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Research article

Thalassophilia and marine identity: Drivers of 'thick' marine citizenship

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ABSTRACT

Changing humanity's relationship with the ocean is identified as one of ten key challenges in the UN Decade of Ocean Science for Sustainable Development (2021–2030). Marine citizenship is one potential policy approach for reducing anthropogenic harms to the ocean and promoting ocean recovery, and there is a need to better understand marine citizenship motivating factors and their interactions. To contribute to a more holistic understanding, we approached this problem using an interdisciplinary, mixed methodology, which prioritised the voices and experiences of active marine citizens. An online survey and semi-structured interviews were conducted to examine factors spanning environmental psychology (values, environmental identity) and human geography (place attachment and dependency). Our data uncovered a unique marine place attachment, or *thalassophilia*, which is a novel conceptualisation of the human capacity to bond with a type of place beyond human settlements or defined localities. It is the product of strong emotional responses to the sensorial experience of the ocean and shared social or cultural understanding of ocean place identifications. A key driver of deeper marine citizenship is marine place dependency, and it is positively influence by *stimulation* and *non-conformity* values, environmental identity, and thalassophilia. We map significant motivating factors to identity process theory and describe a novel marine identity concept. We propose this as an operational mechanism of marine citizenship action, potentially filling the value- and knowledge-action gaps in the context of marine environmental action. This research provides a cornerstone in marine citizenship research by analysing together in one study a multitude of variables, which cross human-ocean relationships and experiences. The identification and characterisation of *thalassophilia* and marine identity process theory will enable research and practice to move forwards with a clearer framework of the role of the ocean as a place in environmental action.

1. Introduction

Marine citizenship is identified as an important process to deliver a transformation of the human-ocean relationship for sustainability (Buchan et al., 2023; McKinley and Fletcher, 2012). Marine citizenship is often understood as informed individual choices, however, our previous work challenges the knowledge-deficit approach (Barr, 2003; Buchan, 2022), and defines marine citizenship as more than pro-environmental behaviours: *exercising the right to participate in the transformation of the human-ocean relationship for sustainability* (Buchan et al., 2023). This broader definition encompasses actions focused on both individual and collective marine impacts, and recognises the political and legal context and personal vulnerability of championing and campaigning for social transformation (See Buchan et al., 2023, for extensive investigation of marine citizenship as a concept and the role of rights and responsibilities.). Having information about effective pro-environmental behaviours becomes insufficient to explain the motivation to engage in 'thick' marine citizenship, which is more public-facing and invested, and is therefore more costly to individual marine citizens. As such, a more comprehensive understanding of the myriad motivations for marine citizenship is crucial in order to promote deeper engagement with marine citizenship.

In this interdisciplinary study, we bring together evidence in environmental psychology and human geography to evaluate the values, environmental identities, place attachments, and place dependencies of active marine citizens in order to explain their motivations for deeper levels of citizenship. Doing so aims to highlight the different personal motivations of a diverse set of marine citizens and thereby to uncover avenues for promoting marine citizenship across diverse publics.

In section 2 below we explain our rationale for investigating how

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these specific factors relate to marine citizenship. In section 3 we discuss the mixed methods approach deployed which included deductive quantitative metrics (3.1.1) and inductive methods to elicit qualitative data to contextualise the quantitative results. In section 4 we present our findings, and in section 5 we discuss these and propose a new concept of marine identity.

2. Background and literature

2.1. Values

In environmental psychology, values are the internally held principles which guide people in how they live their lives, satisfaction of which contributes to wellbeing and supports the sense of self (Corner et al., 2014; Schwartz, 2012). This is a rich area of research, with many different frameworks that have been applied in research to connect values to pro-environmentalism. For example, the New Environmental Paradigm (NEP) (Dunlap et al., 2000), Maslow's hierarchy of needs (Maslow, 1958) and the related Values Mode Model (Rose et al., 2008), and value orientations (Stern et al., 1993), have all been associated with pro-environmental attitudes and behaviours (Chen and Tsai, 2016; de Groot and Steg, 2010; Hawthorne and Alabaster, 1999; Jefferson et al., 2014; Rose et al., 2008).

A common thread in the literature, is the identification of the values that are associated with pro-environmental attitudes and actions. This has resulted in a body of evidence limited to values that can be broadly understood as self-transcendent. Since our research challenge is to grow the number of marine citizens, we felt it was important to investigate all values and evidence potential pathways to marine citizenship in people who do not prioritise self-transcendent values. To achieve this, we applied the widely-used Schwartz model of basic human values that has been well-tested globally (Bilsky et al., 2011; Cieciuch and Schwartz, 2012; Schwartz et al., 2001) and provides an holistic framework organising the value spectrum into ten basic values (Buchan, 2021). In the model, the ten basic values underpin the myriad nuanced and specific values held by people and are organised in a circular manner with opposing poles (Fig. 1).

Though specific basic human values, particularly *universalism* and *benevolence* have been examined in this context (Corner et al., 2014; Katz-Gerro et al., 2017; Leviston et al., 2015; Lucas, 2018), we believe this is the first time all ten values have been investigated for marine, and potentially wider environmental, citizenship.

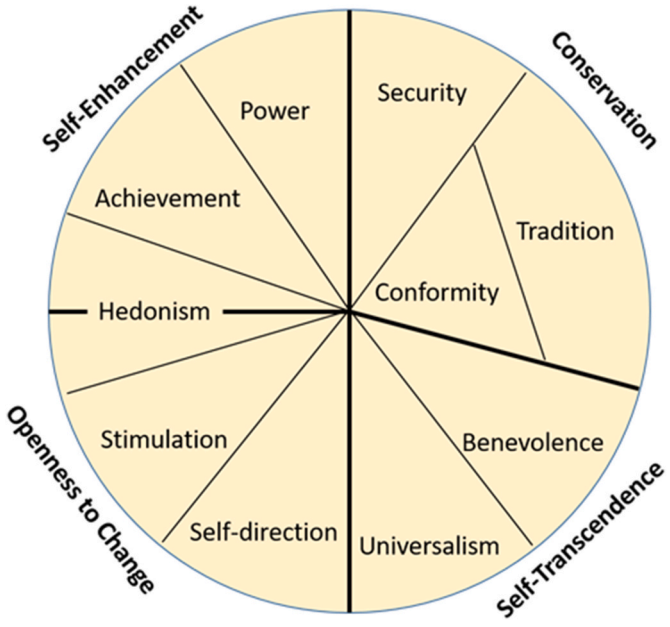

Fig. 1. Schematic depicting Schwartz Human Values after **Schwartz (2012)**. Values are a continuum around the wheel with two poles of opposing value sets. The system evaluates how values are held relative to one another. The list of items tested within each value is presented in Supplementary 1.

2.2. Environmental identity

Although values are important for understanding motivation, we know there is a value-action gap (Blake, 1999) and therefore values will not act alone to drive marine citizenship. Evidence suggests that the relationship between values and pro-environmental behaviours can, amongst other factors, be mediated by environmental identity (Gatersleben et al., 2014; Whitmarsh and O'Neill, 2010), and this is, therefore, an important factor to investigate for marine citizenship. Identities have been shown to increase sense of responsibility (Schmitt et al., 2019) and can be directly linked to behaviours (e.g., prosocial identities and behaviours in Hardy, 2006). Clayton's Environmental Identity Index (EID) is a practical tool that enables quantification of environmental identity. It is tested through a set of items organised into themes (see Supplementary 2). EID is associated with pro-environmental behaviours and environmental participation (Alisat and Riemer, 2015; Clayton, 2003; Freed, 2015), and is more predictive of behaviours than are value-led attitudes (Stets and Biga, 2003; Watson et al., 2015; Whitmarsh and O'Neill, 2010). Rather than objectifying nature, as environmental attitudes might (Watson et al., 2015), environmental identity describes a relationship that embeds nature into the person, enabling its politicisation, and giving it a place within citizenship (Schmitt et al., 2019).

2.3. Place

Environmental identity research highlights the importance of human-environment relationships for environmental citizenship, placing clear emphasis on the role of place, not as simply a physical locality, but more as "porous networks of social relations" (Massey, 1994, p121). The study of place is complicated with a multitude of described relationships, and overlap and blurring of definitions and terms (Lewicka, 2011). For clarity, in this study we use the following definitions to encompass how people feel about place, understand place, and how they need it:

- *Place attachment:* the positively experienced bonds which a person feels towards a place and the emotional meanings the place is imbued with (Devine-Wright, 2013; Vaske and Kobrin, 2001).
- *Place identifications:* social understandings of the attributes of a place (Uzzell et al., 2002)
- *Place dependency:* dependence upon a place to meet some kind of need, e.g. economic, emotional, or physical (Stokols and Shumaker, 1981).

Pro-environmental behaviour models have largely neglected the influence of place (Blake, 1999; Fietkau and Kessel, 1981; Hines et al., 1987; Kollmuss and Agyeman, 2002; Stoll-Kleemann, 2019). There is limited research connecting place and pro-environmental behaviours (Carrus et al., 2014), though strength of place attachment, cultural meanings of place and natural environmental identity are potentially important (Payton et al., 2005; Scannell and Gifford, 2010; Uzzell et al., 2002; Vaske and Kobrin, 2001). The role of place in marine citizenship research has largely focused on proximity or visit frequency to the ocean (Kelly et al., 2019; McKinley and Fletcher, 2012), which is compounded by factors such as economic dependency and mobility (Gustafson, 2009; Hamilton and Safford, 2015). However there is huge significance of physical places and their conceptions for humans (see for example, Hidalgo and Hernández, 2001; Korpela, 1989; Scannell and Gifford, 2010a; Vaske and Kobrin, 2001), and place has been identified as important for social identity processes (Twigger-Ross and Uzzell, 1996),

as seen with settlement identity (Feldman, 1990) and scale of place identity (Devine-Wright et al., 2015).

Given the importance of place for human identity, the evidence for identity as important for action, and the distinctiveness of the marine environment for humans as a terrestrial animal, there is a clear case for investigating the role of the ocean as a place in marine citizenship. We wanted to understand how the ocean as a place might promote marine citizenship and how it relates to any distinction between marine and wider environmental citizenship. To support this, we set out to measure and understand the emotional connections marine citizens have with the ocean (place attachment), how they understand the ocean (place identifications), and how much they need it (place dependency).

2.4. Study overview

This study is part of a wider project which took an interdisciplinary approach to holistically investigate how marine citizenship in influenced by factors relating to people and their psychology, the ocean as a place, and the characterisation of marine citizenship responsibilities and marine citizenship participatory rights. We have reported our findings as they relate to marine citizenship responsibilities and rights in Buchan et al. (2023). Here, we respond to the following research questions:

RQ1. How do value and identity personality factors influence marine citizenship?

RQ2. How do place-related factors (attachment, dependency and identifications) influence marine citizenship?

By investigating a breath of personality and place-related factors, we aimed to create an integrated understanding of the drivers of 'thick' marine citizenship a answer a third research question:

RQ3. How do marine citizens relate to the ocean as a place?

Although we did not set out to investigate marine identity as a potential driver, our findings mapped to identity process theory and in the Discussion we propose a novel marine identity process theory.

3. Methods

In this study, we privileged the voice of active marine citizens to add a new perspective to existing literature dominated by marine practitioner perspectives. Invitation to participate was extended to those who were demonstrably active as marine citizens, as opposed to simply being sympathetic to marine sustainability, as evidenced by membership of one of three case studies. These were two local marine groups in the South West of England, and a national citizen science project, which enabled a nationwide response to the study. Invitation was via the e-mailing lists of the case study projects. The UK-only sample is a limitation of this study.

We employed multiphase, mixed methods through an iterative design incorporating, in sequence: key informant open-ended interviews together with ethnographic shadowing of participants in their roles leading marine groups; an online survey collecting both quantitative and qualitative data; further interviews with and shadowing of participants, purposely selected using survey data to create a diverse interview sample. Mixed methods were selected to enable appropriate measurement of the range of variables being investigated together, for contextualisation of quantitative variables, and to enable a plurality of perspectives and views to be investigated (Johnson et al., 2007). This enabled us to broaden our investigation beyond single epistemologies as it important for investigation of social-ecological systems and 'wicked' problems such as behaviour change for sustainability (Funtowicz and Ravetz, 1993; Miller et al., 2008). This provided rich data with multiple insights into the relationship between personality factors and respondent relationships with the ocean as a place, as their motivations for deeper marine citizenship. (See Buchan et al., 2023; for further methodological detail.)

3.1. Data collection and analysis

3.1.1. Quantitative

The online survey comprised 33 individual questions, counting the quantitative metrics as a single question (the survey is available via the UK Data Service deposit), and included a range of demographic questions including gender, age, educational attainment, income, political party alignment, geographical location, and environmentally relevant education/profession. It elicited 280 responses. Survey respondents were 60.4% female, 37.9% male, and 0.4% transgender. Age ranged from 19 to 82 years. To perform statistical analysis of factor relationships with marine citizenship, we developed a novel metric to give each respondent a quantitative score for the depth of their marine citizenship (Buchan et al., 2023). The score ranged from 0 to 15, with 15 indicating 'thick' marine citizenship. Intention towards marine citizenship was also measured, on a 7-point Likert scale from 1 = *I never consider the impact I have on the marine environment* to 7 = *I always consider the impact my actions have on the marine environment*.

A number of standard psychometric tests were employed in this study, including basic human values, environmental identity, place attachment and place dependency. To measure respondent basic human values, we used the well-tested Portrait Value Questionnaire approach as described in Schwartz et al. (2015, 2001). The original PVQ descriptions were followed as written in the protocol, with the minor alteration of '*they*' replacing '*he/she*' in the descriptions to make them more gender neutral as this was delivered via online survey (see Supplementary 1). Raw value scores are created by taking the mean for each value's question set. Subsequent analyses used the centred scores, which corrects for between-respondent variation in intensity.

Clayton's Environmental Identity (EID) Index was used as a straightforward means of investigating environmental identity. The Index uses Likert questions grouped into themes for which a mean score is given. However, given the inclusion of the full PVQ set of items amongst many other questions, the 24 item EID Index was reduced through selection of a single question from five of the themes in the survey (Supplementary 2). Autobiography was excluded from the index and was instead more deeply examined in the place attachment scale. We note this reduces the overall power of the metric, but amongst many other factors investigated, this enabled a simple indication of environmental identity.

Place attachment was measured through a set of items with a five-point Likert scale where 1 = strongly disagree and 5 = strongly agree (Table 1). The mean was calculated for an overall marine place

Table 1
Place attachment measurement items, adapted to be ocean specific after Devine-Wright et al. (2015) except where indicated: * Payton et al. (2005); ** Savage et al. (2010). Respondents were asked: "*How attached are you to your local beach or coastline? Please rate how much you agree or disagree with each statement.*" (1–4) and "*How do you feel about the marine and coastal environment in general? Please rate how much you agree or disagree with each statement.*" (5–9).[1] This item score is reversed to indicate strong attachment to one place.

	Theme	Item
1	Active (conscious choice)	Living in this place was my conscious choice.
2	Traditional (unreflective rootedness)	I have strong family connections to this place.
3	Functional	The marine environment is the best place for the things I like to do.
4	Placelessness (indifference)	There are many coasts in the UK and in the world where I could live.[1]
5	Emotional	I miss the sea when I am not there.
6	Emotional	I am proud of the marine environment.*
7	Emotional	The sea is part of me.
8	Emotional	I want to be engaged in affairs of the sea.
9	Aesthetic	I take pleasure in looking at the sea.**

attachment score in which a higher score indicates stronger place attachment.

To measure place dependency, respondents were asked "*In what way do you feel dependent upon the marine environment?*" using a five-point Likert scale where 1 = strongly disagree and 5 = strongly agree. This was asked in three ways: "*I depend upon the sea for my livelihood/well-being/recreation or other interests*."

Quantitative data were descriptively and statistically analysed in Microsoft Excel and IBM SPSS 25. Likert data was treated as interval data. ANOVA was used to investigate the strength of relationships and differences within and between the data sets (Creswell, 2014). Full details of each statistical test are provided alongside the findings in the results sections.

3.1.2. Qualitative

Qualitative data were obtained through 12 open-ended survey questions and through ten interviews with survey respondents purposively selected to incorporate diversity of the investigated factors. There were practical constraints to securing additional interviews, however the interview sample adequately covered the range of variables sought. Interviews lasted 1–3 h and were recorded and transcribed. In combination with their interviews, interviewees were shadowed while engaging in a marine citizenship activity of their choice to add context and understanding to their responses, hence the variation in interview duration. These activities were beach cleans, marine group meetings, lobster hatchling release, commercial nature viewing boat trip, citizen science recording, and a public engagement event. This approach supported the interviewees in engaging with the research and they shared their views enthusiastically. Interviews and shadowing were conducted between July 2018 and December 2018 by the lead author.

Regardless of source, qualitative data were coded according to the ten basic human values; EID index themes; and references to attachment to or dependency on the ocean as a place, as well as other inductive codes around emotions and place meaning. Coding was initially by hand, with refinement of coding during transfer to NVivo12, which was used for analysis and included quantitative data as attributes to enable mixed methods analysis that did not privilege either data type.

4. Results

The results section first presents findings which relate to the personality characteristics of basic human values (4.1) and environmental identity (4.2). The findings then move from personality factors to the relationship marine citizens have with the ocean as a place, beginning first with marine place attachment and its emotional underpinning (4.3); next the physical attributes and place identifications of the ocean that give rise to these important relationships (4.4); and concludes with marine place dependency (4.5).

4.1. Basic human values

4.1.1. Values in the marine citizen population

All ten basic human values were represented and prioritised within our sample population of marine citizens (a positive score in Fig. 2), indicating that there is diversity in active marine citizens' values. Power was least prioritised, whilst self-transcendence (*benevolence, universalism*) and openness to change (*hedonism, stimulation, self-direction*) values were most consistently prioritised.

Using regression, we examined the relationship between basic human values and two dependent variables: depth of marine citizenship and intention to take action for the marine environment (Table 2). *Benevolence* and *universalism* were significant predictors of intention but not of deeper marine citizenship, indicating that though self-transcendent values are held by most marine citizens, they may not

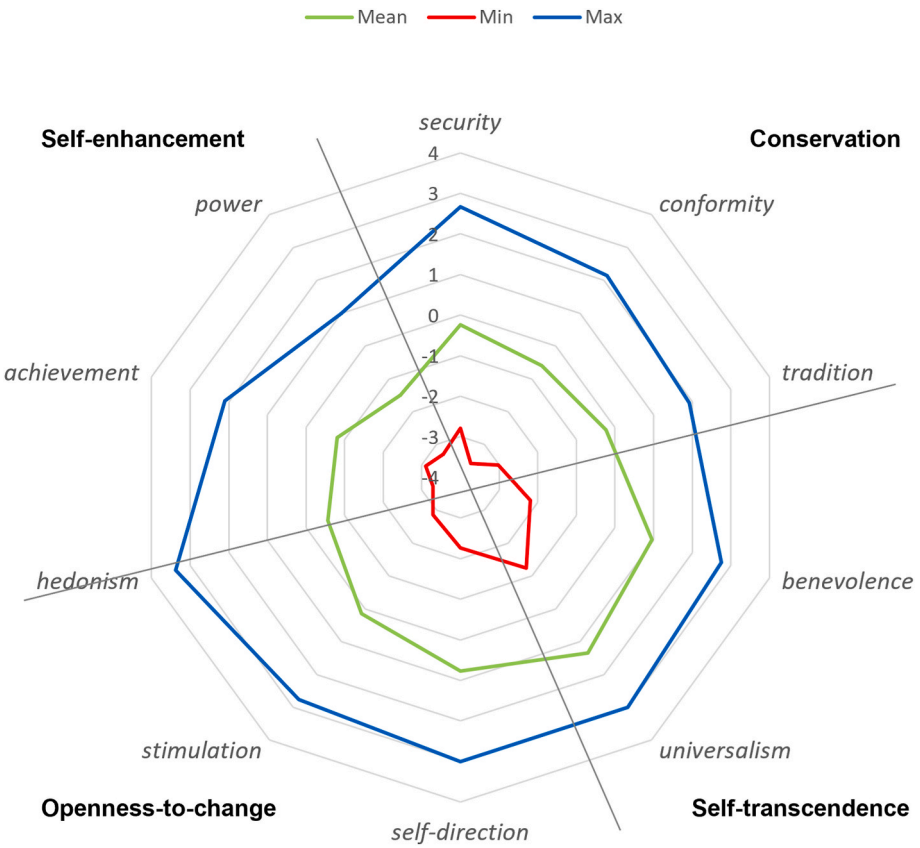

Fig. 2. Distribution of Schwartz portrait value questionnaire scores (Schwartz et al., 2015), centred around respondents' means, for survey population; (N = 276). See Supplementary 1 for value descriptions.

Table 2
Linear regressions examining predictive power of basic human values upon depth of marine citizenship score and marine citizenship intention (measured on a seven-point Likert scale) in a population of marine citizens. *p < .05 **p < .001. NB. It is not possible to run a multiple regression with all ten values. Likert data is treated as interval. (Protocol from: Schwartz et al., 2015).

Value	Marine citizenship score				Marine citizenship intention			
	F (df)	Sig.	Adj. R^2	B	F (df)	Sig.	Adj. R^2	B
Security	11.454 (1273)	.001**	0.037	−0.686	4.608 (1273)	.033*	0.013	−0.147
Conformity	9.139 (1273)	.003*	0.029	−0.621	1.554 (1273)	.214	0.002	−0.087
Tradition	0.428 (1273)	.513	−0.002	−0.145	0.001 (1273)	.973	−0.004	−0.003
Benevolence	1.112 (1274)	.293	0.000	0.293	5.253 (1274)	.023*	0.015	0.211
Universalism	0.609 (1274)	.436	−0.001	0.245	8.545 (1274)	.004*	0.027	0.303
Self-direction	0.509 (1274)	.476	−0.002	0.164	0.869 (1274)	.352	0.000	0.072
Stimulation	20.486 (1274)	.000**	0.066	0.863	14.547 (1274)	.000**	0.047	0.246
Hedonism	1.28 (1273)	.259	0.001	0.228	1.383 (1273)	.241	0.001	−0.079
Achievement	0.000 (1273)	.999	−0.004	0.000	3.762 (1273)	.053	0.010	−0.134
Power	0.956 (1274)	.329	0.000	−0.267	16.107 (1274)	.000**	0.052	−0.356

drive marine citizenship action. Likewise, not wishing to have *power* over things is important for intention. Non-*conformity* however, is important for taking deeper action. *Stimulation* was significant in both cases, with highest explanatory power for marine citizenship. The typical marine citizen is a self-transcendent change-maker, and their marine citizenship is positively influenced by their interest and appetite for challenge.

4.1.2. Contextualising basic human values in the marine/marine citizenship context

Using mixed methods, we used interview data alongside all ten value scores to investigate how different values and their relationship to marine citizenship were understood by active citizens themselves. This enabled us to understand how each value might be 'tapped into' to promote marine citizenship in others, going beyond what is typical amongst marine citizens (Table 3).

There were clear pathways between self-transcendent values and marine citizenship. *Stimulation* was a particularly notable influence on depth of marine citizenship and connects with the material experience of the ocean. Conversely, *hedonism* and *achievement* tended to reinforce and support the influence of other values. Whilst *conformity* was a significant negative influence on marine citizenship depth, the qualitative data did not indicate this was a direct association, more a pre-requisite, to some extent, for wanting to challenge existing social systems. Whilst some values are more commonly associated with pro-environmental behaviours in this and other research, the findings presented here indicate that all values have the potential to be tapped into to support interest and participation in marine citizenship actions.

4.2. Environmental identity

Environmental identity was measured using a reduced set of items from Clayton's (2003) Environmental Identity (EID) Index (Fig. 3). Using regression, we found that EID was significantly positively predictive of both depth of marine citizenship ($F(1, 278) = 12.444$, $p < .001$, adj. $R^2 = 0.039$) and intention towards marine citizenship ($F(1, 277) = 54.597$, $p < .001$, adj. $R^2 = 0.162$). The difference in explanatory power indicates that environmental identity is a much stronger driver of intention than action, therefore additional factors act to produce action.

Environmental identity was contextualised using the qualitative data. Survey respondents (n = 280), referred most often to the EIDI element *environmental citizenship* (58 references, e.g. "*Personal commitment to environmental values and action as a volunteer alongside my paid employment*"); and *time in nature* (36 references, e.g. "*I enjoy spending time at the beach, surfing or days out with my family*").

Environmental citizenship themes within the interview data (54 references) encompassed complex emotions such as passion and guilt, and a moral duty to be proactive. The data showed a wide range of actions including direct action on individual impacts (e.g., beach cleaning; making sustainable choices), through to those focused on societal impacts (e.g., public engagement actions; career choice). Though systemic barriers to efficacy were acknowledged, personal responsibility was valued, and there was crossover with self-transcendent values. E.g. "*I think how you behave individually as a citizen is hugely important … I feel like everyone should do their bit and try and influence the most positive outcomes and … share commons communally, mindfully, rather than exploiting and pillaging.*"

Time in nature was also frequently referenced in interview data (49 references). All interviewees referenced some sort of outdoor activity, e.g., rockpooling, walking on the beach, rock-climbing, surfing, exploring, observing for artistic creation, and beach cleaning. However, these code data were not mere lists of outdoor activities but rather reflected a deep value of being in nature. Interviewees described themselves as "*outdoorsy*" and "*fish*". Spending time in nature would "*bring life back*" and was a rewarding social experience, promoting wellbeing.

The data indicate a synergistic relationship between marine and wider environmental citizenship, and that experience of being in nature is an important piece of the environmental citizenship puzzle. There is also a positive feedback relationship between marine citizenship and spending time in nature. Bringing together these two factors, interview data highlighted that place is important, both at local and global scales. For example: "*environmental consciousness for me I think is being part of the place wherever it is that you happen to be standing at that moment*"; and "*A lot of children in [coastal town] have never even seen the sea and that's just horrible to think that … and you think right we've got to do something about that*". In the latter case, spending time in nature was viewed as a formative experience for wellbeing and development, and almost as an environmental right for young people.

4.3. Marine place attachment (thalassophilia)

The findings thus far presented demonstrate key value and identity bases influencing marine citizenship, and suggest that marine citizens have a relationship with the marine environment. This study also produced emergent findings about the emotional quality of this relationship.

Most commonly, survey respondents (n = 100) felt *enjoyment* (inc. pleasure, happiness and fun); *love* (more so in female respondents, 78%); *concern* (inc. worry, fear; centred around human harms); and *passion* (93% of which were female respondents). 82% (n = 27) of descriptions of loving nature were marine specific. A richer emotional context emerged in the interviews (n = 10). Interviewees primarily felt *love/passion*, and *concern* was reduced in relative importance. Formative experiences were *shocking* or *inspiring*. These findings indicate that marine citizens feel positive emotions in response to the ocean.

Emotional bonds with place underpin place attachment. We measured attachment to the ocean as a place (Table 4) to further understand its nature and prevalence in marine citizens, and its

Table 3
Quantitative and qualitative interpretations of basic human values amongst marine citizens, gathered via Portrait Value Questionnaire. Population centred mean/range refers to mean and range of value scores centred around the mean of each individual, across whole survey population (N = 276). Interviewee scores range refers to centred scores from ten interviewee participants, who were purposefully selected from the survey population to represent a breadth of variables, including basic human value scores. Interview data was coded against each of the ten basic human values.

Value	Context		
	Population centred mean (range)	Interviewee centred scores range	No. interviewees coded for value
Conservation			
Security	−0.23 (−2.79 to 2.67)	−2.07 to 0.76	6
	54 of the 57 participants for whom *security* was in their top three values, *universalism* was likewise in their top three. Qualitatively, *security* connected to marine livelihoods, environmental cleanliness, local natural knowledge, and ocean provisioning of food and oxygen.		
Conformity	−0.59 (−3.57 to 2.14)	−3.57 to 0.96	8
	Qualitatively this value was not well represented. Where it did appear, it related to feeling different to others. The power of social norming for driving pro-environmental behaviour change was also noted, e.g. "*Some of them are better at going along with the regulations then, as long as everyone is doing it.*" Interviewees with the lowest *conformity* scores tended to be proud of difference, even rebellious. It is logical that change-making marine citizens would not prioritise conforming to social norms.		
Tradition	−0.23 (−3.02 to 1.93)	−1.02 to 1.48	9
	Tradition linked with family traditions of spending time in nature, which is a component of environmental identity (see 4.2); And cultural traditions, for example of seaside holidays, which might support development of marine place identifications.		
Self-transcendence			
Benevolence	0.95 (−2.19 to 2.76)	−0.93 to 1.93	10
	Low-scoring interviewees tended to value their marine citizenship contribution through a lens of what they have to offer, e.g., professional skills offered. High-scorers valued marine citizenship as of benefit to humanity and out of moral duty. With little mention of in-groups, *benevolence* and *universalism* were close. One interviewee (*benevolence* 1.52; *universalism* −0.14), viewed the ocean as a gift to humanity rather than having intrinsic value.		
Universalism	1.34 (−1.24 to 3.00)	−0.14 to 2.48	9
	Interviewees scoring: >2.00 fully integrated humans as part of the natural world at a more global scale, viewing marine citizenship as part of being a world citizen. E.g., *"If you connect like the natural world around you, you realise that you're part of something, and also at the same time, you're not the be all and end all."* 1.00–2.00 tended to empathise more with humans or with other living things. E.g., *"I think it makes me more aware or be more aware of the wildlife. It gives me more of a connection. If I'm picking stuff up I'm actively thinking of a turtle would think that was a jellyfish or something could get their head stuck in the stretchy things that hold the cans together."* <1.00 expressed a lack of connection with nature. *"I suppose you still see like things on TV and you know like, that's still part of the world isn't it?"*		
Openness to change			
Self-direction	0.77 (−2.26 to 3)	−0.84 – 2.07	7
	The qualitative data reflected confidence and sense of purpose, e.g., "*We have power to create our own lives and our own future*". Leaders with strong self-direction referred to the first person frequently illustrating a strong drive and application, e.g., "*I had got a grant … Everything that was done … was done by me … I campaigned …" inter alia.* Age accounted for 7.1% of the centred self-direction score (adj. R^2 = 0.071, ($F(1,274) = 21.706$, $p < .0005$), adding insight to the over-representation of older people in this research.		
Stimulation			0.14 (−2.86 to 2.76)
−1.02 – 2.14	10 *Stimulation* was often difficult to distinguish from *hedonism* in the interview data. Data which was more related to challenge, change, freedom and interest was coded to *stimulation*. *Stimulation* expressed as: knowledge; change; challenge; adventure and the unknown; novelty and difference; creativity; social/political dynamism (contemporary and historical); new opportunities; fascination; and connectivity. High scorers were interested in the ocean was as "*another world*" and marine citizenship was "*opening little doors*" to this novel and unknown world. They showed particular interest in the policy-world.		
Hedonism	−0.56 (−3.29 to 3.38)	−2.07 – 1.43	9
	Data more related to sensory, physical, desire or need was coded as *hedonism*. *Hedonism* expressed as the emotional or sensual feelings associated with marine experiences, e.g. "*that's my drug when I go into the sea and I put my head under … I feel incredible*". However, *hedonism* could also work against marine citizenship if there was a lack of personal pleasure in the activities, or to do something would mean prioritising it over something more enjoyable. This value did not appear to act alone, rather reinforcing other values according to how they fill needs and desires.		
Self-enhancement			
Achievement	−0.81 (−3.1 to 2.1)	−2.52 – 1.43	10
	Higher *achievement* scores related to successfully establishing marine groups or projects, or developing credibility amongst peers, with recognition that other marine citizens will benefit from feeling they are achieving something. *Achievement* reinforced other mechanisms, such as boosting self-esteem, rather than having very specific links to marine citizenship.		
Power	−1.49 (−3.29 to 1.00)	−2.52–−0.43	6
	It was not possible to interview a marine citizen with a positive score, with only 4% of the survey respondents scoring positively. There was qualitative difference between those scoring more or less negatively: Those scoring nearer zero mentioned having influence over others, controlling group activities, and recognised ways that people could be manipulated into marine citizenship. With more strongly negative scores, this sense of personal platform diminished and there was an increasing sense of the importance of collective action, e.g. "then they have to listen because it's the power of the people".		

relationship with marine citizenship.

We found that marine citizens were more attached to the ocean as a type of place than to specific coastal locations, and multiple strands of data evidence this. First, the item "There are many coasts in the UK and in the world where I could live" had a mean score close to 4, *Agree*. Second, there was little family connection associated with the coast, as would be expected in studies of location-based place attachment. Multi-dimensional scaling additionally indicated that these two items did not co-locate with the other items within the metric (see Supplementary 3) and were therefore removed for statistical analyses using the full mean place attachment score. Third, the data showed that marine citizens often choose to live near the sea. 72.9% lived within 20 min' travel time of the sea, and of the 131 marine citizens living <~10 min away, 90.8% indicated a conscious choice to live there. Fourth, respondents lived, on average, only 35% of their life in their current location, demonstrating a lack of ties to past locations. Fifth, interview data reinforced this conscious choice: "*being close to the sea will be a definite factor in whether we move or where we choose to move*"; "*being in the water doesn't matter*

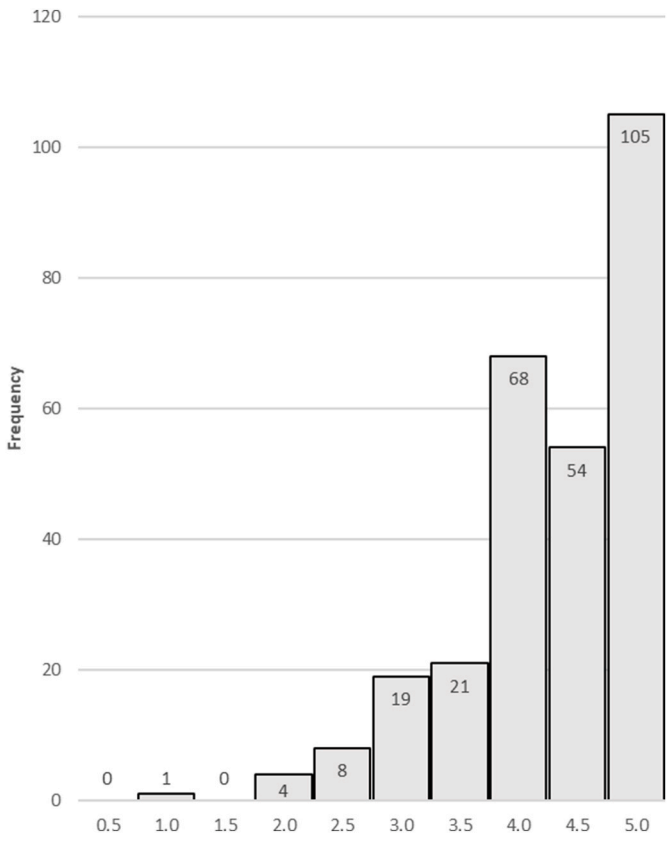

Fig. 3. Frequency of Environmental Identity scores in marine citizens (n = 280). Score is the mean of five items forming a reduced Environmental Identity Index (Clayton, 2003). Likert scale score: 1 = strongly disagree, 3 = neutral, 5 = strongly agree. Mean = 4.10, Std. Dev. = 0.773. See Supplementary 2 for details of the scale.

Table 4
Items measuring marine place attachment in an online survey of marine citizens. 1 = strongly disagree, 3 = neutral, 5 = strongly agree. Figures are underlined where the score is negative for place attachment.

Place Attachment item	N	Mean	Std. Deviation	N/a[c]
I take pleasure in looking at the sea	278	4.81	.565	
Living in this place was my conscious choice	250	4.46	1.045	30
I miss the sea when I am not there	280	4.44	.914	
I want to be engaged in affairs of the sea	279	4.21	.961	
The marine environment is the best place for the things I like to do	266	4.17	1.074	13
The sea is part of me	278	4.03	1.130	
I am proud of the marine environment	275	4.03	1.149	
I have strong family connections to this place	255	2.82	1.688	23
There are many coasts in the UK and in the world where I could live[a]	267	3.75	1.449	12
Place attachment mean score	280	3.90	.612	
Place attachment refined mean score[b]	280	4.31	.677	

Notes.
[a] The scale of 1 = strongly disagree to 5 = strongly agree is inversely associated with local place attachment therefore, unlike the other items, a higher score is lower local place attachment. This item's scores were inverted prior to processing for the calculation of means, with an inverted item mean of 1.98.
[b] This is the mean removing items relating to family connections and coasts which were low place attachment scoring and related more to specific location-based attachment.
[c] N/a was respondents who did not answer because they did not live near the coast; these were treated in SPSS as system missing so as not to affect mean and other statistic calculations and to distinguish from 'don't know' responses.

where the water is … I think I could be in any sea"; "*Whatever it is, we have to be by the sea*". We call this generic marine place attachment *thalassophilia.*

We found a positive relationship between thalassophilia and marine citizenship depth ($F(1,278) = 14.004$, $p < .001$, $R^2adj. = 0.045$). The data supported the premise that thalassophilia can drive marine citizenship, e.g., doing marine citizenship because of "*An absolute passion and connection to the sea*". The data exposed a potential reciprocal relationship between these factors with place-based marine citizenship actions enhancing thalassophilia, e.g., "*I feel more at home on the beach, not just a visitor*", and marine citizenship "*forges a more personal connection to the ocean*". Of course, our marine citizen respondents were already aware of this connection: "*I've found people protect what they love and understand so I feel to protect marine environmental health we need citizenship projects to allow people to come together and make a difference*".

4.4. The basis of thalassophilia

"*Only by direct experience and contact can one get any true impression of the importance and majesty of the marine environment.*" (Interviewee).

Three prominent themes emerged in the interview data which indicated the capacity of the ocean, via its materiality and conceptions of the ocean as a place (place identifications), in generating significant human-ocean relationships and motivation for marine citizenship. We discuss these in turn.

4.4.1. Sensory experience of ocean materiality

Physically and sensorially experiencing the ocean directly was the most prominent of the three themes, coded in six interviews (Table 5). Most heavily coded was *visual* (n = 4), and *movement* (n = 5). *Touch, space,* and *sound* had less coverage (n = 3), and *temperature* and *olfactory* senses were only briefly mentioned. The data indicated how the sensory experience of ocean materiality not only provoke emotional responses, but are seen by interviewees as important for developing concern and taking action. Such experiences may be the first step towards developing

Table 5
Sensory experience of ocean materiality as described by marine citizens in interview. Quotes are italicised.

Descriptives	Example data
Visual	
Waves and light	*For me it's not seeing the sea, it's seeing the breaking waves.* *When I first came and looked at the sea here, it literally takes your breath away, I mean literally … the glisten of the sea, with the sun catching it, and the blue, and then on a dark day, the dark moodiness of the sea.*
Observing degradation	[Taking action] *Because of what I was seeing.*
Observing human-ocean relationship	*It's lovely to see so many people in the sea.*
Visual experience in marine citizenship/public engagement	*We'll take them to the beach and then they're like oh this is really bad. I think they have to see it, they have to be a part of seeing all the rubbish wash up.*
Movement	
Ocean physicality	*It's the feeling of being in the sea and being on the waves and being underwater.* *When you dive it's like flying. Isn't it?*
Ocean power	*I like that feeling that it's stronger than you. And you're only there at the whim of the ocean because it's letting you be.* *And it's wild and it's, you know. In the winter it's just so rough and scary but beautiful.*
Touch, sound, olfactory and temperature	
Sensory pleasure	*The smell and the taste and how it feels on the skin.* *The sand is so white and, that when you walk on it, it literally squeaks.*
Sensory connection for marine citizenship	*If you allow them to touch and feel something it's different, and if you let them experience something it's different again.*

thalassophilia.

4.4.2. The quality of the sea

The 'quality' of the sea related to cleanliness, perceived natural purity and biodiversity. Beach litter and pollution was cited as a trigger for marine citizenship and impactful for thalassophilia, e.g., "*I think I could be in any sea … and any coast, unless it was covered in litter*." Water quality was particularly impactful for those engaging in immersive marine recreation such as surfing: "*it's just horrible to swim in isn't it, with stuff floating around*." And the ocean itself was described as metaphorically cleansing: "*just by sitting here, it can, it sort of, I'm not in the sea but the waves are washing it off me*".

Perceived high quality triggered environmental consciousness: "You've probably had the best experience of scuba diving that you will ever have in any part of the world because there're no tourists here, there's no pollution, you go to anywhere else and it won't be as good. And that sort of really, you know on the sort of conservation front, that sort of really made me think wow." Interviewees were sensitive to differing perceptions of the coast: "You know because you live here, but if you live in the middle of a city you have no connection to the ocean, unless you have a holiday somewhere, and even then you're seeing really the polished version of it."

We would suggest that where there are perceptions of high quality marine environment, these are challenged by degradation which can prompt a desire to take action.

4.4.3. Lack of ocean boundaries

This theme reflected how the physical fluidity and interconnectedness of the ocean influences conceptions of the ocean as a place full of challenge, freedom and openness, bringing perspective for individual humans engaging with it. This theme reflects the significance of *stimulation* in the study data (4.1).

The ocean was perceived as:

- A place of freedom and space: "*on land you can sort of see everything can't you, you're sort of a bit stuck here aren't you? Stuck on land. But in the sea you could go anywhere … if I drive to like Birmingham, I feel constricted, like I feel a bit claustrophobic and I'm like I don't know where the sea is*".
- Unknown and challenging: "*I love how much isn't known. Like sticking a tag on a shark or a whale … that you know almost nothing about the life cycle of, was just mind-blowing … I love anything to do with adventure and not-knowing a whole realm, a whole sphere of sea. Adventure.*"

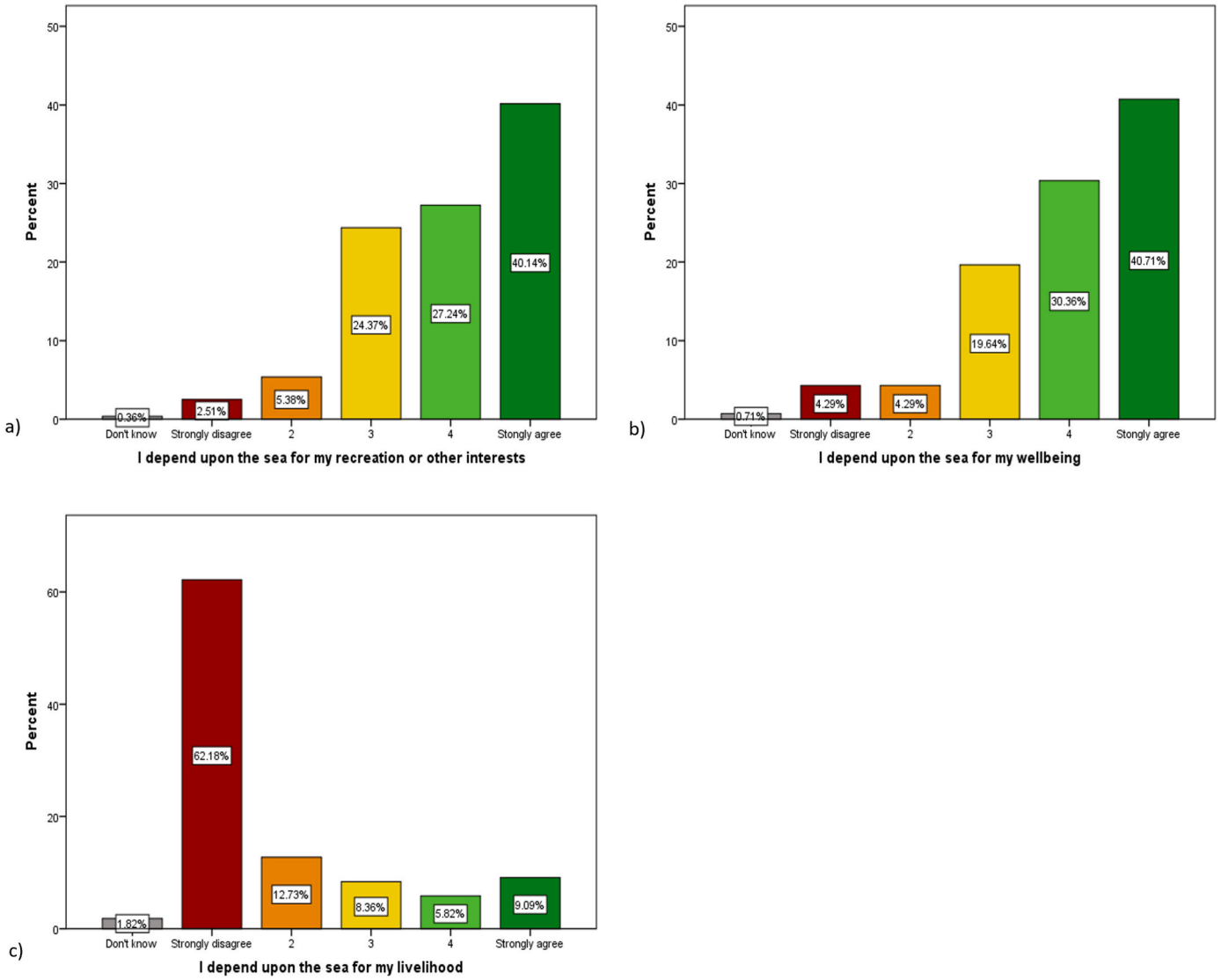

Fig. 4. Respondents were asked "I depend upon the sea for my … " a) recreation or other interests; b) wellbeing; c) livelihood. Responses were by Likert scale with 1 = strongly disagree and 5 = strongly agree. N = 280.

- Vast and temporal and intellectually interesting: "*There's something that I think about the sea is the space isn't, like you when you get to the edge of the sea there's a big vast space. And there's something cool about that, in that there is no land … I think it changes every day as well which is interesting isn't it*".

Interest in and learning about the ocean and its wildlife was frequently cited in survey data as a motivation for marine citizenship. The interview data concepts of freedom, challenge and dynamic space may therefore provide insight into the kinds of connections being made by other survey respondents between the ocean and their engagement with it.

4.5. Place dependency

We wanted to understand how deeply embedded the human-ocean relationship was in the lives of marine citizens and so we investigated dependency upon the ocean for livelihood, wellbeing and recreation. We found a strong dependency for wellbeing and recreation, and limited dependency for livelihood in the study sample (Fig. 4). Respondents who reported marine livelihoods (n = 31) were typically engaged in occupations that were supported by or themselves supported ocean sustainability. 199 survey respondents agreed or strongly agreed that they were dependent upon the marine environment for their wellbeing, with qualitative data always describing interaction with the marine environment as positive for wellbeing.

Through multiple regression, we found that marine place dependencies work synergistically to promote marine citizenship (Table 6). Though fewer marine citizens felt they had a marine dependency for livelihood, where it was present, it provided the most explanatory power (13.1%) for deeper marine citizenship of all variables statistically analysed in this study.

A potential pathway was indicated from marine recreation to marine citizenship, for example, one interviewee drew a direct connection between recreational dependency and marine citizenship: "*if your passion is the marine thing you're obviously gonna be like woah we've got to protect fish stocks, we've got to protect some of this biodiversity, we've got to protect the beauty and whatever for other generations*".

5. Discussion

Here we provide insight into how values, identities, emotions and human-ocean relationships manifest in marine citizens and influence their intention to act and depth of marine citizenship. Here, we offer reflections on how the individual factors investigated and their combined effect advance understandings of what motivates marine citizens and therefore how marine policy might promote citizenship.

5.1. Discussion of individual factors

5.1.1. RQ1: How do value and identity personality factors influence marine citizenship?

A unique contribution of this study is a range of interesting findings demonstrating the potential to connect all values to marine citizenship, enabled by our mixed methods approach to basic human values. Strong prioritisation of *universalism* value in our sample aligns with previous research (Cheung et al., 2014; Corner et al., 2014; de Groot and Steg, 2010; Katz-Gerro et al., 2017; Leviston et al., 2015; Prati et al., 2018). However, we also found that *stimulation* and low-*conformity* have an important role in engagement in 'thick' – more public and more costly – marine citizenship actions. This may add clarity to the findings of Katz-Gerro et al. (2017) and Schultz and Zelezny (1999) which give mixed relationships between *conformity* and pro-environmental behaviours.

The significance of *stimulation* value for deeper marine citizenship and the importance of the materiality of the ocean indicates it as an environment which may particularly stimulate people. However, *stimulation* and nature-interest have also been identified as important for response to climate change adaptation (Leviston et al., 2015) and nature-protecting behaviours (Kals et al., 1999), suggesting this may apply to wider environmental citizenship.

Achievement, hedonism, tradition, and security have been found to be negative predictors of pro-environmental behaviours (Leviston et al., 2015; Schultz and Zelezny, 1999), and shown to work against environmental concern and citizenship (Lucas, 2018). We too found negative relationships with deeper marine citizenship for *conformity* and *security*. Yet our respondents were keenly aware that norming marine citizenship would make it more acceptable to the public, and our qualitative data suggest marine citizens may see *security* as a more universal risk due to wider ecosystem change.

We must be mindful of the small explanatory power of values and the known value-action gap (Blake, 1999). Expression of values is mediated by identity (Gatersleben et al., 2014) and we found that environmental identity is also a driver, though more so for intention than action. Environmental Identity Index themes important for marine citizenship, notably *environmental citizenship* and *time in nature*, are consistent with existing literature (Clayton, 2003; Dresner et al., 2015; Kals et al., 1999).

5.1.2. RQ2: How do place-related factors (attachment, dependency and identifications) influence marine citizenship?

A key contribution of our work is the identification of a place attachment to the ocean as a specific type of natural environmental place which transcends the local, its significance for deeper marine citizenship, and the characterisation of material and conceptual ocean place identifications which promote this emotional attachment. This has echoes of the concept of biophilia, which highlights evolutionary attachment to natural terrestrial environments (Yi, 1992; referenced in Bott et al., 2003). Building on this concept, we have called this marine place attachment *thalassophilia*.

Whilst general emotional affinity links to nature-protecting behaviour (Kals et al., 1999), we know that local place attachment can both promote and hinder pro-environmental behaviours (Carrus et al., 2014); promote civic action (Devine-Wright and Howes, 2010; Payton et al., 2005); and that wider connection to the marine environment is possible (van Putten et al., 2018). The detection of a more generalised natural-place attachment may provide insight into conflicting findings in the context of environmental citizenship, by enabling distinction between local and generic place attachments and how they compete or synergise. We provide a thalassophilia metric based on established place attachment research and triangulated with qualitative data, that can be applied to such questions in future.

Our findings on the potential origins of thalassophilia encourage us to reflect on the relative roles of place identifications of the ocean (such as it being pristine, natural, a place of freedom and exploration) and the materiality of the ocean which can, perhaps uniquely, support a four-dimensional immersive sensory experience. In particular, whether or not these kinds of place identifications are required for marine citizenship and whether or not identifications built around intensive or extractive marine use would work against marine citizenship. We know from anthropology and geography that senses can mediate relationships between humans and place, with smell triggering memories and emotions and defining a setting (Gorman, 2017; Paterson, 2012); touch

Table 6
Regression between individual dependency variables and marine citizenship score. F(3,270) = 19.830, p < .001, R2adj. = 0.171.

Variable	F	Adj.R^2	Sig.	β
Livelihood	42.308 (1273)	0.131	p < .001	0.366
Wellbeing	26.971 (1278)	0.085	p < .001	0.297
Recreation/interests	23.112 (1277)	0.074	p < .001	0.278

Notes: β = standardised coefficient.

important for health and knowing oneself (Brown, 2017); and both indicating marine environmental quality (Naidu, 2018). Such sensory understandings of place are not always scientifically cogent, for example association of visual water clarity with marine health (Gelcich et al., 2014), and this may muddy the waters of the relationship between informed marine citizenship and perceptions of ocean health. There is also a blurring between sensory experience and place identifications such as changes to the ocean vista inhibiting the feeling of freedom (Devine-Wright and Howes, 2010). This relationship between the materiality of the ocean and the place identifications humans associate with it warrants further investigation, together with the implications for marine citizenship.

Finally, the holistic, interdisciplinary nature of the study has enabled us to identify that the strongest factor influencing depth of marine citizenship is marine place dependency. With the strongest influence being livelihood dependency, there is a need to consider the potential influence of extractive and non-extractive marine livelihoods upon marine citizenship. Given the above findings, we propose a potential pathway towards deeper marine citizenship that begins with positive sensory experiences promoting emotional attachment to the ocean (thalassophilia), which, through reinforcement, can develop into a place dependency. Once dependent upon a healthy ocean, people become more deeply motivated to take action to protect it.

5.2. *RQ3: How do marine citizens relate to the ocean as a place?*

Our findings indicate that motivation for deeper marine citizenship is highly complicated with multiple influencing factors and considerable variation within them amongst marine citizens. The quality of the human-ocean connection appears to be paramount, working in synergy with morality and a sense of civic responsibility (see Buchan et al., 2023 for discussion of the civic participation of this population).

A thread running throughout is that the ocean forms a component of marine citizens' identity. We found that our findings map to identity process theory, which has developed as a significant social psychological theory bringing together values, social representations, and a role for place supporting the self-concept (Breakwell, 1993; Moscovici, 1963; Tajfel, 1974; Twigger-Ross and Uzzell, 1996). Fig. 5 illustrates this mapping to the core identity process components of distinctiveness, continuity, self-esteem and self-efficacy.

We found a particular link within environmental identity to spending time in nature and environmental citizenship, alongside thalassophilia. Our findings indicate a connection between marine citizens' basic human values and ocean place identifications, for example high *stimulation* value and the conception of the ocean as a challenging and interesting place. To feel content in a place, place identifications must be congruent with values (Uzzell et al., 2002). We know from Breakwell (1993) that identity is socially relational, and therefore the cultural element of ocean place identifications will be important for how individuals understand the ocean as important to their self-concept. This gives a clear motivation for voluntary public engagement work which seeks to share a representation of the ocean as beautiful, interesting, valuable to humanity, and deserving of protection and sustainable management.

We suggest therefore that there is a marine identity which is *an identity rooted in the way in which the ocean as a place* supports *the sense of self*. Here the 'ocean as a place' is inclusive of both the materiality of the ocean, as described in 4.4, and the more conceptual social representations or place identifications of it.

A marine identity process theory gives a framework for understanding how values, environmental identity, and place relationships support the sense of self, in the context of social constructions of the ocean and coast. Crucially, as a process theory, it also gives a mechanism that links both psychological factors and place relationships to action, potentially filling the value- and knowledge-action gaps. Threatened identities are known to drive action in order to restore the sense of self (Breakwell, 1986; Jaspal and Breakwell, 2014). In the context of our work, we propose that for those who have such a strong emotional

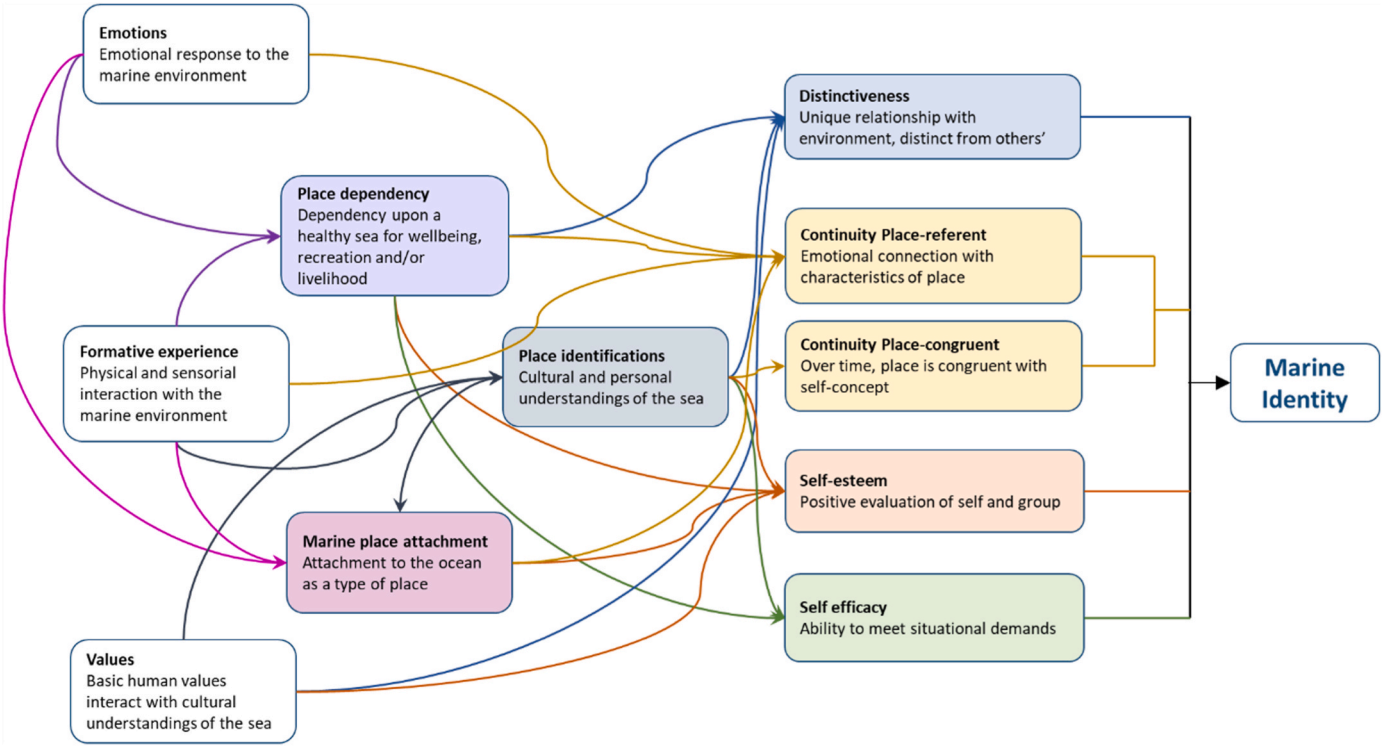

Fig. 5. This 'spaghetti' diagram shows the primary links between the key factors evidenced in this study as connected to an identity process theory of marine identity, based upon the theory of Twigger-Ross and Uzzell (1996). Coloured boxes are factors which are influenced by other factors. Arrows are coloured to assist with following them to their influenced factor. White boxes are inputs to other factors.. (Buchan, 2021.)

attachment to and dependency upon a healthy ocean that it forms part of their identity, marine degradation not only threatens the natural environment, it directly threatens their marine identity and they must take action to restore the imbalance. The most self-efficacious way to do this, where marine degradation is often far removed from an individual's locus of control, is to engage in more and deeper marine citizenship to try to fundamentally change society's relationship with the ocean.

In our study, marine identity of active marine citizens was a positive driver of deeper marine citizenship. However, it is probable there will be many forms or types of marine identity among the general public based on a range of ocean representations, which may equally be neutral or work against marine citizenship in individuals, due to the particular relationship those people have with the ocean. Further avenues of enquiry into marine identity would benefit from a useful metric to help identify and measure it in research participants.

6. Conclusions

We conducted a mixed methods, interdisciplinary study, investigating multiple factors that characterise marine citizens and influence their marine citizenship. We have found that it is possible to link all ten basic human values to the ocean and marine citizenship in a positive way, which will benefit researchers and practitioners engaged in promoting marine environmental sustainability by supporting diversification of approach to reach new potential marine citizens.

Our findings on human-ocean relationships give new insight into the motivations for marine citizenship that will support researchers and practitioners seeking to promote behaviour change. This will have particular utility alongside the current work on ocean literacy, complementing environmental education approaches and reinforcing findings showing that emotional connections to the ocean are important. We have identified a novel generic place attachment to the ocean, which is positively influential on marine citizenship, for which we have applied the term *thalassophilia*. We have additionally characterised how both the materiality of the ocean and the social representations of it through place identifications are important for developing thalassophilia. We have identified that the most influential factor investigated is marine place dependency and that this has particular implications because of the different kinds of dependencies that people have upon the ocean, which may not necessarily depend upon a healthy ocean.

Our most significant contribution to this field of enquiry is the proposal of marine identity process theory which gives a framework for a multitude of factors influential on marine citizenship and its operational function within the value- and knowledge-action gaps. We believe the work presented here marks a cornerstone in understanding of marine citizenship and has implications for the role of natural places in wider environmental citizenship in research and practice.

CRediT authorship contribution statement

P.M. Buchan: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Validation, Visualization, Writing – original draft, Writing – review & editing. **L.S. Evans:** Conceptualization, Methodology, Supervision, Validation, Writing – review & editing. **S. Barr:** Supervision, Writing – review & editing. **M. Pieraccini:** Supervision, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

I have shared the data in the attach file step.

Interdisciplinary Marine Citizenship Research: Survey and Interview Data, 2017–2018 (Original data) (UK Data Service)

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The research data supporting this publication are openly available from the UK Data Service at: https://reshare.ukdataservice.ac.uk/855922/

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jenvman.2024.120111.

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