring, control, and surveillance means that regulations are difficult to enforce. While robustly addressing this issue is likely to require multiple areas of action, there is a need for participatory approaches involving local communities in the design of conservation measures (Alexander et al., 2018); given current challenges related to the inability of authorities to conduct strong inspection and oversight measures in Príncipe, communities could be key enforcers of such measures.

2.2 | Survey design and administration

A questionnaire was designed in order to incorporate sections on: individual and household sociodemographic characteristics; use of natural resources of conservation interest (marine and terrestrial, such as rays, sea turtles, and monkeys); perceptions regarding threats, changes, and opportunities for fishing livelihoods; opinions about marine resource management and decision making as well as rule-breaking, and freedom of choice and action. Questionnaire development was based on insights from preliminary work including 14 focus group discussions and a pilot study (see Appendices A1 and A3 for detailed methodology). To explore differences regarding management interventions, respondents were also asked to select their top-three recommended actions based on a list of options identified in group discussions. Data collection was undertaken as baseline to posteriorly assess impacts; structured questionnaire-based surveys were used to enable population-level generalizations (see Appendix A2 for English and Portuguese versions of the questionnaire).

In February–March 2017, questionnaires were administrated by a trained team of six local enumerators; all interviews were conducted in Portuguese and, if required, creole explanations were used. Surveyed rural communities (i.e., people in Santo António town, the capital of the island, were not targeted) included: the only six permanent coastal communities and five randomly-selected noncoastal communities (Figure 1); due to the small size of the island and population, we were interested in exploring resource dependence across rural communities and expected marine conservation initiatives could benefit from, and affect, noncoastal communities as well as those directly related to fishing. Surveys were administered to all households, targeting household head and respective partner separately, if available, providing they were residents (defined as living in that community at least 6 months per year; INE, 2016) and aged 18 or older. Before administering the questionnaires, the interviewers provided a brief description of the general aims of the study and emphasized the voluntary and anonymous nature of the questionnaire, with participants being ensured that the interview could be stopped at any time.

2.3 | Study framework

We follow Kabeer (1999) and consider that resources, including material, human, and social aspects available to individuals and communities, generally affect empowerment. Because poverty alleviation requires empowerment of stakeholders to shape decisions that affect their lives (World Bank, 2001), we consider empowerment as a domain of poverty (Ibrahim & Alkire 2007). Psychological empowerment towards conservation (i.e., our variable of interest) is thus conceptualized as a process potentially related to three poverty domains: security, opportunity, and general empowerment (World Bank, 2001; Figure 2). Together with complementary demographic variables (i.e. age, gender, education level, location of birth, and coastal/noncoastal place of residence), context-specific indicators (Table 1) are used as independent variables to explore potential drivers of respondents' psychological empowerment (measured as belief in personal and collective ability to influence marine protection in Príncipe; Table 1).

Following Gurney et al. (2014), each domain of poverty was considered to be represented by different components, operationalized in this study by context-specific indicators (Table 1, Figure 2), while acknowledging the complementary and interconnected nature of the concepts illustrated in Figure 2. For example, governance, freedom of choice and action, participation, control, and collaboration are all considered as components of general empowerment and potentially associated to its psychological dimensions. These indicators do not cover all facets of each component or domain of poverty but are meant to represent key issues identified as potentially important during focus groups. Indicators concerning respondents' perceptions were assessed using 5-point Likert-type scales.

2.4 | Data analysis

To consider whether individual and collective influence items measured the same latent variable, we considered their internal consistency; given relatively low internal consistency (Cronbach's alpha = 0.52), we kept these two measures separate. To account for the ordered nature of the response variables (respondents' agreement with influence statements described in Table 1: completely disagree; disagree; neither agree nor disagree; agree; completely agree)

TABLE 1 Variables used in this study to explore potential drivers of respondents' belief in personal and collective ability to influence marine protection in the island of Príncipe (São Tomé and Príncipe)

Framework component (based on World Bank, 2001; Gurney et al., 2014)	Indicator/Variable used in this study	Data type	Description
Dependent variables			
"Psychological empowerment"	Perceived individual ability to influence marine protection[a]	Ordinal	Disagreement with statement "There's nothing I can do to protect the sea in Príncipe" based on a 5-point Likert-type item
	Perceived collective ability to influence marine protection[a]	Ordinal	Agreement with statement "If people in my community work together, we can protect our sea" based on a 5-point Likert-type item
Independent variables			
Livelihood diversity	Average number of different occupations (HH)[*]	Continuous	Total number of different occupations in the household divided by the number of all household members
Resource dependence	Fisheries dependence	Binary	Whether fishing or fish trading is the primary occupation
Financial capital (HH)[*]	Wealth (HH)[*]	Binary	Whether material style of life is below or equal to median (estimated from principal component score based on household assets, such as type of house walls, mobile phone, motorbike; further details Figure S1)
Natural capital	Fish catch	Categorical	Present fish catch reported as worse, same or better than ten years ago
	Condition of local marine environment	Categorical	Present fish abundance at sea reported as worse, same or better than ten years ago
Governance	Level of perceived compliance with fisheries regulations at community level	Continuous[b]	Agreement with statement "People in my community comply with fisheries regulations" based on a 5-point Likert-type item
	Community enforcement of fishing laws	Continuous[b]	Disagreement with statement "If anyone breaks fisheries rules, my community doesn't do anything" based on a 5-point Likert-type item
	State enforcement of fishing laws	Continuous[b]	Disagreement with statement "If anyone breaks fisheries rules, authorities in Príncipe don't do anything" based on a 5-point Likert-type item

(Continues)

TABLE 1 (Continued)

Framework component (based on World Bank, 2001; Gurney et al., 2014)	Indicator/Variable used in this study	Data type	Description
Freedom of choice and action	Level of freedom of choice and action	Continuous	Composite scale on agreement with statements "I feel pleased about my occupation," "I can decide my own life's path," and "I have a lot of opportunities to decide my own life's path" based on sum of three Likert-type items
Participation	Level of involvement in community decision-making	Continuous[b]	Agreement with statement "I am involved in decisions made in my community" based on a 5-point Likert-type item
	Level of involvement in fisheries management decisions	Continuous[b]	Agreement with statement "I am involved in decisions made about fisheries management in Príncipe" based on a 5-point Likert-type item
Control	Potential control about factors affecting fish abundance at sea	Continuous	Proportion of fisher-related factors (e.g., fishing at bays, effort, mesh size) listed among top three perceived factors affecting fish abundance at sea in Príncipe (ranging from 0: none are fisher-related to 1: all are fisher-related)
Collaboration	Membership of association	Binary	Whether belongs to any association (e.g., fishers, women, youth, church)
Demographics	Gender	Binary	Gender of the respondent
	Age	Continuous	Reported age of the respondent
	Education level	Categorical	Respondent's reported level of education (3 level factor: no education; primary; higher than primary)
	Birth place	Categorical	Place of birth (3 level factor: Príncipe; São Tomé; abroad)
	Coastal community	Binary	Whether lives in a coastal community

[*]This framework (see Figure 2) is based on World Bank (2001) and Gurney et al. (2014), with the addition of complementary context-specific indicators identified as potentially important during focus group discussions in the study area. HH represents information collected at household level (instead of individual level).

[a]Used as independent variable in model fitted to collective/individual influence.

[b]Independent variables treated as continuous; for alternative analyses and results when these variables are treated as ordered or categorical, see Table S6.
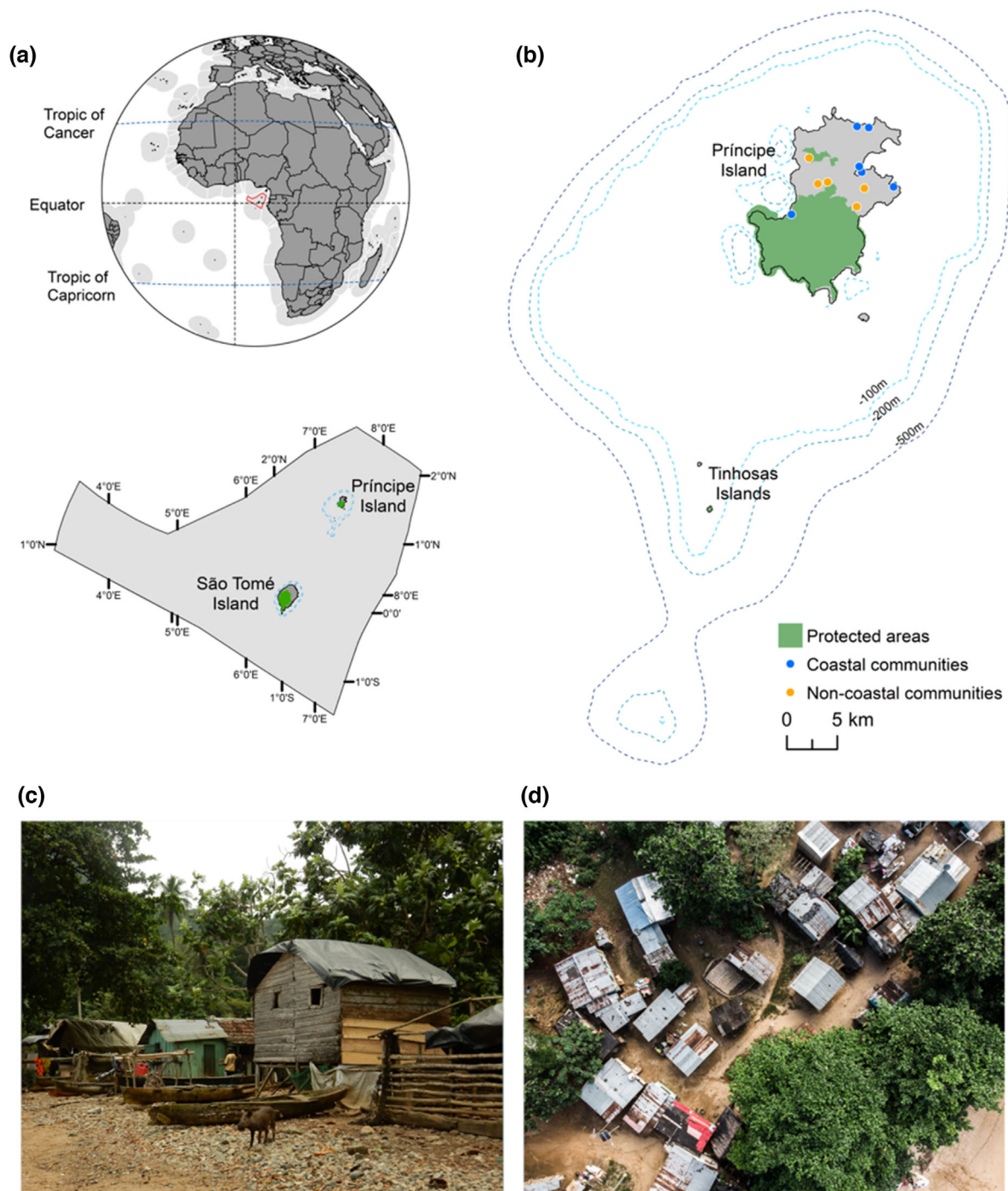
FIGURE 1 Location of (a) São Tomé and Príncipe in the Gulf of Guinea, with both inhabited islands illustrated, and (b) surveyed coastal (blue) and noncoastal (orange) communities in the island of Príncipe. All ($n = 6$) permanent coastal communities were surveyed, and five noncoastal communities were randomly selected from a list of 23 noncoastal rural communities. c and d are fishing communities in Príncipe. Photo credits: Ana Nuno and Dário Pequeno Paraíso

without making assumptions about the distance between categories or their distribution, ordinal logistical regressions were fit to explore relationships between individual and collective influence scores and all potential explanatory variables (Table 1; see Appendix S1 for considerations about the treatment of Likert-type data). To investigate

effects on binary variables (e.g., having consumed a certain species or choosing a specific management intervention as a top-three recommended action), generalized linear models with quasi-binomial error distribution and a logit link were fitted. Odds ratios were then used to compare differences between groups; for example, an odds ratio of 2
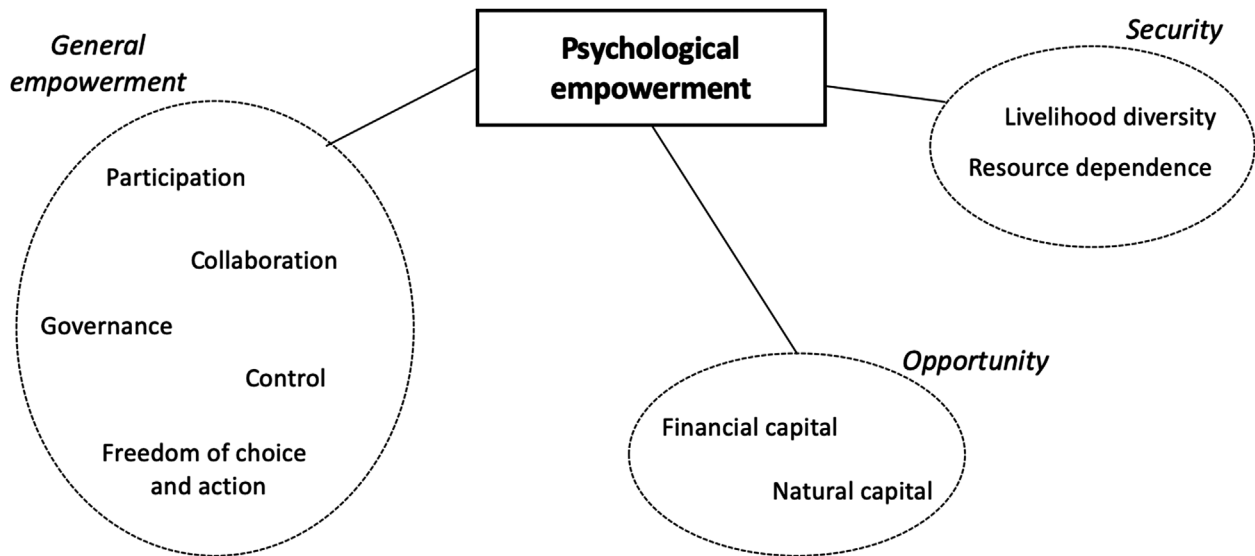
FIGURE 2 Diagram illustrating key concepts used in this study to explore potential drivers of "psychological empowerment" and their contextualization within three poverty domains: opportunity, security, and general empowerment (World Bank, 2001), while acknowledging the complementary and interconnected nature of the concepts illustrated here. "Psychological empowerment" measured as respondents' self-reported belief in personal and collective ability to influence marine protection in the island of Príncipe (São Tomé and Príncipe)

for given category means that category was twice as likely to recommend a certain intervention. Akaike information criterion (AIC) was used to select the most parsimonious models among all possible combinations and to rank models according to their log-likelihood penalized for the number of parameters (Burnham & Anderson, 2002). We averaged estimates across models with ΔAIC < 4 using the MuMIn package v.1.42.1 (Bartoń, 2018); AIC ≥4 indicating considerably less support for the model (Burnham & Anderson, 2002). Statistical analyses were conducted in R version 3.4.4 (R Core Team, 2018).

3 RESULTS
3.1 | Study participants

A summary of sociodemographic characteristics of participants is provided in Table S1. Among the 869 respondents, 202 reported to be fishers (all men) and 153 as fish traders (all women)—see Table S1 for more information on gender, occupations, and coastal versus noncoastal comparisons.

3.2 | Perceived state of fisheries and marine environment and resource use

Among all respondents, 54% stated fisheries catch in Príncipe had decreased during the last ten years, while 10% reported no change, 10% believed catch had increased, and 26% stating they did not know (Table S2). When asked about fish abundance at sea, 38% reported a decrease over last 10 years, with 13% reporting no change, 9% saying it

had increased, and 41% stating they did not know. Respondents were more likely to report decreases in both fish catch and abundance if they were men ($p < 0.001$), fisher or fish traders ($p < 0.001$), and were educated beyond primary level ($p < 0.04$; additional statistical details in Table S3). In addition, whilst 58% of respondents agreed they had some individual ability to protect the marine environment in Príncipe (with 35% disagreeing), 79% of respondents agreed that collectively their communities had some ability to protect the marine environment (with 10% disagreeing).

Several species of conservation concern were consumed during the 12 months prior to our study, with sharks and rays eaten by 48% and 17% of respondents, respectively (Figure 3; Table S4). Consumption of monkeys ($p < 0.02$) and bats ($p < 0.01$) was more likely in noncoastal communities and sharks ($p < 0.001$), rays ($p < 0.03$), brown boobies ($p < 0.02$), and sea turtles ($p < 0.05$) were more frequently consumed in coastal areas (additional statistical details in Table S5). When considering the source of these products, 50% of shark consumers had purchased it, while receiving as a gift was the most important source for brown boobies (Table S4), suggesting different drivers for their trade.

3.3 | Potential predictors of psychological empowerment

When considering belief in personal influence as a measure of psychological empowerment towards conservation, state enforcement, collective influence, freedom of choice and action, condition of local marine environment, and
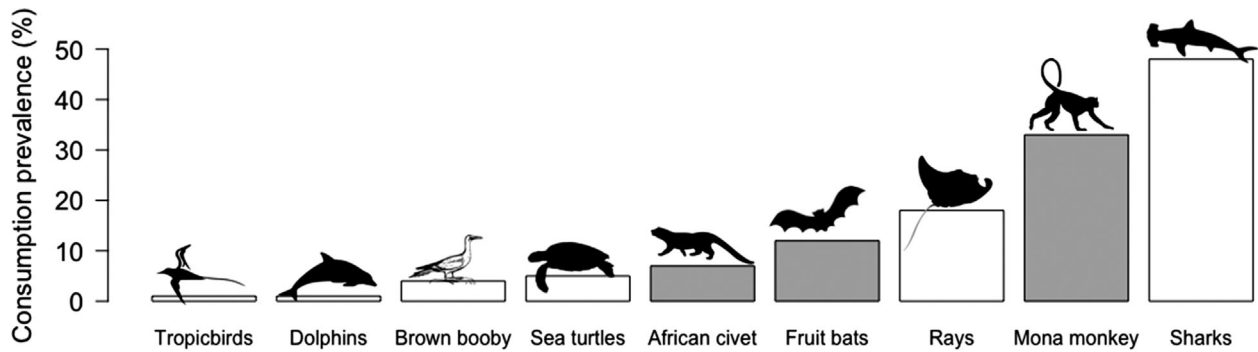
FIGURE 3 Prevalence of consumption of several marine and terrestrial taxa of conservation concern or interest by surveyed participants (N = 869) in the island of Príncipe during the last 12 months prior to our study. White bars illustrate coastal and marine species and grey bars refer to terrestrial species. Sea turtles are legally protected in São Tomé and Príncipe, making harvest, selling and consumption illegal. Mona monkey (*Cercopithecus mona*) and African civet (*Civettictis civetta*) are introduced species. Further details in Table S2

living in a coastal community were the most important variables for understanding variation in respondents' answers (Table 2). Higher rates of perceived influence were more likely when respondents lived in coastal communities, had higher levels of individual freedom of choice and action and collective influence, as well as when they perceived higher state enforcement of fisheries laws. Respondents who answered "don't know" about marine environment condition were less likely to perceive high influence than those who believed this remained the same, worse, or better (Table 2). Other variables also included in the top models but with less support were gender, birthplace, and involvement in community decisions. The remaining variables had relative importance <40% and change in fisheries catch was absent from the best performing models.

Collective influence was best explained by involvement in fisheries management decisions, individual influence, freedom of choice and action, and condition of marine environment (Table S7). Being a coastal community was not an important predictor of collective influence.

3.4 | Management preferences and implications

When asked to choose the three most important actions for increasing fish abundance at sea in Príncipe and linking this information to participants' psychological empowerment scores, the following options were more likely to be chosen by respondents with higher levels of perceived influence: stop use of small mesh nets; stop fishing in bays; create no-fishing areas; raise awareness about sustainable fishing practices; increase state enforcement; and regulate industrial fishing (Figure 4). Involving fishers and fish traders in fisheries decisions was less likely to be recommended by participants with higher levels of perceived individual influence, although recommended as a

top action by fishers and fish traders (Table S9). Creating no-fishing areas and raising awareness about sustainable fishing practices were the two actions with the highest increase according to influence levels; this effect was particularly high for creating no-fishing areas and individual influence (Figure 4). Recommendations by fishers and fish traders are described in Table S8.

4 | DISCUSSION

Policies aimed at poverty alleviation and conservation should be informed about factors that enhance empowerment. This is intrinsically valuable and instrumental in achieving international commitments; these consistently call for the empowerment of those less privileged (e.g., SDG 5 focuses on women empowerment for gender equality and empowerment of small-scale fishers is essential for food security and poverty alleviation; Food and Agriculture Organization of the United Nations, 2015). Despite its policy and conservation relevance, empowerment is often merely a "buzzword" with unclear and imprecise claims (Petriello et al., 2020). By identifying conditions that might facilitate psychological empowerment towards conservation, including gender considerations, we obtained insights that are essential for assessing conservation feasibility, facilitating engagement, and guiding policy implementation. These findings are of critical importance to policymakers as strategies to engage communities in conservation proliferate, with robust applications of conservation social science on the ground often lagging behind.

Whether people engage in conservation initiatives may be influenced by belief about their own abilities to achieve change. When accounting for multiple sociodemographic variables and poverty domains (Table 1, Figure 2), our results from an island-wide survey of rural communities in Príncipe suggest that indicators related to governance,

TABLE 2 Parameter unconditional estimates (i.e., obtained by averaging over all models in the top model set) from the averaged ordered logistic regressions fitted to levels of belief in personal influence over marine conservation in the island of Príncipe. *

Parameter	Individual influence		
	Estimate (SE)	z-value	Relative variable importance
Gender: Female	0.19 (0.19)	1.012	0.68
Age	−0.01(0.01)	0.039	0.09
Education level			0.09
None	0.06 (0.21)	0.266	
Higher	0.01 (0.05)	0.103	
Birth place			0.43
São Tomé	0.07 (0.13)	0.503	
Other country	0.32 (0.45)	0.713	
Coastal community: No	−0.51 (0.18)	2.771	1
Livelihood diversity	−0.01 (0.06)	0.226	0.15
Fisheries dependence: No	0.03 (0.09)	0.248	0.17
Membership of association: Yes	0.01 (0.07)	0.165	0.13
Wealth: below or equal to median	0.01 (0.07)	0.187	0.13
Fish catch	—	—	—
Same			
Better			
Don't know			
Condition of local marine environment			
Same	0.06 (0.24)	0.256	
Better	−0.36 (0.28)	1.284	1
Don't know	−0.57 (0.19)	2.925	
Perceived compliance[a]	−0.02 (0.06)	0.335	0.22
Community enforcement[a]	−0.01 (0.03)	0.039	0.09
State enforcement[a]	0.26 (0.08)	3.008	1
Freedom of choice and action	0.51 (0.13)	3.932	1
Involvement in community decisions[a]	0.05 (0.09)	0.599	0.41
Involvement in fisheries decisions[a]	0.01 (0.05)	0.241	0.16
Collective influence[a]	0.96 (0.12)	8.135	1
Control about fish abundance at sea	−0.12 (0.24)	0.489	0.33

*The relative importance of predictor variables is expressed as the sum of the Akaike weights for the variables included in the averaged models (Burnham & Anderson 2002). McFadden pseudo R^2 = 0.20 (reported only for the model with the highest AICc weight). Reference levels: male; primary education; born in Príncipe; coastal community; nonmember of association; above median wealth; worse fish catch; worse condition of local marine environment. Shading denotes significance at $p < 0.05$. —: Absent from the best performing models.

[a]Independent variables treated as continuous; for alternative analyses and results when these variables are treated as ordered or categorical, see Table S6.

freedom of choice and action, participation and natural capital were key components explaining variation in self-perceived influence, suggesting these are key factors to be enhanced in Príncipe. Factors such as wealth, fisheries dependence, and sociodemographics did not seem to play a major role (e.g., gender was not among top variables), pointing to the need of accounting for a wide range of socio-psychological factors when assessing social capital for conservation implementation (Pretty & Smith 2004). For example, Mills et al. (2013) found that conservation feasibility in the Solomon Islands was associated with characteristics of the governance system, users, and the socioeconomic and political setting. Due to our focus on a single case-study, some effects are likely to be related to the very small size and population of the island, as well as high reliance on small-scale fisheries as source of income and food (Béné & Heck 2005; Belhabib et al., 2015). Further research is required, including comparisons across case studies and focusing on multiple components of psychological empowerment, to draw more general recommendations. In addition, given that our study focused on individuals' perceived abilities to individually or
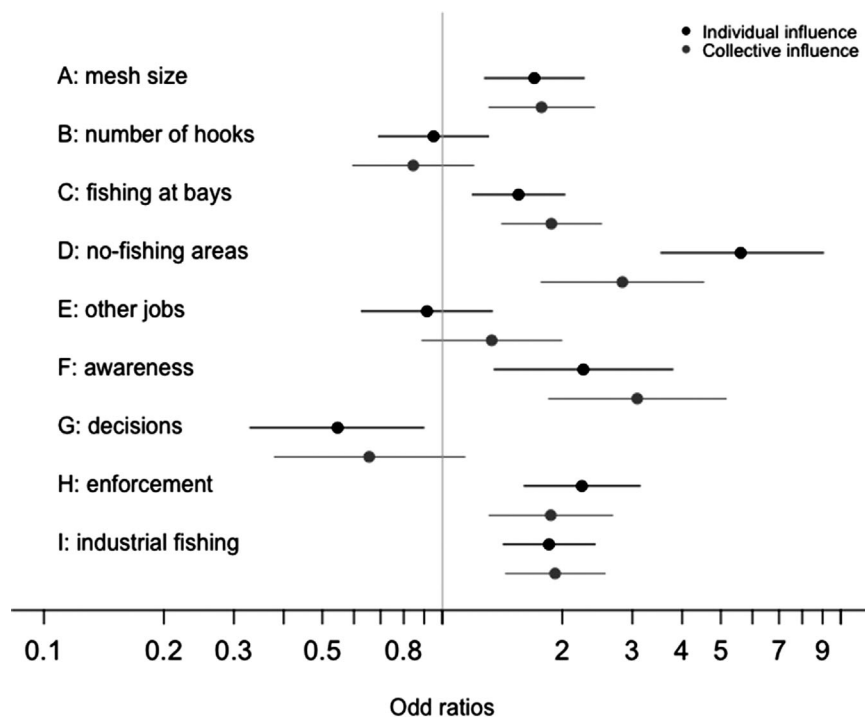
FIGURE 4 Odds ratios (with 95% confidence intervals) of increase in survey respondents recommending specific intervention as a top-three management action as a function of level of belief in personal (black) and collective (grey) influence. (A): Stop use of small mesh size nets; (B): Decrease number of hooks; (C): Stop fishing at bays; (D): Create no-fishing areas; (E): Create other jobs for fishers; (F): Raise awareness about sustainable fishing practices; (G): Involve fishers and fish traders in fisheries decisions; (H): Increase state enforcement; (I): Regulate industrial fishing. Each level shown is compared with baseline "option not chosen as top-three recommendation." Grey line represents odd ratio = 1 (both groups have same odds)

collectively influence marine conservation outcomes, our findings relate specifically to how to promote action for conservation. While this can help to identify the social and contextual factors that influence behaviors, we acknowledge this takes a relatively narrow approach that neglects other important social considerations and components of empowerment.

Empowerment has frequently been suggested as both a requirement and a goal of resource comanagement (Jentoft, 2005; Jentoft et al., 2018). It is thus essential considering the management implications of varying empowerment levels. We found that people with higher levels of self-perceived influence over marine conservation were more likely to recommend specific measures (i.e., creating no-fishing areas, and raising awareness about sustainable fishing practices); overall, recommended actions included measures to be implemented by the state, NGOs, communities, and other actors. This suggests specific linkages between empowerment and acceptability of specific management actions, illustrating benefits of conducting social characterization of communities affecting, or being affected by, interventions (Bennett et al., 2019) and investing in empowering stakeholders (Fröcklin et al., 2018). Collective action was perceived as more influential than individual action, providing insights about message framing to be used to promote engagement (e.g., emphasize power to achieve something together for incentivizing participation in projects in Príncipe). Assessments of previous initiatives are, however, essential; fisheries associations in Príncipe remain incipient, conflicted and mainly

set to secure governmental and aid funding (Nuno et al., 2015), suggesting that informal collective action might be more locally appropriate (e.g., projects in Príncipe could focus on informal groups based on social networks and relationships people draw upon in pursuit of common objectives).

As we are about to enter the United Nations Decade of Ocean Science for Sustainable Development (2021–2030), critical approaches from the social sciences are needed for advancing the sustainable use and conservation of the oceans (Bennett, 2019). Empowerment has been often stated as a goal of community-based initiatives but few have critically analyzed its determinants and implications, with a recent call for the use of locally-defined and goal-focused empowerment applications in conservation (Petriello et al., 2020). Importantly, potential trade-offs between different dimensions of empowerment and specific conservation outcomes should be assessed. For example, while we found psychological empowerment towards conservation was positively related to a few other indicators of general empowerment (i.e., governance, freedom of choice and action, and participation), a more empowered individual might decide not to engage in conservation efforts, blurring the link to conservation improvements. By explicitly focusing on determining factors that play a role in enhancing the promotion of conservation action, we gain insights about a narrow definition of psychological empowerment as a precondition for specific interventions, such as fisheries comanagement. However, we recognize further theoretical considerations are required to explore

the complex and multidimensional nature of psychological empowerment.

While our survey tool would have to be further tested (e.g., regarding its reliability, inclusion of additional explanatory variables and measurement error), we suggest explicit assessments should be incorporated as part of monitoring and evaluation initiatives, identifying locally relevant strategies, target groups, and goals for enabling effective conservation action through empowered individuals. This will contribute to meeting the transformative potential of international conservation and development commitments by providing operational tools for enhancing empowerment. By expanding our understanding of empowerment (e.g., assessing multiple dimensions per Zimmerman & Rappaport, 1988), we might start unravelling the complexity of promoting meaningful community engagement and guide policymakers. While local context is likely to be a major factor, wider-scale and cross-cultural assessments should provide much needed insights about how to empower people for effecting change.

Attaining development and conservation goals (e.g., SDGs and CBD) requires focusing on empowerment and equity concerns, while considering trade-offs (Klein, McKinnon, Wright, Possingham, & Halpern, 2015). Yet, an uncritical approach to empowerment might oversimplify this complex social concept and undermine meaningful engagement (Petriello et al., 2020), with implications at all scales from project development to policy implementation. Similarly to what is currently being done in this data-poor study region, by critically assessing and facilitating empowerment among actors (e.g., resource users, nongovernmental environmental staff, civil society), we will promote involvement of diverse stakeholders working towards common visions and ultimately promote the co-development of strategies; this is crucial for achieving long-term sustainability.

ACKNOWLEDGMENTS

ETHICS STATEMENT

This research was approved by the University of Exeter Ethics Committee (Ref. 2017/1565) and adhered to the guidelines by the British Psychology Society.

DATA AVAILABILITY STATEMENT

Anonymized data available by request.

AUTHORS' CONTRIBUTIONS

A.N. conceived the study, analyzed the results, and led the writing of the manuscript. A.N. and L.M. collected the data. A.N., K.M., B.J.G., and A.C.B. obtained funding. All authors provided comments and edits to the manuscript.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.