



Contrasting the Motivations and Wildlife-Related Value Orientations of Recreational Fishers With Participants of Other Outdoor and Indoor Recreational Activities

OPEN ACCESS

Beatriz Morales-Nin^{1*}, Robert Arlinghaus^{2,3†} and Josep Alós^{1†}

Edited by:

Jon Olaf Olaussen,
Norwegian University of Science and
Technology, Norway

Reviewed by:

Faik Ardahan,
Akdeniz University, Turkey
Dimitrios K. Moutopoulos,
University of Patras, Greece

*Correspondence:

Beatriz Morales-Nin
beatriz@imedea.uib-csic.es

†These authors have contributed
equally to this work and share first
authorship

Specialty section:

This article was submitted to
Marine Fisheries, Aquaculture and
Living Resources,
a section of the journal
Frontiers in Marine Science

Received: 25 May 2021

Accepted: 05 July 2021

Published: 16 August 2021

Citation:

Morales-Nin B, Arlinghaus R and
Alós J (2021) Contrasting the
Motivations and Wildlife-Related Value
Orientations of Recreational Fishers
With Participants of Other Outdoor
and Indoor Recreational Activities.
Front. Mar. Sci. 8:714733.
doi: 10.3389/fmars.2021.714733

¹ The Fish Ecology Group, Department of Marine Ecology, Instituto Mediterráneo de Estudios Avanzados (IMEDEA, CSIC-UIB), Esporles, Spain, ² Division of Integrative Fisheries Management, Department of Crop and Animal Sciences, Faculty of Life Sciences, Humboldt-Universität zu Berlin, Berlin, Germany, ³ Department of Biology and Ecology of Fishes, Leibniz Institute of Freshwater Ecology and Inland Fisheries, Berlin, Germany

Assessing the motivations and wildlife-related value orientations (WVOs) of outdoor recreations, such as recreational fishing (RF), is of key importance to understand the human dimensions of natural resource use and to inform management actions. Using a national random telephone survey, we contrasted the participation rate, the socio-economical profile, and the motivations and WVO of the participants of RF, outdoor recreation (OR), consumptive outdoor recreation (COR), and indoor recreation (IR) in Spain. Participation rates of the four subgroups were 6.6, 15.3, 49.4, and 28.4%, for RF, COR, OR, and IR, respectively. The four subgroups differed in socio-economic characteristics, with women being substantially less involved in RF compared to COR, OR, and IR. Moreover, we found higher incomes and educational degrees of the participants in the three outdoor modalities compared to IR. Motivations to engage in RF, COR, OR, and IR were different. Recreational fishers placed significantly more importance on the motives “to be close to nature,” “to experience tranquility,” “to get away from the usual demands of life,” “to relax psychologically,” “to stay with family,” and “to get exercise” compared to the other recreational groups, being very different from the ones to practice IR. We did not find significant differences in the WVO among the participants of the four recreational activities. We conclude that recreational fishing is a widespread recreational activity in Spain, embedded in all the segments of the society, thereby generating substantial psychological benefits, which are not equally produced by other forms of indoor and outdoor recreation.

Keywords: wildlife value orientations, recreational fisheries, Spain, motivation, outdoor recreation, indoor recreation, conservation issues, participation rates

INTRODUCTION

As countries become more prosperous and people have higher incomes, citizens are able to spend more resources on leisure and recreational activities (Bell et al., 2007; Arlinghaus et al., 2021). Leisure and recreation are as much a part of life as work, constituting an essential part of human development and a strong contributor to quality of life (Torkildsen, 2005). Industrialization has altered our nutrition and the way we live and work, which has created abundant health problems related to sedentary life (e.g., obesity and diabetes), renewing the interest to engage in healthy activities for the body and mental well-being (Wang et al., 2002; Christensen et al., 2013). The ongoing COVID-pandemic has further increased the participation of large fractions of society in outdoor recreation and other nature-related activities (Landry et al., 2021).

For many years, the field of outdoor recreation studies has studied the reasons for the engagement of people in recreational activities. Following expectancy theory, people engage in recreation to obtain expected psychological benefits (Driver et al., 1991; Fedler and Ditton, 1994). Most recreational activities are multifaceted and contribute to multiple expected psychological outcomes (Driver and Knopf, 1976; Manfredo et al., 1996). Recreational activities can be considered as indoor recreation (IR) (i.e., reading, exercising, and attending cultural events) or outdoor recreational activities (i.e., swimming in the ocean, angling, biking, and observing nature). Outdoor recreation (OR) often takes place in areas with direct access to nature or (urban) green areas, typically as part of daily or weekend routines. Outdoor recreation is becoming an important element of a healthy life and maybe a remedy against the deficiencies of a modern life that often takes place in built environments, separated from nature (Bell et al., 2007). Outdoor recreation is considered a complex socio-ecological system. As such, we must enhance our understanding of the interactions and intersections between the ecological and social systems (D'Antonio, 2020). There is ample literature on non-consumptive OR and consumptive outdoor recreation (COR: hunting, fishing, mushrooming, and plant recollection), and both can have direct and indirect impacts upon nature (Duffus and Dearden, 1990; Gutzwiller et al., 2017). In addition to having ecological impacts, OR can also benefit people by providing memorable experiences. In general, OR participants tend to be more satisfied with their activity than participants in COR (Vaske and Roemer, 2013). One reason is that COR have less control over key elements of their activity (e.g., catching fish) than participants in non-consumptive OR.

One socially relevant consumptive outdoor leisure activity is recreational fishing (RF), which is a popular activity in many parts of the world (Arlinghaus et al., 2021). In developed nations, 1 in 10 people fish for leisure, amounting to at least 220 million recreational fishers worldwide—more than 5 times the number of commercial fishers (Arlinghaus et al., 2019). In Europe, an estimated 8.7 million people are recreational sea fishers

corresponding to a participation rate of 1.6%, resulting in an estimated effort of 77.6 million days fished with an expenditure of €5.9 billion annually (Hyder et al., 2018). In Spain, several studies have examined different aspects of marine RF at regional scales. For example, the socio-economic profile of recreational fishers, participation rates, effort, and captures have been presented (Coll et al., 2004; Morales-Nin et al., 2005; Soliva, 2006; Font and Lloret, 2014; Alós et al., 2016; Pita et al., 2017; Gordo et al., 2019), and their economic impact has been evaluated in several Spanish regions (Franquesa et al., 2004; Soliva, 2006; Morales-Nin et al., 2015; Hyder et al., 2018; Pita et al., 2018). The socio-economic aspects of the Spanish freshwater recreational fisheries have received much less attention (Morales-Nin and Lobón-Cerviá, 2020), and there is no national wide survey that has used probability-based sampling strategies addressing the national magnitude, and social and cultural relevance of RF at the national level. The lack of nationwide works has limited the possibility to create a national strategy governing Spanish recreational fisheries (Pita and Villasante, 2019). Currently, even basic participation data gaps exist, i.e., the national participation rate in freshwater and marine recreational fishing in Spain is currently unknown.

In addition to the basic information, such as participation rate, it is equally important to know why people engage in a specific type of recreation as this information can help managers to direct their efforts toward meeting the expected psychological benefits (Driver et al., 1991; Manfredo et al., 1996; Fang et al., 2017). Previous research in other countries has found that people engage in outdoor recreation for multiple reasons, including to enjoy both consumptive (e.g., catching or collecting animals or plants) and non-consumptive benefits (e.g., enjoying a pleasant social environment or developing self-esteem) (Mills, 1985; Walker et al., 2001; Aşan and Emeksiz, 2018), with outdoors and “escaping from it all” remaining a major motivator (Driver and Knopf, 1976; Zeidenitz et al., 2007). Similarly, in RF, the motivations to engage in the activity are multi-dimensional, involving both activity-general (e.g., enjoying nature) and activity-specific motives (e.g., experiencing self-enhancement and mastery *via* the catching of fish) (Fedler and Ditton, 1994).

In Spain, there is a paucity of research related to motivations to engage in RF and other forms of outdoor recreation (Morales-Nin et al., 2015). More general research exists on the contributors to participation. In a study on the motivations to engage in sports, 20.6% of the respondents were very interested in sports, while 41.9% were moderately interested. A small percentage of 1.7% indicated that they practiced diving and/or spear-fishing, and 2.9% declared that they had fished for sport—taking part in training or a fishing competition (CIS, 2005). Regarding motivations for marine RF in Mallorca (Balearic Islands), residents considered enjoying tranquility and consuming the catch as their major motivations, while tourists enjoyed the whole trip (Morales-Nin et al., 2015). There is no research that has administered the same survey scales to RF, COR, OR, and IR to compare whether the groups are motivated by distinct factors. It can be expected that RF and OR place a high premium on the nature experience, while IR does not, but there is no research on this topic in Spain.

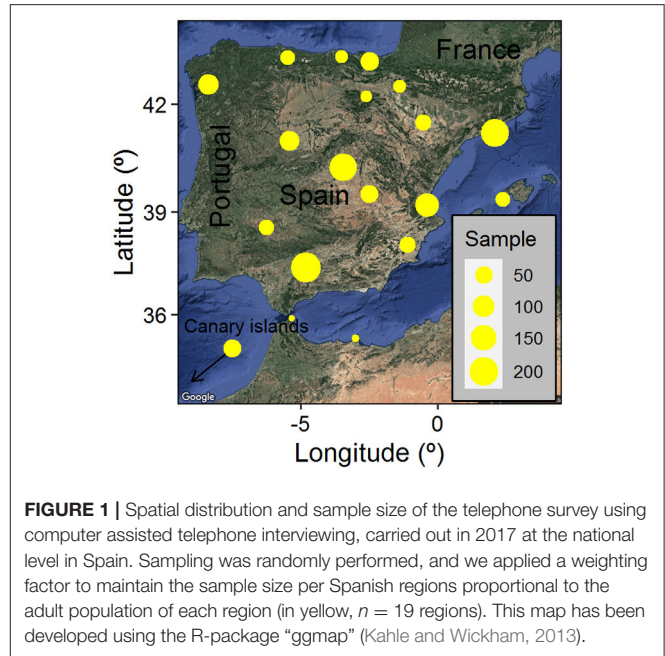
Abbreviations: COR, consumptive outdoor recreation; IR, indoor recreation; OR, outdoor recreation; RF, recreational fishing; WVO, wildlife-related value orientations.

Besides motives, the behavior of people is also affected by values, beliefs, attitudes, and norms (Vaske, 2008). Previous research has compared how different recreationists vary in selected beliefs and attitudes related to the environment (Dunlap and Heffernan, 1975; Geisler et al., 1977; Bjerke et al., 2006) as well as motivations (Bimonte and Faralla, 2014; Fraser et al., 2019). The participants in “appreciative” OR activities (e.g., cross-country skiing and hiking) were found to hold stronger pro-environmental attitudes than participants in “consumptive” activities (hunting, fishing, and collection of mushrooms) or “mechanized” activities (e.g., snowmobiling and trail biking) (Jackson, 1986). Also, it was found that OR participation is more strongly related to attitudes toward specific aspects of the environment necessary for pursuing such activities, than to attitudes toward more “distant” environmental issues (Jackson, 1986). One way to understand the relationship of people with the environment, specifically wildlife, is to measure wildlife-related value orientations (WVOs) (Fulton et al., 1996; Manfredo et al., 2021). The WVO represents human beliefs toward wildlife, which involve two key dimensions—domination and mutualism (Teel et al., 2005). Domination is a dimension where WVO emphasizes and justifies human consumptive use of wildlife (e.g., through hunting or fishing), whereas mutualism is indicated by caring and social affiliation with wildlife (Manfredo et al., 2020). The WVO has been found to affect not only specific attitudes and behavioral intentions of individuals related to several wildlife-related activities, such as fishing (Bruskotter and Fulton, 2013) or hunting, but also to affect general support of biodiversity conservation (Hunter and Brehm, 2004; Clark et al., 2017; Manfredo et al., 2021). One open question is whether people engaging in different forms of OR also vary in WVO. Specifically, more consumptive forms of OR should differ from less consumptive forms on selected value dimensions, such as domination and mutualism. Regarding RF, a few studies have evaluated WVO of recreational fishers, reporting that the fraction of utilitarians (scoring mainly high on domination) as well as pluralists (scoring high on both domination and mutualism) was similar in RF in comparison with other OR, or with the general public (Bruskotter and Fulton, 2008; Teel et al., 2010; Riepe and Arlinghaus, 2014). This finding is insightful as it indicates that RF does not necessarily hold highly utilitarian WVO and may also care as much about the well-being of animals (as represented in mutualism orientations) as in the other segments of society.

The aim of this work was to describe the magnitude and the recreational preferences of the Spanish adult population, including their beliefs regarding wildlife, using a nationwide population-based telephone survey. We address four objectives in this paper: to determine the participation rate in RF and other OR and IR in Spain; to determine the social-economic profile of participants in each recreational group; to understand and contrast motivations by different recreationists; and to determine the beliefs of the Spanish population toward wildlife and compare them with different recreational forms.

MATERIALS AND METHODS

A random telephone survey was carried out in 2017 at the national level, targeting the Spanish adult population (+18



years) to evaluate different aspects of OR and IR. The random telephone survey was implemented using computer-assisted telephone interviewing, and the sampling design was randomly implemented at the national level applying a quota per Spanish region (e.g., Balearic Islands) to obtain a proportional image at the national level represented graphically using the R-package, “ggmap” (Kahle and Wickham, 2013) (Figure 1). A total of 3,306 random telephone calls were carried out obtaining $N = 1,279$ completed surveys (response rate = 38.7%). Albeit the response rate being relatively low due to various causes (i.e., not having time to respond, not interested in inquiries, and general public as target); with this sample size, we estimated a sampling error lower than 3% for the confidential interval (CI) 95.5% and maximum dispersal of data ($p = q = 0.5$). Quality controls by the European Society for Opinion and Marketing Research protocols and internal protocols (e.g., a pre-survey test of 30 interviews were accomplished) were applied. The telephone survey was carried out by the Balearic Institute for Advanced Sociological Studies (IBES) and was anonymous. A random ID was generated for each respondent, which ensured no personal data were included in the database. The telephone survey was complemented on average and SD of 8 min \pm 3.9 min. In this study, we focus on a series of questions related to (i) participation in OR and IR activities including RF; (ii) social-economic segmentation variables, (iii) motivations to practice OR and IR activities, and (iv) statements that represent a variety of ways people feel about fishing and wildlife.

Participation in OR and IR Activities Including RF

The first part of the survey aimed at identifying different profiles of participation in OR and IR activities, including RF, by asking: *Which recreational activities have you practiced in the last 12 months?* The list of major recreational activities

TABLE 1 | Nationwide population-based participation rates (%) in recreational fishing (RF, people who have fished and have the intention to fish in the next 12 months), current fishers (current, people who have fished at least once in the last 12 months), historical fishers (historical, people who have fished at least once in their life), and future recreational fishers (Future, people who have the intention to fish in the next 12 months).

| Activity | <i>n</i> | Participants | CI-l | CI-u | Rate | CI-l | CI-u |
|------------|----------|--------------|------------|------------|------|------|------|
| RF | 1,186 | 2,559,303 | 1,986,716 | 3,131,890 | 6.6 | 5.1 | 8.1 |
| Current | 1,182 | 3,747,280 | 3,047,604 | 4,446,957 | 9.7 | 7.9 | 11.5 |
| Historical | 1,045 | 18,821,350 | 17,582,606 | 20,060,094 | 48.7 | 45.5 | 51.9 |
| Future | 1,186 | 6,844,463 | 5,958,818 | 7,7301,08 | 17.7 | 15.4 | 20.0 |

The table shows the samples size (*n*), the estimated number of participants (participants), participation rate (rate, %), as well as their lower and upper confidence intervals (CI-l and CI-u, respectively).

included outdoor (skiing, RF, hiking and wildlife watching, diving, hunting, running, biking, sailing or kayaking, and harvesting in the outdoors, including mushrooming, and plant and snail collection) and IR activities (gym, dancing or similar indoor activities, cultural events and concerts, cinema, indoor reading, indoor music, playing video-games, and navigating the Internet). We asked to indicate by affirmative answer whether the people had participated in each of the mentioned OR and IR activities. We also included three additional questions regarding recreational fishing (*Have you ever been fishing for recreation in your life? Are you planning to go fishing for recreation in the next year? and, if yes, are you planning to go fishing in freshwaters and/or marine waters?*). The responses served to classify participants into four different categories related to their leisure activities: RF, participants in COR (including hunting, mushrooming etc.), other OR, and exclusive participants in IR activities (IR) (Beard and Ragheb, 1983).

We classified an interviewee as an RF when he or she positively answered the three questions described above related to RF (Table 1, *n* = 84). We also estimated the number of current, lapsed, and future RF according to their answers to the three questions as presented in Table 1. We classified an interviewee as participant in COR (*n* = 200) when positively answering the question regarding COR activities (hunting, mushrooming, and plant and snail collection), and as participant in OR (*n* = 656) activities when positively answering the question regarding OR activities and was not classified as COR nor RF. Finally, we classified the interviewees as exclusive participants in IR, when participants had not practiced any OR activity during the last 12 months (*n* = 331). A total of 8 interviewees were not classified to any profile objective of this study (i.e., people who have not practiced any of those activities asked).

To estimate the number of participants in RF, COR, OR, and IR (participation rate), we used a ranking approach (*aka* iterative proportional fitting) as it uses iterative post-stratification to match marginal distributions of a survey sample to known population margins (in terms of the age and sex distribution of the population and the surveyed sample (Deville et al., 1993). We used the data of the adult population in Spain in July 2017 published by the National Institute of Statistics (Spanish Government). Accordingly, the population in Spain was 38,659,649 people, where 48.6% were men and 51.4% were women and was structured according to these three age classes:

from 17 to 30 years (age class 1, 15.77% of the adult population), from 31 to 65 years (age class 2, 61.25%), and 66 years or more (age class 3, 22.98%). The social-economic questions included both the gender and the age of the interviewee (see Section Social-Economic Differences Among the Outdoor and Indoor Profiles). We computed our own post-stratification weights of our sample regarding the gender and age structure of our survey sample to deal with biases in the frequency sampling and properly estimate population participation. We used the function *rake* of the R-package “survey” to compute the participation rate (in terms of absolute number and percent) and the confidential interval for each OR and IR profile (Lumley, 2010). The participation rate (%) for recreational fishing in Spain was computed not only as the class defined before (RF) but also independently for lapsed anglers, current anglers who fished during the last 12 months, and those with the intention of fishing in the future (intention to fish in the next 12 months).

Social-Economic Differences Among the Outdoor and Indoor Profiles

The second part of the survey aimed at studying the social-economic differences among the four subgroups (RF, COR, OR, and IR). A series of questions regarding the demographic and social characteristics of the interviewee was completed. These questions included: the *gender* of the respondent, the *age* (years), *living place* (categorized as urban-towns or rural-villages using the postal code), their *economic income* (1 = lower than €700/month, 2 = between €701 and €1,200/month, 3 = between €1,201 and €1,500/month, 4 = between €1,501 and €2,000/month, 5 = more than €2,000/month), and their *educational degree* (0 = none, 1 = primary, 2 = secondary and 3 = university degree). Not available (NA) was attributed to non-respondents. To test the differences among the different OR and IR groups, we used both univariate and multivariate approaches. Regarding the univariate approach, we computed two-proportions: *z*-test using the function *prop.test* among the variables, *gender* and *living place*, and the profiles to test for differences among the categorical variables. For continuous variables, we used ANOVA and *post-hoc* pairwise comparisons through Tukey’s Honest Significant Difference (HSD) test when significant ANOVA effects were found. Homogeneity in the variance was assessed by exploring plots of the raw data and a logarithmic transformation was applied in case of strong deviations from normality. Regarding the multivariate approach,

a principal component analysis (PCA) was performed to the mean-centered and scaled demographic and social variables to see the general patterns of variation among the outdoor and indoor profiles using the function, *pca* of the R-package *vegan* (Oksanen et al., 2019). All analyses were performed using R (R Core Team, 2017).

Motivations to Practice OR and IR Activities

The third part of the telephone survey aimed at revealing the motivations to practice the four profiles described below. We focused on the desired goal stated that were achieved by participation in OR and IR through recreation experience preference scales (Driver et al., 1991; Manfredi et al., 1996). Accordingly, the telephone survey included the question: *How important or unimportant are the following reasons to practice outdoor recreational activities?* According to the meta-analysis by Manfredi et al. (1996), we selected a number of representatives within the domain-grouping items that represented the dimensions of the broader goal constructed. These items involved all preference domains described for leisure motivation: achievement/stimulation, autonomy/leadership, risk-taking, equipment, family, similar people, new people, learning, enjoy nature, introspection, creativity, nostalgia, physical fitness and rest, escape from personal social pressures, escape from physical pressure, and teaching others (Manfredi et al., 1996). The respondents were asked to answer the question for each item (in total, 17 items) using a Likert-type importance/non-importance scale: absolutely essential (2 for the analysis), very important (1), important (0), not important (-1), and not important at all (-2). To test for the difference among the motivations of the different outdoor and indoor groups (RF, COR, OR, and IR), we used a General Linear Model (GLM) using the original scale for each item using the R-package. We computed the coefficients (motivation scores) and CI for each profile with respect to the RF subgroup and tested the differences between pairs of recreational profiles.

Wildlife-Related Value Orientations of Outdoor and Indoor Recreationists

The fourth part of the survey was based on estimating the WVO of the four profiles of outdoor and indoor recreationists. Following the previous work, four WVO types were estimated corresponding to the combinations of different answers on the domination and the mutualism WVO by Teel et al. (2005) and Teel and Manfredi (2010) (mutualist, utilitarian, pluralist, and distanced). We selected 9 out of the original 28 items concerning basic beliefs about the use and rights of fish and wildlife use and included them in the telephone survey. We slightly adapted some of the items for better representing fisheries and fish. The questions were divided into two basic WVOs: mutualism and utilitarianism. Mutualism items included: *We should strive for a world where humans and fish and wildlife can live side by side without fear; It would be more rewarding to me to help animals rather than people; I value the sense of companionship I receive from animals; and Fish are valuable in their own right, regardless of*

people. Regarding the utilitarian value orientation, we considered five items: *Humans should manage fish and wildlife populations so that humans benefit; The needs of humans should take priority over fish and wildlife protection; Fisheries are valuable only if they produce jobs and income for people; It is acceptable to use fish and wildlife in research even if it may harm or kill some animals; and It is acceptable for people to kill wildlife if they think it poses a threat to their life.* The nine items were randomly sorted in the telephone survey.

Respondents rated their level of agreement with belief items on a scale from strongly disagree (1) to strongly agree (5) and (3) the neutral score. We examined the reliability or item interrelatedness of value-orientation scales using Cronbach's alpha. We computed the mean of each respondent of each corresponding belief dimension item to generate an individual value-orientation score and tested differences among the four indoor and outdoor participant groups using ANOVA in relation to both utilitarianism and mutualism value orientations. In case of significant differences, we used Tukey's test to extract a set of CIs and *p*-value on the differences between the means of the levels. We then segmented the respondents into four different types of WVO types by comparing their scores on utilitarianism and mutualism *via* a cross-tabulation procedure (Teel and Manfredi, 2010). Types were classified on the basis of whether they scored high (>the population mean of the dimension) or low (<the population mean of the dimension) on mean composite belief dimension scales. Mutualists scored high on mutualism and low on utilitarian WVO, the utilitarians scored high on utilitarian and low on mutualism, and the pluralists scored high on both WVOs, while the distanced individuals scored low on both WVOs. We compared the proportion of WVO types in the four recreational profiles and tested differences using a two-proportion *z*-test.

RESULTS

Participation in OR and IR Activities Including RF and Validation of Results

Outdoor recreational activities received the highest participation rate with 49.4% [46.3–52.5], meaning that about half of the Spanish people carried out some OR activity, such as skiing, hiking, walking, wildlife watching, diving, biking, sailing, or kayaking during the last 12 months (Table 2 and Figure 2). 28.4% [25.5–31.2] of the Spanish people practiced only IR activities without taking part in RF and any kind of OR activity (Table 2 and Figure 2). Moreover, 100% of people practicing OR had practiced some IR at leisure in the last 12 months.

Between the different outdoor activities related to some consumptive activity, we estimated a participation rate of 15.3% [13.1–17.6] of the population in COR including hunting, mushroom gathering, and snail and plant collection. The estimated rate of participants in RF was the lowest of the four subgroups (IR, OR, COR, and RF) with 6.6% [5.1–8.1] of the population being classified as RFs (Table 1 and Figure 2). About 73% of the responders classified as RF had planned to go fishing in marine waters, while about 40% had planned to go fishing in

TABLE 2 | Criteria, participation rates (%) and social-economic attributes of the four profiles considered in this study regarding outdoor recreation (OR) and indoor recreation (IR).

| Type of participant | Criteria | National participation rate [CI] | Gender (%) | Urban vs. Rural (%) | Age (years) | Economic income (1–5) | Educational level (0–3) |
|--------------------------------------|---|----------------------------------|---|---|--|--|--|
| Recreational Fishing (RF) | Historical, current recreational fisher with intention to fish next year | 6.6% [5.1–8.1] | Male (72%) Female (28%) ^{COR,OR,IR} | Urban (57.3%) Rural (42.7%) ^{COR} | 43.1 ± 14.2 years | 3.5 ± 1.3 degree ^{IR} | 2.4 ± 0.7 degree ^{IR} |
| Consumptive Outdoor Recreation (COR) | Non-participant, in recreational fishing, who performs some kind of consumptive outdoor recreation | 15.3 [13.1–17.6] | Male (53.3%) Female (46.7%) ^{RF} | Urban (42.5%) Rural (57.6%) ^{RF} | 44.8 ± 16 years ^{IR} | 3.3 ± 1.3 degree ^{IR} | 2.4 ± 0.7 degree ^{IR} |
| Outdoor Recreation (OR) | Non-participant, in recreational fishing, who performs some kind of outdoor recreation | 49.4 [46.3–52.5] | Male (47.8%) Female (52.2%) ^{RF} | Urban (48.5%) Rural (51.5%) | 42.5 ± 14.7 years ^{IR} | 3.2 ± 1.3 degree ^{IR} | 2.5 ± 0.7 degree ^{IR} |
| Indoor Recreation (IR) | Non-participant, in recreational fishing or other form of outdoor recreation, who only perform some kind of indoor recreation | 28.4 [25.5–31.2] | Male (43.6%) Female (56.4%) ^{RF} | Urban (45.6%) Rural (54.4%) | 49.5 ± 16.4 years ^{COR,OR} | 2.8 ± 1.4 degree ^{RF,COR,OR} | 2.2 ± 0.8 degree ^{RF,COR,OR} |

The table shows the criteria used to classify the types of participants in the survey, the national participation rate (as % and Confidential Interval, CI), the proportion of men and women participants, the proportion of urban and rural participants, the mean and standard deviation (SD) of the age per profile, the mean (SD) of the economic income per profile, and the mean (SD) of the education level per profile. Economic income (1 = lower than €700, 2 = between €701 and €1,200, 3 = €1,201–€1,500, 4 = €1,501–€2,000, 5 = more than €2,000) and educational degree (0 = None, 1 = Primary 2 = Secondary, and 3 = University degree) are shown as numbers. Significant ($p < 0.05$) two-proportion z-test and post-hoc pairwise comparisons through Tukey's HSD are noted in uppercase letters of pairs.

freshwater, and 13% of the RF had planned to go fishing in both environments. The estimated number of RFs in Spain, however, varied according to the criteria adopted to classify a respondent as RF, which was the highest for historical RF with over half of the population involved (Table 1).

The validity of the participation rate estimated using random telephone surveying is supported by a general inquiry at the national level about participation in one or more sports (39.4%; CIS, 2005) and by other sources like the number of hunting licenses. As hunters need several permits, including a license to carry guns, the actual number of licenses represents a good source of participation rate in hunting. According to our telephone survey, although the number of hunters surveyed was low, we predicted the total number of hunters in Spain to be 875,395 [496,080–1,254,711] (those that answered positively to the question *Have you gone out for hunting in the last 12 months?*). According to the general register of the Spanish Government, the number of hunting licenses issued in 2017 was 827,771 (MAPA, 2017), which is very well-aligned with our survey, and overall suggests that our surveying method generates accurate estimations of the participation rate in the IR and OR activities evaluated.

Social-Economic Differences Among the OR and IR Types

Regarding the five attributes evaluated—gender, urban vs. rural, age, economic income, and educational degree (Table 2)—the social-economic differences among the profiles revealed some

significant patterns. There was an increase in the participation of women from RF, COR, OR, to IR, with RF involving the lowest participation of women (only 28% of participation rate), which was significantly ($p < 0.01$) different from the others (Table 2 and Figure 2). For COR, OR, and IR, gender proportions did not differ significantly (Table 2). Regarding the proportions of urban and rural participants in each activity, there were significant differences between RF and COR profiles ($p < 0.05$), with the proportion of rural participants being higher in COR relative to RF (Table 2). There were non-significant differences among the other recreational groups (Table 2 and Figure 2). The RF average age did not differ significantly from the other groups (Figure 2), and we only detected significant differences between the participants in IR and the COR and OR profiles, with IR participants being significantly older (Table 2). The average income and educational level between RF, COR, and OR were similar, and the only group that differed significantly from the others were the participants in IR (Figure 2), where interviewees significantly had lower incomes and educational levels (Table 2). The two first components of the PCA applied to the social-economic attributes summarized the individual univariate results, showing gender as the major attribute causing differences (indicated by the longest vector in Figure 3), age, income, and educational degree contributing to the profile differences due to the IR effect, and a small non-significant effect of being urban or rural (Figure 3). Regarding the correlation among attributes, in general, the five social-economic attributes were uncorrelated (Figure 3).

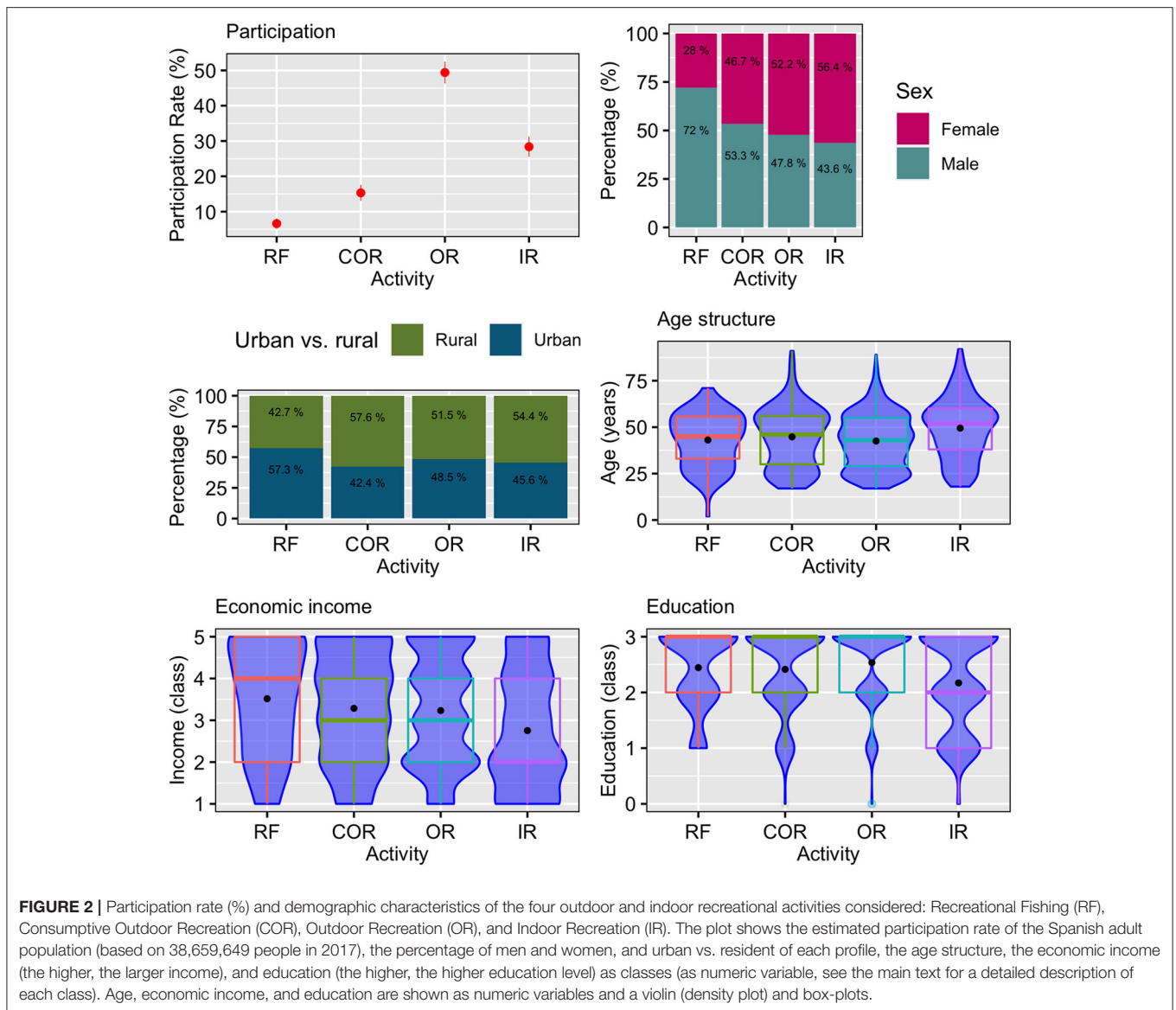
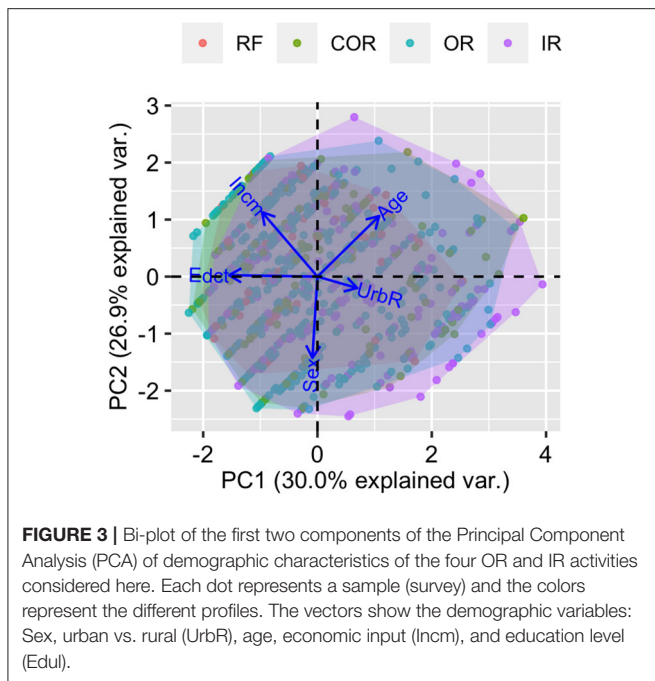


FIGURE 2 | Participation rate (%) and demographic characteristics of the four outdoor and indoor recreational activities considered: Recreational Fishing (RF), Consumptive Outdoor Recreation (COR), Outdoor Recreation (OR), and Indoor Recreation (IR). The plot shows the estimated participation rate of the Spanish adult population (based on 38,659,649 people in 2017), the percentage of men and women, and urban vs. resident of each profile, the age structure, the economic income (the higher, the larger income), and education (the higher, the higher education level) as classes (as numeric variable, see the main text for a detailed description of each class). Age, economic income, and education are shown as numeric variables and a violin (density plot) and box-plots.

Motivations to Practice OR and IR Activities

Figure 4 shows the motivation scores (\pm CI) for each profile (RF, COR, OR, and IR). In general, the motivations to practice OR and IR were similar for several motivation items that received low importance scores, for example taking risks, competing with others, being alone or being a member of a club (Figure 4). By contrast, the motivation items related to getting exercise, staying with the family, relaxing psychologically, getting away from the usual life, experiencing tranquility and being close to nature, were significantly and strongly different between OR (including RF) and IR activities; being significantly more important for OR than for IR (Figure 4). None of these motivation items just mentioned were statistically different from zero for IR (Figure 4). The most important motivations for RF were, in the order of importance:

to be close with nature, to experience tranquility, to get away from the usual demands of life, to relax psychologically, to stay with family; and to get exercise (Figure 4). With respect to the objective of this study (contrasting RF with the other OR and IR activities), the RF profile significantly differed in three items relative to COR, to test the equipment being more important for RF, to discover something new, and to get exercise being more important for COR (Table 3). The RF and OR motivations differed significantly on five motivation items (Table 3). The RF placed significantly more importance on the aspect to stay with family, to test equipment, to compete with others, and to teach others relative to OR, while to discover new things was more important for OR compared to RF (Table 3). Finally, with respect to the comparison between RF and IR participants, both profiles significantly differed in 12 (out of the 17) motivation items,



indicating that IR represents a completely different motivational profile than RF (Table 3).

Wildlife-Related Value Orientations of OR and IR

The estimated Cronbach's alpha to explore the internal consistency reliability of the scale to measure domination and mutualism were 0.65 [0.62–0.68] and 0.62 [0.58–0.65], respectively. The mean (SD) of the different groups of the utilitarian orientation were 2.8 ± 0.6 for RF, 2.7 ± 0.69 for COR, 2.7 ± 0.72 for OR, and 2.85 ± 0.74 for IR. The ANOVA and posterior Tukey's test only revealed a significant difference between OR and IR profiles, ranking IR participants higher on domination (ANOVA, F -value = 3.012, $p < 0.05$). The mean (SD) of the different groups of the mutualism orientation were 3.48 ± 0.75 for RF, 3.59 ± 0.69 for COR, 3.54 ± 0.64 for OR, and 3.51 ± 0.59 for IR, the values were not statistically different (ANOVA, F -value = 0.903, $p = 0.439$). The general analysis of the proportions of WVO types of the Spanish population resulted in 25.7% of the respondents being segmented as mutualists, 17.9% as distanced, 15.5% as pluralists, and 40.9% as utilitarians (Figure 5). In general, the proportions of mutualists, utilitarians, pluralists, and distanced were consistent across all the recreational participants, and the two-proportion z -test on paired profiles did not show any significant differences (Figure 6).

DISCUSSION

Leisure and recreational activities provide important benefits to communities that including improving the health and the well-being of individuals, contributing to the empowerment of individuals, and promoting the development of inclusive

communities that integrate people of all different ages, abilities, and levels of skill. The types of recreation and leisure activities people participate in vary greatly depending on the local context, and tend to reflect the social systems and cultural values. Our nation-wide survey on the adult Spanish population provided a first insight about the popularity and break down of recreation activities at the national level. The majority of respondents practiced some recreation activities and the participation in OR was overwhelming: 6 out of 10 Spanish people have practiced some OR (including COR), and have been in contact with OR during the last 12 months. The IR followed with 3 out of 10, while RF was only practiced by <1 out of 10 people in Spain.

In general, OR participation is higher than IR in all countries, with 48.8% people in USA practicing OR in 2016, for instance (The Outdoor Foundation, 2017). Probably, the mild weather in Spain facilitates the OR practice as well as the low cost of many OR practices (i.e., walking) explaining the higher participation, contrasting with IR practitioners who in general have lower income levels and education (Figure 2). The ongoing COVID-pandemic will probably exacerbate the differences between participation rates in OR and other nature-related activities with IR (Landry et al., 2021). Our work provides the raw basal data to assess this change in Spain.

Regarding the specific case of RF, the level of participation reported (6.6%) and the number of participants (over 2.5M, Table 1) were higher than previous estimates. For example, Gordo et al. (2019) reported over 871,000 marine recreational fishers based on the license system, while our work estimates that the actual number of people (not boats) involved in marine recreational fisheries in Spain is 1,868,291 [1,450,302–2,286,280] based on the percentage of people who have planned to fish marine water bodies (73% of the RF). The previous underreporting can be attributed to several reasons. First, our work is the first nation-wide survey to estimate the participation rate in RF in Spain, considering both freshwater and marine recreational fisheries, while previous work mostly focused on one of the two environments. Second, our work is the first direct evaluation of the participation using random surveying, independent of fisheries data. Previous assessments were based on official licenses or permits (Morales-Nin et al., 2015; Gordo et al., 2019; Pita and Villasante, 2019). The high diversity of licenses and permits (including boating, rather than individual issuing) among the Spanish regions render the determination of the actual number of people involved in the challenging RF (Pita and Villasante, 2019). To illustrate this problem with the licenses, we can consider the example of the Balearic Islands, one of the Spanish regions with high interest in RF (Morales-Nin et al., 2005; Alós et al., 2014; Cabanellas-Reboredo et al., 2017). Among the number of licenses issued in 2017, 32,134 licenses were issued for shore fishing (individually issued), 1,470 for spearfishing (individually issued), and 12,044 for boating, suggesting a total number of 45,648 recreational fishers. However, a simple simulation of a yearly-round fishing season, where the 30% licensed RF boats go out for fishing the weekends, with two or three different fishers on board (as revealed by Cabanellas-Reboredo et al., 2017), generates over 100,000 recreational fishers—a number that is pretty close to the obtained by our

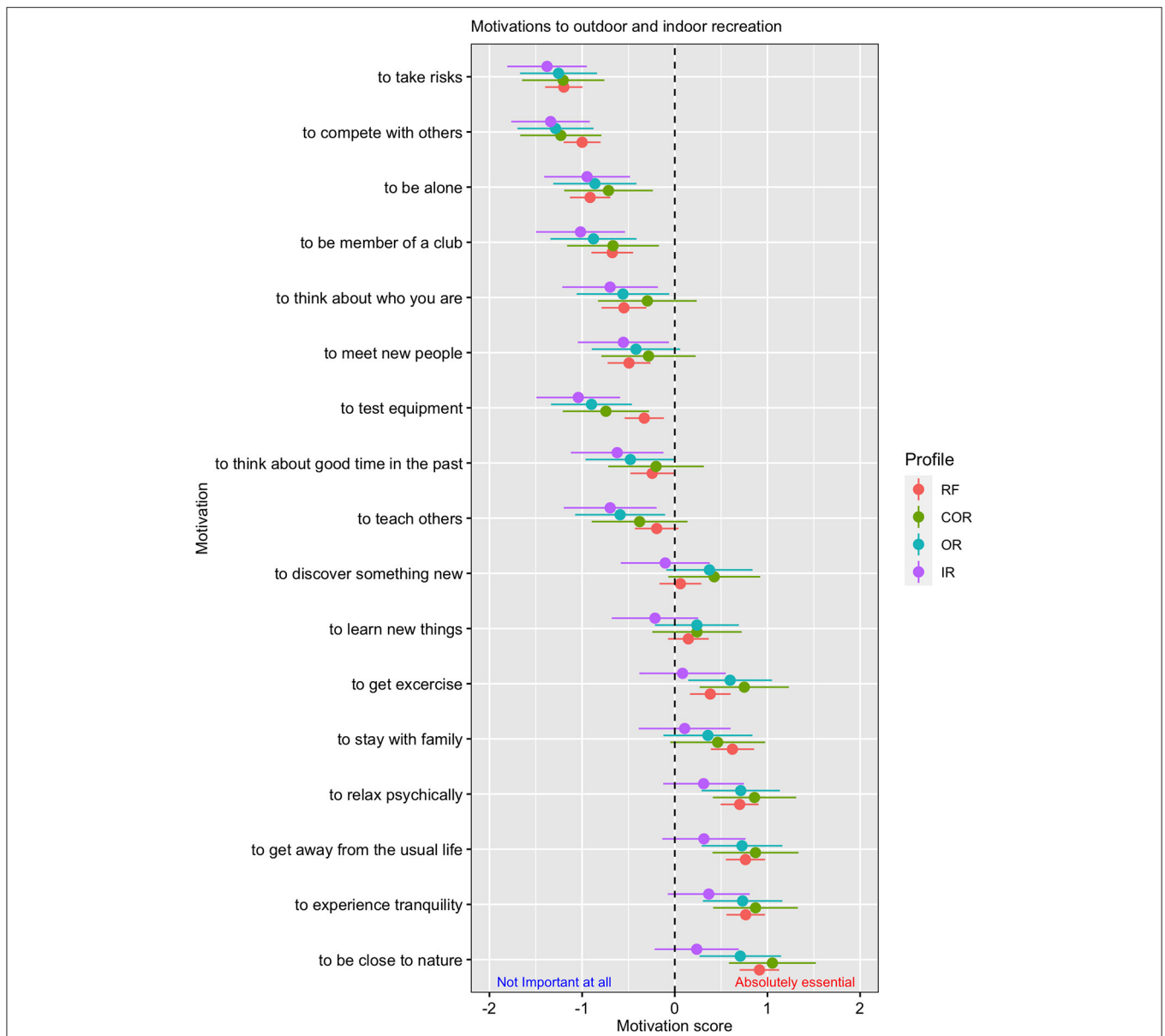


FIGURE 4 | Motivation scores (dot) and Confidence Interval (CI) generated by fitting a General Linear Model (GLM) to each motivation item and for each outdoor and indoor profile: Recreational fishing (RF), consumptive outdoor recreation (COR), outdoor recreation (OR), and indoor recreation (IR). The plot is shown in Likert-type importance/non-importance scale and was scaled from -2 to 2 for the analysis, where visualization is absolutely essential (2 for the analysis), very important (1), important (0), not important (-1), and not important at all (-2).

random telephone survey when only focusing the Balearic Islands (1.2 million of citizens from the Balearic Islands, based on a report in 2017). This previous underestimation induced by heterogeneous license systems and the fact that 5% of the people in Spain practices RF illegally, without license or permit (Gordoa et al., 2019), has generated a distorted picture about the social magnitude and the participation rates of the Spanish population based on the license system. A switch to a harmonized system based on individuals (Pita and Villasante, 2019), accompanied by regular random survey assessment like the one performed by us, should provide a better view of the actual number of participants

in RF—which we estimated as 6.6% of the population in 2017—a key factor to estimate effort and captures from this sector (in conjunction with individual effort and catch).

The participation rate estimates, however, changes according to the definition of “recreational fisher” (Table 1), and results varied from almost half of the population of lapsed fishers (have fished at least once in their lives) to 6.6% of the current anglers (Table 1). Participation rate alone does not necessarily reflect the total effort in the population. In fact, the effort of most of the recreational fishers is very low, and they generally are classified as low avid (Cabanellas-Reboredo et al., 2017). Instead, total

TABLE 3 | Parameters of the General Linear Models (GLM) fitted to each motivation item and for each outdoor and indoor profile: Recreational Fishing (RF), Consumptive Outdoor Recreation (COR), Outdoor Recreation (OR) and Indoor Recreation (IR).

| Motivation item | Profile | Coef. | CI-l | CI-u | P-value |
|--------------------------------------|---------|-------|-------|-------|-------------|
| To stay with family | OR | -0.26 | -0.51 | -0.02 | $p < 0.05$ |
| | IR | -0.52 | -0.78 | -0.25 | $p < 0.001$ |
| To test equipment | COR | -0.41 | -0.67 | -0.16 | $p < 0.01$ |
| | OR | -0.57 | -0.79 | -0.34 | $p < 0.001$ |
| | IR | -0.71 | -0.95 | -0.47 | $p < 0.001$ |
| To learn new things | IR | -0.36 | -0.61 | -0.11 | $p < 0.01$ |
| To be a member of a club | IR | -0.34 | -0.60 | -0.09 | $p < 0.01$ |
| To discover something new | COR | 0.37 | 0.09 | 0.64 | $p < 0.01$ |
| | OR | 0.31 | 0.07 | 0.55 | $p < 0.05$ |
| To be close to nature | IR | -0.68 | -0.92 | -0.44 | $p < 0.001$ |
| To compete with others | OR | -0.29 | -0.50 | -0.08 | $p < 0.01$ |
| | IR | -0.34 | -0.56 | -0.12 | $p < 0.01$ |
| To think about good time in the past | IR | -0.38 | -0.64 | -0.11 | $p < 0.01$ |
| To get exercise | COR | 0.37 | 0.11 | 0.63 | $p < 0.01$ |
| | IR | -0.30 | -0.55 | -0.05 | $p < 0.05$ |
| To relax psychically | IR | -0.39 | -0.62 | -0.16 | $p < 0.01$ |
| To get away from the usual life | IR | -0.45 | -0.69 | -0.21 | $p < 0.001$ |
| To experience tranquility | IR | -0.40 | -0.63 | -0.16 | $p < 0.01$ |
| To teach others | OR | -0.40 | -0.65 | -0.15 | $p < 0.01$ |
| | IR | -0.50 | -0.77 | -0.24 | $p < 0.001$ |

The table shows the coefficients of each profile with respect to the intercept of the model (not shown) which represents the RF, the Confidence Interval (CI) and the p-value of the original Likert-type importance/non-importance scale. Only significant ($p < 0.05$) coefficients are shown, and they can be interpreted as significant differences (positive or negative) with respect to the RF coefficient (the intercept of the GLM).

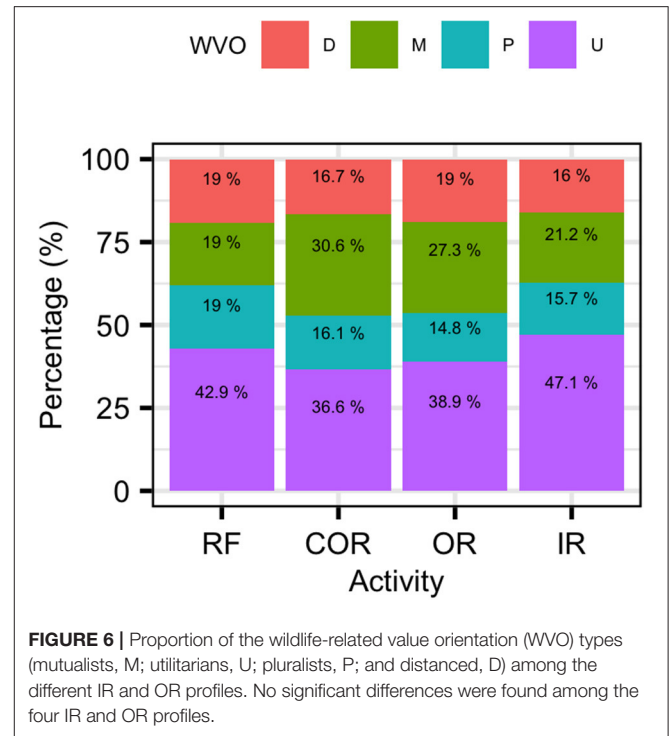
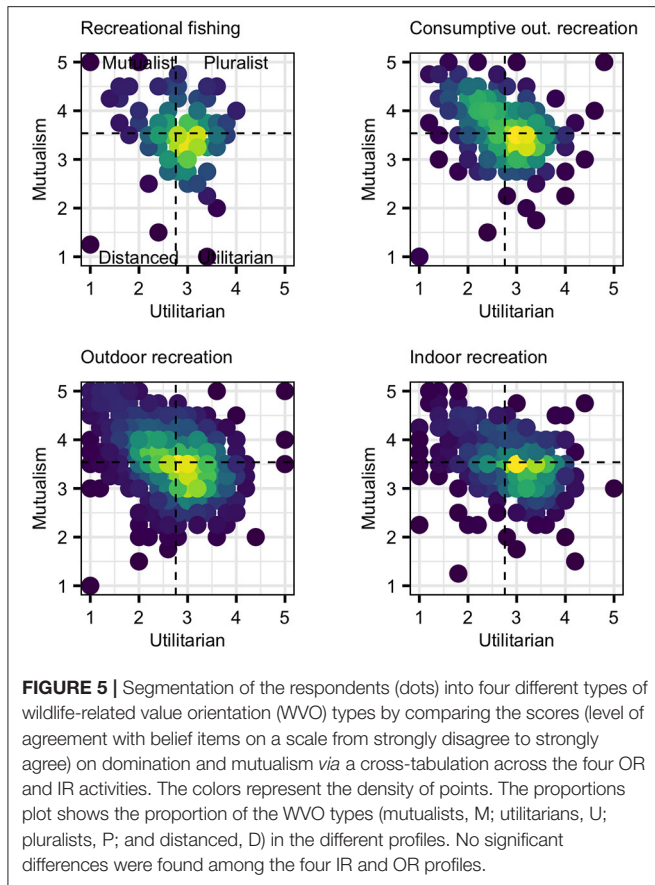
effort is a combination of the participation rate, the individual fishing activity, and the population magnitude (Aas, 1995). However, considering the closed definitions to the actual number of recreational fishers (RF 6.6% and current 9.7% participation rates, **Table 1**), the Spanish participation rates are on average similar to the other industrialized countries (Arlinghaus et al., 2015, 2021). A relevant issue, however, is that both, the estimates of ours and previous estimates, do not consider ages younger than 18. In most of the regions of Spain, these people do not need a license or permit; moreover, our survey was based only on the adult population. The participation of young generations deserves further attention, as this fraction of the population can constitute an important fraction of the RF population (Dargitz, 1988) and because most fishers recruit from their first experiences during childhood.

Regarding the demographic characteristics, our results suggest that all the groups of the Spanish society are involved in RF; young and old, with high and low income, or with high and low educational degree. The only social group that is misrepresented in comparison to OR and IR are women (28% of the participants in RF are women). Gender was the main driver of differentiation among recreational activity, with a predominance of women in IR and a low percentage of women in RF. Typically, women are substantially underrepresented among anglers, which has also been found, for example in Germany (Arlinghaus, 2004). Gender has received considerable attention in the leisure literature, given its influence on the meanings that individuals ascribe to their

experiences (Wood and Danylchuk, 2012). Gendered differences become more pronounced in the outdoors because women tend to be more risk-averse in their leisure choices (Wiley et al., 2000; Evans, 2014; Morris et al., 2018), which is in agreement with our findings. The low participation of women in RF has been reported elsewhere (Fedler and Ditton, 2001; Floyd et al., 2006; Hyder et al., 2018), and confirmed here for Spain. The causes of the low woman engagement in RF, as well as the social-economic profile of women deserve further attention.

Surprisingly, considering the involvement of demographics in the groups, there are no general differences between rural and city dwellers, albeit rural dwellers and IR participants having generally lower economic level. We only detected a significant difference between RF and COR, suggesting that participants on COR are more rural-oriented participants than RF whose profiles are closer to OR and IR profiles. The age range was similar between leisure practices except in IR where they tended to be older. The physical and psychological benefits of OR (Brown, 1981; Breitenstein and Ewert, 1990), including RF (Freudenberg and Arlinghaus, 2009; McManus et al., 2011), have been described elsewhere. We, therefore, encourage the reduction of the age differences between IR and OR activities by promoting outdoor activities, including recreational fisheries, to older class ages to invert this tendency. This is particularly relevant in the current COVID-pandemic situation.

Our results on motivations to practice the leisure activities showed that for all OR modalities, to experience tranquility and



stay close to nature were the main motivations. Other physical and social benefits are also relevant, like staying with family and to get away from the usual life. Across all recreational types, among the 17 items presented (Figure 4), the least important was to take risks and compete with the introspective aspects (to be alone, to think about who you are, and to think about the past), while some social aspects (to be a member of a club, to meet new people, and to teach others) were more relevant, but not decisive. The main motivations of all recreationists were first to be close to nature, followed by the experiences linked to escape; like to enjoy tranquility, to relax, or to be away from the usual life. Getting exercise was relatively important as well as learning new things. Therefore, the motivations linked to the vectors, self, and experience (Dillard and Bates, 2011) were the main ones, irrespective of the leisure activity practiced. These results largely follow previous work in OR (Driver and Knopf, 1976; Driver et al., 1991; Gaffar et al., 2019). For example, the main motivations for the participants in mountain biking in Norway were physical exercise, contemplation, and nature and location (Skår et al., 2008). Significant differences were found between IR and other practitioners, in particular RF. For IR, the motivations linked to experience were less important, being, in general, less motivated than people engaged in other activities (Figure 4). The motivation of the IR practitioner is linked to pleasure (Sargent, 1972), while association with the natural environment is linked to OR (Crandall, 1980).

Regarding RF, there are many motivations to fish, some of the most important are temporary escape, being outdoors, relaxation, and the experience of the catch (Driver and Knopf, 1976; Fedler and Ditton, 2001; Schramm and Gerard, 2004; Beardmore et al., 2011). Motivations and satisfaction can vary, as shown in Germany where anglers relatively give little importance to catch motives but whose satisfaction is still mainly catch-dependent (Arlinghaus, 2006). Although RF is the foremost leisure activity, the harvest of fish for personal consumption by RFs has contributed and will continue to do so, to human nutrition by providing an accessible, affordable, and often sustainable food source, notwithstanding concerns about food safety and possibly overfishing (Cooke et al., 2018). In Majorca Island, the motivations for practicing RF were highly hedonic, with 92% of the responses declaring leisure reasons. Related to this fact is the prioritization of sites to practice recreational fishing in quiet places ranked first. The second motivation for practicing recreational fishing was catch consumption, which is preferably freshly consumed (82% of responses) or frozen for later consumption (Morales-Nin et al., 2015). This work constitutes to be the first comparison of the motivations of OR and IR that can be considered managing any kind of recreation in Spain.

We found only modest differences among recreational types in WVO. This indicates that most participants in contemporary Spain have a similar value system with regard to wildlife, independent of what type of recreation they practice. An alternative explanation is that we may have chosen a too coarse of a grouping for differences to show up. Also the reliability of the two WVOs did not meet the standard of 0.7, suggesting that more work on item framing and translation is needed

to render the WVO reliable in the Spanish culture (Nunnally, 1975). Before this research becomes available, we provide for the first time, the means of the two basic WVOs (utilitarianism and mutualism) in Spain. Despite subtle differences, we found utilitarian scores were statistically lower in OR participants than in IR participants, suggesting a slight decrease in the belief that wildlife should be managed for human benefit in OR participants. This is consistent with the idea that the OR class is not involved in any kind of consumptive activity (fishing or hunting). Results were not consistent in mutualism, and we did not find any significant difference among groups, suggesting a similar belief that humans and animals can co-exist in harmony, and that wildlife deserves some form of rights and care. Compared to other countries, Teel et al. (2010) reported the mutualism scores in eight European countries (Austria, Belgium, France, Hungary, Netherlands, Romania, Slovakia, and Scotland) in urban, semi-urban, and rural citizens showing a mean of 3.5, 3.46, and 3.45, respectively. We found an overall average of 3.5 in the mutualism score for the Spanish participants, suggesting that Spain falls into average values of basic WVOs as in other western and European countries.

Regarding the percentages of the four WVO, we found that, at the national level, about 40.8% of the profiled respondents scored as utilitarians, 25.9% as mutualists, 17.7% as distanced, and 15.6% as pluralists. The three OR groups did not show any significant differences in their beliefs toward wildlife; however, small differences were found for IR. In comparison with other countries, Teel et al. (2010) reported that in the United States, 25–50% of participants were classified as utilitarians, 15–41% as mutualists, 15–31% as pluralists, and 6–19% as distanced, numbers that include the observed values and similar pattern in Spain. In recent years, there has been a persistent argument that when societies modernize—as registered in terms of sociodemographic factors, such as residence (becoming more urban), education (more people having a higher education), and income (people getting more affluent)—our views of wildlife also change, eventually leading to an erosion of support of traditional uses of wildlife and greater support for biodiversity conservation (Manfredo et al., 2003, 2020, 2021). In turn, public value orientations toward wildlife seem to become less utilitarian and more protectionist (Zinn et al., 2002; Manfredo et al., 2021). Our work provides the basic data to explore that these global patterns also start occurring in southern Europe.

CONCLUSION

We found that OR is highly relevant to Spanish society and that the participation in RF is higher than previously believed, with over 2.5 M participants, distributed over freshwater and marine environments. The RF is present in all the segments of society, excluding women. Motivation to fish was found to be similar among all ORs, but strong differences between IR and RF were found. Key motives that distinguish RF from IR include the enjoyment of nature, experiencing tranquility, getting away from the usual demands of life, relaxing psychically,

or staying with family. In the current crisis time, due to the COVID-19 pandemic, the relevance of OR and of RF is bound to further increase, and another analysis suggests that this activity captures specific motivations and is completed by an otherwise similarly concerned segment of society with regard to human treatment of wildlife. In fact, recreational anglers were found to be overwhelming pluralists, i.e., they not only care for their catch but also perceive wildlife and fish as to be deserved for caring and protection. However, as RF is a consumptive activity, in certain situations it can produce a high level of exploitation of fish resources (Alós et al., 2012, 2016; Martorell-Barceló et al., 2018). Thus, proper management of the activity is necessary to maintain both the biological productivity of the exploited stocks considering the social and cultural dimension of RF in Spain.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by request to the corresponding author, without undue reservation.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

BM-N and JA identified the objectives and carried out the fieldwork. RA contributed to the study design and analytical methodology. JA carried out the data analysis. BM-N, JA, and RA jointly discussed results and discussion and drafted the manuscript. All authors contributed to the article and approved the submitted version.

FUNDING

JA was supported by the Ramón y Cajal Grant (Grant no. RYC2018-024488-I), funded by the Spanish Ministry of Science and Innovation (MICINN), and he also received funding from the CLOCKS R&D Project (grant no. PID2019-104940GA-I00) funded by the MICINN and the Agencia Estatal de Investigación, and the intramural research project, JSATS (Grant no. PIE202030E002) funded by the MICINN and the Spanish National Research Council (CSIC). RA acknowledges funding from the German Ministry of Education and Research (marEEshift: 01LC1826D, Aquatag 033W046A).

ACKNOWLEDGMENTS

The Balearic Institute for Advanced Sociological Studies (IBES) is acknowledged for its support. We thank Mrs. Silvía Pérez-Mayol for providing technical support.

REFERENCES

- Aas, Ø. (1995). Constraints on sportfishing and effect of management actions to increase participation rates in fishing. *N. Am. J. Fish. Manag.* 15, 631–638.
- Alós, J., Palmer, M., and Arlinghaus, R. (2012). Consistent selection towards low activity phenotypes when catchability depends on encounters among human predators and fish. *PLoS ONE* 7:e48030. doi: 10.1371/journal.pone.0048030
- Alós, J., Palmer, M., Rosselló, R., and Arlinghaus, R. (2016). Fast and behavior-selective exploitation of a marine fish targeted by anglers. *Sci. Rep.* 6:38093. doi: 10.1038/srep38093
- Alós, J., Palmer, M., Trias, P., Díaz-Gil, C., and Arlinghaus, R. (2014). Recreational angling intensity correlates with alteration of vulnerability to fishing in a carnivorous coastal fish species. *Can. J. Fish. Aquat. Sci.* 72, 217–225. doi: 10.1139/cjfas-2014-0183
- Arlinghaus, R. (2004). *Recreational Fisheries in Germany—A Social and Economic Analysis, Report No. 18*. Berlin: Berichte des IGB.
- Arlinghaus, R. (2006). On the apparently striking disconnect between motivation and satisfaction in recreational fishing: the case of catch orientation of German anglers. *N. Am. J. Fish. Manag.* 26, 592–605. doi: 10.1577/M04-220.1
- Arlinghaus, R., Aas, Ø., Alós, J., Arismendi, I., Bower, S., Carle, S., et al. (2021). Global participation in and public attitudes toward recreational fishing: international perspectives and developments. *Rev. Fish. Sci. Aquac.* 29, 58–95. doi: 10.1080/23308249.2020.1782340
- Arlinghaus, R., Abbot, J. K., Fenichel, E. P., Carpenter, S. R., Hunt, L. M., Alós, J., et al. (2019). Opinion: governing the recreational dimension of global fishes. *Proc. Natl. Acad. Sci. USA* 116, 5209–5213. doi: 10.1073/pnas.1902796116
- Arlinghaus, R., Tillner, R., and Bork, M. (2015). Explaining participation rates in recreational fishing across industrialised countries. *Fish. Manag. Ecol.* 22, 45–55. doi: 10.1111/fme.12075
- Aşan, K., and Emeksiz, M. (2018). Outdoor recreation participants' motivations, experiences and vacation activity preferences. *J. Vacat. Mark.* 24, 3–15. doi: 10.1177/1356766716676300
- Beard, J. C., and Ragheb, M. G. (1983). Measuring leisure motivation. *J. Leis. Res.* 15, 219–228. doi: 10.1080/00222216.1983.11969557
- Beardmore, B., Haider, W., Hunt, L. M., and Arlinghaus, R. (2011). The importance of trip context for determining primary angler motivations: are more specialized anglers more catch-oriented than previously believed? *N. Am. J. Fish. Manag.* 31, 861–879. doi: 10.1080/02755947.2011.629855
- Bell, S., Tyrväinen, L., Sievänen, T., Pröbstl, U., and Simpson, M. (2007). Outdoor recreation and nature tourism: a European perspective. *Living Rev. Landsc. Res.* 1:2. doi: 10.12942/lrll-2007-2
- Bimonte, S., and Faralla, V. (2014). Happiness and nature-based vacations. *Ann. Tour. Res.* 46, 176–178. doi: 10.1016/j.annals.2014.02.002
- Bjerke, T., And, C. T., and Kleiven, J. (2006). Outdoor recreation interests and environmental attitudes in Norway. *Manag. Leis.* 11, 116–128. doi: 10.1080/13606710500520197
- Breitenstein, D., and Ewert, A. (1990). Health benefits of outdoor recreation: implications for health education. *Health Educ.* 21, 16–21. doi: 10.1080/00970050.1990.10616165
- Brown, P. J. (1981). "Psychological benefits of outdoor recreation," in *Social Benefits of Outdoor Recreation*, ed J. R. Kelly (Washington, DC: Department of Agriculture, Forest Service), 13–17.
- Bruskotter, J. T., and Fulton, D. C. (2008). Minnesota anglers' fisheries-related value orientations and their stewardship of fish resources. *Hum. Dimens. Wildl.* 13, 207–221. doi: 10.1080/10871200802023227
- Bruskotter, J. T., and Fulton, D. C. (2013). The future of fishing: an introduction to the special issue. *Hum. Dimens. Wildl.* 18, 319–321. doi: 10.1080/10871209.2013.823580
- Cabanellas-Reboredo, M., Palmer, M., Alós, J., and Morales-Nin, B. (2017). Estimating harvest and its uncertainty in heterogeneous recreational fisheries. *Fish. Res.* 188, 100–111. doi: 10.1016/j.fishres.2016.12.008
- Christensen, K. M., Holt, J. M., and Wilson, J. F. (2013). The relationship between outdoor recreation and depression among older adults. *World Leis. J.* 55, 72–82. doi: 10.1080/04419057.2012.759143
- CIS (2005). *Data From: Los Hábitos Deportivos de los Españoles (III) [The Sports Habits of the Spaniards (III)]*. Madrid: Centro de Investigaciones Sociológicas. Available online at: http://www.cis.es/cis/export/sites/default/Archivos/Marginales/2580_2599/2599/Cru2599_enlace.html
- Clark, A. G., Thompson, T. W., Vernon, J. L., and Whittaker, A. (2017). Utah's watershed restoration initiative: restoring watersheds at a landscape scale. *Hum. Wildl. Interact.* 11, 302–310. doi: 10.26077/g8we-ta66
- Coll, J., Linde, M., García-Rubies, A., Riera, F., and Grau, A. M. (2004). Spear fishing in the Balearic Islands (west central Mediterranean): species affected and catch evolution during the period 1975–2001. *Fish. Res.* 70, 97–111. doi: 10.1016/j.fishres.2004.05.004
- Cooke, S. J., Twardek, W. M., Lennox, R. J., Zolderdo, A. J., Bower, S. D., Gutowsky, L. F. G., et al. (2018). The nexus of fun and nutrition: recreational fishing is also about food. *Fish. Res.* 19, 201–224. doi: 10.1111/faf.12246
- Crandall, R. (1980). Motivations for leisure. *J. Leis. Res.* 12, 45–54. doi: 10.1080/00222216.1980.11969418
- D'Antonio, A. (2020). Non-consumptive recreation and wildlife conservation: coexistence through collaboration. *Calif. Fish Wildl. J.* 106, 9–10. Available online at: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=178984&inline>
- Dargitz, R. E. (1988). Angling activity of urban youth: factors associated with fishing in a metropolitan context. *J. Leis. Res.* 20, 192–207. doi: 10.1080/00222216.1988.11969772
- Deville, J. C., Särndal, C.-E., and Sautory, O. (1993). Generalized ranking procedures in survey sampling. *J. Am. Stat. Assoc.* 88, 1013–1020. doi: 10.1080/01621459.1993.10476369
- Dillard, J. E., and Bates, D. L. (2011). Leisure motivation revisited: why people recreate. *Manag. Leis.* 16, 253–268. doi: 10.1080/13606719.2011.613624
- Driver, B. L., Brown, P. J., and Peterson, G. L. (1991). *Benefits of Leisure*. Pennsylvania, PA: Venture Pub.
- Driver, B. L., and Knopf, R. C. (1976). Temporary escape: one product of sport fisheries management. *Fisheries* 1, 21–29.
- Duffus, D. A., and Dearden, P. (1990). Non-consumptive wildlife-oriented recreation: a conceptual framework. *Biol. Conserv.* 53, 213–231. doi: 10.1016/0006-3207(90)90087-6
- Dunlap, R. E., and Heffernan, R. B. (1975). Outdoor recreation and environmental concern. *Rural Sociol.* 40, 18–30.
- Evans, K. (2014). *The context of successful navigation of gendered norms in outdoor adventure recreation: the case of professional female adventure athletes* [Dissertation thesis], Clemston University, Clemston, SC, United States.
- Fang, W. T., Ng, E., and Chang, M.-C. (2017). Physical outdoor activity versus indoor activity: their influence on environmental behaviors. *Int. J. Env. Res. Pub. He.* 14:797. doi: 10.3390/ijerph14070797
- Fedler, A. J., and Ditton, R. B. (1994). Understanding angler motivations in fisheries management. *Fisheries* 19, 6–13.
- Fedler, A. J., and Ditton, R. B. (2001). Dropping out and dropping in: a study of factors for changing recreational fishing participation. *N. Am. J. Fish. Manag.* 21, 283–292.
- Floyd, M. F., Nicholas, L., Lee, I., Lee, J. H., and Scott, D. (2006). Social stratification in recreational fishing participation: research and policy implications. *Leis. Sci.* 28, 351–368. doi: 10.1080/01490400600745860
- Font, T., and Lloret, J. (2014). Biological and ecological impacts derived from recreational fishing in Mediterranean coastal areas. *Rev. Fish. Sci. Aquac.* 22, 73–85. doi: 10.1080/10641262.2013.823907
- Franquesa, R., Gordo, A., Mina, T., Nuss, S., and Borrego, J. R. (2004). "The recreational fishing in central and Western European Mediterranean frame," in *Report of the 16th Annual Conference of the European Association of Fisheries Economist*. Gabinete de Economía del Mar, Universidad de Barcelona.
- Fraser, M., Muñoz, S.-A., and MacRury, S. (2019). What motivates participants to adhere to green exercise? *Int. J. Env. Res. Pub. He.* 16:1832. doi: 10.3390/ijerph16101832
- Freudenberg, P., and Arlinghaus, R. (2009). Benefits and constraints of outdoor recreation for people with physical disabilities: inferences from recreational fishing. *Leis. Sci.* 32, 55–71. doi: 10.1080/01490400903430889
- Fulton, D., Manfredo, M. J., and Lipscomb, J. F. (1996). Wildlife value orientations: a conceptual and measurement approach. *Hum. Dimens. Wildl.* 1, 24–47. doi: 10.1080/10871209609359060
- Gaffar, V., Yuniawati, Y., and Ridwanudin, O. (2019). A study of outdoor recreation motivation and activity preferences. *J. Southwest Jiatong Univ.* 54, 1–10. doi: 10.35741/issn.0258-2724.54.3.23

- Geisler, C. C., Matinson, O. B., and Wilkening, E. A. (1977). Outdoor recreation and environmental concerns: a restudy. *Rural Sociol.* 42, 241–249.
- Gordoa, A., Dedeu, A. L., and Boada, J. (2019). Recreational fishing in Spain: first national estimates of fisher population size, fishing activity and fisher social profile. *Fish. Res.* 211, 1–12. doi: 10.1016/j.fishres.2018.10.026
- Gutzwiller, K. J., D'Antonio, A. L., and Monz, C. A. (2017). Wildland recreation disturbance: broad-scale spatial analysis and management. *Front. Ecol. Environ.* 15, 517–524. doi: 10.1002/fee.1631
- Hunter, L. M., and Brehm, J. M. (2004). A qualitative examination of value orientations toward wildlife and biodiversity by rural residents of the Intermountain region. *Hum. Ecol. Rev.* 11, 13–26. Available online at: <http://www.jstor.org/stable/24707016>
- Hyder, K., Weltersbach, M. S., Armstrong, M., Ferter, K., Townhill, B., Ahvonen, A., et al. (2018). Recreational sea fishing in Europe in a global context – participation rates, fishing effort, expenditure, and implications for monitoring and assessment. *Fish Fish.* 19, 225–243. doi: 10.1111/faf.12251
- Jackson, E. L. (1986). Outdoor recreation participation and attitudes to the environment. *Leis. Stud.* 5, 1–23. doi: 10.1080/02614368600390011
- Kahle, D., and Wickham, H. (2013). ggmap: spatial visualization with ggplot2. *R J.* 5, 144–161. doi: 10.32614/RJ-2013-014
- Landry, C. E., Bergstrom, J., Salazar, J., and Turner, D. (2021). How has the COVID-19 pandemic affected outdoor recreation in the US? A revealed preference approach. *Appl. Econ. Perspect. Policy* 43, 443–457. doi: 10.1002/aep.13119
- Lumley, T. (2010). *Complex Surveys: A Guide to Analysis Using R*. Seattle, WA: Wiley Series in Survey Methodology.
- Manfredo, M. J., Driver, B. L., and Tarrant, M. A. (1996). Measuring leisure motivation: a meta-analysis of the recreation experience preference scales. *J. Leis. Res.* 28, 188–213. doi: 10.1080/00222216.1996.11949770
- Manfredo, M. J., Teel, T. L., Berl, R. E. W., Bruskotter, J. T., and Kitayama, S. (2021). Social value shift in favour of biodiversity conservation in the United States. *Nat. Sustain.* 4, 323–330. doi: 10.1038/s41893-020-00655-6
- Manfredo, M. J., Teel, T. L., and Bright, A. D. (2003). Why are public values toward wildlife changing? *Hum. Dimens. Wildl.* 8, 287–306. doi: 10.1080/716100425
- Manfredo, M. J., Teel, T. L., Don Carlos, A. W., Sullivan, L., Bright, A. D., Dietsch, A. M., et al. (2020). The changing sociocultural context of wildlife conservation. *Conserv. Biol.* 34, 1549–1559. doi: 10.1111/cobi.13493
- MAPA (2017). *Data From: Anuario de Estadística Forestal [Forestral Statistics Yearbook]*. Madrid: Ministerio de Agricultura, Pesca y Alimentación. Available online at: https://www.mapa.gob.es/es/desarrollo-rural/estadisticas/forestal_anuario_2017.aspx
- Martorell-Barceló, M., Campos-Candela, A., and Alós, J. (2018). Fitness consequences of fish circadian behavioural variation in exploited marine environments. *PeerJ* 6:e4814. doi: 10.7717/peerj.4814
- McManus, M. J., Newton, W., Storey, J., and White, J. (2011). *Identifying the Health and Well-being Benefits of Recreational Fishing*, Report No. 2011/2017. Curtin University of Technology, Centre of Excellence for Science, Seafood and Health.
- Mills, A. S. (1985). Participation motivations for outdoor recreation: a test of Maslow's theory. *J. Leis. Res.* 17, 184–199. doi: 10.1080/00222216.1985.11969629
- Morales-Nin, B., Cardona-Pons, F., Maynou, F., and Grau, A. M. (2015). How relevant are recreational fisheries? Motivation and activity of resident and tourist anglers of Majorca. *Fish. Res.* 165, 45–49. doi: 10.1016/j.fishres.2014.10.010
- Morales-Nin, B., and Lobón-Cerviá, J. (2020). *La Pesca Recreativa: del Ocio a la Economía [Recreational Fishing: From Leisure to Economy]*, 1st Edn. Madrid: CSIC and Catarata.
- Morales-Nin, B., Moranta, J., García, C., Tugores, M. P., Grau, A. M., Riera, F., et al. (2005). The recreational fishery off Majorca Island (western Mediterranean): some implications for coastal resource management. *ICES J. Mar. Sci.* 62, 727–739. doi: 10.1016/j.icesjms.2005.01.022
- Morris, E., van Riper, C. J., Kyle, G. T., Wallen, K. E., and Absher, J. (2018). Accounting for gender in a study of the motivation-involvement relationship. *Leis. Sci.* 40, 494–507. doi: 10.1080/01490400.2016.1256799
- Nunnally, J. C. (1975). Psychometric theory—25 years ago and now. *Educ. Res.* 4, 7–21. doi: 10.3102/0013189X004010007
- Oksanen, J., Blanchet, G., Friendly, M., Kindt, R., Legendre, P., McGlenn, D., et al. (2019). *vegan: Community Ecology Package*. Available online at: <https://cran.r-project.org/web/packages/vegan/index.html> (accessed June 21, 2021).
- Pita, P., Artetxe, I., Diogo, H., Gomes, P., Gordoa, A., Hyder, K., et al. (2017). Research and management priorities for Atlantic marine recreational fisheries in Southern Europe. *Mar. Policy* 86, 1–8. doi: 10.1016/j.marpol.2017.08.030
- Pita, P., Hyder, K., Gomes, P., Pita, C., Rangel, M., Veiga, P., et al. (2018). Economic, social and ecological attributes of marine recreational fisheries in Galicia, Spain. *Fish. Res.* 208, 58–69. doi: 10.1016/j.fishres.2018.07.014
- Pita, P., and Villasante, S. (2019). The building of a management system for marine recreational fisheries in Galicia (NW Spain). *Ocean Coast. Manag.* 161, 191–200. doi: 10.1016/j.ocecoaman.2018.12.027
- R Core Team (2017). *R: A Language and Environment for Statistical Computing*. Vienna: R Foundation for Statistical Computing.
- Riepe, C., and Arlinghaus, R. (2014). Explaining anti-angling sentiments in the general population of Germany: an application of the cognitive hierarchy model. *Hum. Dimens. Wildl.* 19, 371–390. doi: 10.1080/10871209.2014.918219
- Sargent, F. O. (1972). Motives for outdoor recreation. *J. N. Es. Agric. Econom. Council* 1, 216–224. doi: 10.1017/S0163548400000340
- Schramm, H. L. Jr., and Gerard, P. D. (2004). Temporal changes in fishing motivation among fishing club anglers in the United States. *Fish. Manage. Ecol.* 11, 313–321. doi: 10.1111/j.1365-2400.2004.00384.x
- Skår, M., Odden, A., and Vistad, O. J. (2008). Motivation for mountain biking in Norway: change and stability in late-modern outdoor recreation. *Norsk Geogr. Tidsskr.* 62, 36–45. doi: 10.1080/00291950701865101
- Soliva, A. M. (2006). *La pesca marítima recreativa en cataluña: aspectos biológicos, sociales y económicos [The recreational marine fishing in Catalonia: biological, social and economical aspects]* [Master thesis], University of Barcelona, Barcelona, Spain.
- Teel, T. J., Manfredo, M. J., Jensen, F. S., Buijs, A. E., Fischer, A., Riepe, C., et al. (2010). Understanding the cognitive basis for human-wildlife relationships as a key to successful protected-area management. *Int. J. Sociol.* 40, 104–123. doi: 10.2753/IJS0020-7659400306
- Teel, T. L., Dayer, A. A., Manfredo, M. J., and Dright, A. D. (2005). *Regional Results From the Research Project Entitled "Wildlife Values in the West"*, Report No. 58. Fort Collins, CO: Human Dimensions in Natural Resources Unit, Colorado State University.
- Teel, T. L., and Manfredo, M. J. (2010). Understanding the diversity of public interests in wildlife conservation. *Conserv. Biol.* 24, 128–139. doi: 10.1111/j.1523-1739.2009.01374.x
- The Outdoor Foundation (2017). *Outdoor Recreation Participation Report*. Washington, DC.
- Torkildsen, G. (2005). *Leisure and Recreation Management*, 5th Edn. London; New York, NY: Routledge Taylor and Francis.
- Vaske, J. J. (2008). *Survey Research and Analysis: Applications in Parks, Recreations and Human Dimensions*. State College, PA: Venture Pub.
- Vaske, J. J., and Roemer, J. M. (2013). Differences in overall satisfaction by consumptive and nonconsumptive recreationists: a comparative analysis of three decades of research. *Human Dimens. Wildl.* 18, 159–180. doi: 10.1080/10871209.2013.777819
- Walker, G. J., Deng, J., and Dieser, R. B. (2001). Ethnicity, acculturation, self-construal, and motivations for outdoor recreation. *Leis. Sci.* 23, 263–283. doi: 10.1080/01490400152809115
- Wang, H. X., Karp, A., Winblad, B., and Fratiglioni, L. (2002). Late-life engagement in social and leisure activities is associated with a decreased risk of dementia: a longitudinal study from the Kungsholmen project. *Am. J. Epidemiol.* 155, 1081–1087. doi: 10.1093/aje/155.12.1081
- Wiley, C. G. E., Shaw, S. M., and Havitz, M. E. (2000). Men's and women's involvement in sports: an examination of the gendered aspects of leisure involvement. *Leis. Sci.* 22, 19–31. doi: 10.1080/014904000272939
- Wood, L., and Danylchuk, K. (2012). Constraints and negotiation processes in a women's recreational sport group.

- J. Leis. Res.* 44, 463–485. doi: 10.1080/00222216.2012.11950274
- Zeidenitz, C., Mosler, H. J., and Hunziker, M. (2007). Outdoor recreation: from analysing motivations to furthering ecologically responsible behaviour. *For. Snow Landsc. Res.* 81, 175–190. Available online at: <https://www.dora.lib4ri.ch/wsl/islandora/object/wsl%3A15345>
- Zinn, H. C., Manfredo, M. J., and Barro, S. C. (2002). Patterns of wildlife value orientations in hunters' families. *Hum. Dimens. Wildl.* 7, 147–162. doi: 10.1080/10871200260293324

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's Note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Copyright © 2021 Morales-Nin, Arlinghaus and Alós. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.