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Research article

Emotions, trust, and expectations: Comparing determinants of public support for managed realignment across cases

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ABSTRACT

Managed realignment (MR) involves repositioning coastal or river flood defenses to re-establish tidal flooding and restore intertidal ecosystems in reclaimed areas. The restoration of intertidal ecosystems contributes to flood risk management and achieving nature conservation objectives. However, MR often faces resistance from local communities, potentially undermining its implementation. Previous qualitative studies have discussed the role of socio-psychological constructs in shaping public attitudes toward MR, but quantitative empirical assessments grounded in socio-psychological theory are scarce. In addition, the absence of comparative research across multiple cases limits the potential for generalization, making it difficult to apply findings to other contexts and populations. This study contributes to filling these research gaps by examining socio-psychological constructs that shape public support for MR in three case study areas in the Netherlands. We administered questionnaires among households (N = 324) and used multivariate and regression models to analyze the collected data. Results across the case studies point to three socio-psychological constructs that consistently explain public support for MR, including (i) trust in institutions, (ii) outcome expectancies and (iii) emotions. These constructs are intercorrelated, suggesting that they influence each other when collectively shaping support for MR. Strategies to enhance public support could be more effective when they address these constructs in an integrated manner. Moving forward, it is important to explore how public engagement and communication around MR policies could be tailored to leverage positive emotions better and how the design of MR can be aligned with location-specific priorities.

1. Introduction

Many populated coastal regions around the world have long relied on protective infrastructure such as dams and dikes to manage land-water interactions and defend against flooding. This has enabled the expansion of habitable and productive land, but also resulted in the loss and degradation of natural coastal ecosystems.

In recent decades, traditional flood risk management has been re-evaluated in favor of more sustainable strategies, such as managed realignment (MR) (Goeldner-Gianella, 2007; Warner et al., 2018). MR refers to the repositioning of flood defenses to re-establish tidal flooding and restore intertidal ecosystems in a formerly reclaimed area from the sea (Esteves, 2014). Several objectives may be underlying the decision to implement MR (van den Hoven et al., 2022), two of which are commonly present. Firstly, MR offers a more flexible and adaptive approach to flood risk management compared to traditional engineering solutions like dikes (Kiesel et al., 2020). This becomes particularly important in the light of sea-level rise where worldwide some form of MR is a core alternative among adaptation pathways (Haasnoot et al., 2021; Mach and Siders, 2021). Secondly, the restoration of intertidal ecosystems creates rich habitats for plant and animal species (Barbier et al., 2011), and thereby contributes to meeting nature conservation

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policy objectives (Morris, 2013).

Despite these double benefits the practical implementation of specific MR projects is often opposed by nearby inhabitants (Esteves, 2014; Weisner and Schernewski, 2013). This suggests that improvements in flood risk management and ecological quality may not always be perceived as such by the local community (Bax et al., 2023), or that the aversion to losing the status quo outweighs perceived benefits. Opposition to MR could result in the delay or complete cessation of planned projects (Esteves and Williams, 2017), putting at risk the potential role that MR could play in achieving biodiversity, water safety and climate adaptation objectives in the coming decades. It is therefore imperative to understand how people perceive MR and what factors shape these perceptions.

Several studies have provided qualitative insights into the socio-psychological processes that could impede or promote public support for MR (e.g. De La Vega-Leinert et al., 2018; Roca and Villares, 2012). However, quantitative empirical studies remain limited in number and scope, often relying on questionnaires with a limited foundation in socio-psychological theory (Myatt et al., 2003a; Needham and Hanley, 2019; Schernewski et al., 2018). Furthermore, existing research lacks comparative analyses across cases using standardized questionnaires, which limits the potential for generalization to other areas and populations.

Our study aims to address these gaps by providing quantitative insights from household questionnaires carried out across three cases of MR in the Netherlands. We ground the design of our questionnaire in well-established theoretical frameworks and concepts from the (environmental) socio-psychology literature. By doing so, we aim to shed light on the cognitive, affective and social constructs that shape public support for MR. If the identified constructs are generic across the three cases in the Netherlands – a country with centuries-long norm of land reclamation instead of realignment – these insights may inform the planning and implementation of acceptable MR interventions elsewhere.

This study builds upon previous research by Bax et al. (2023), which examined how local communities near the same three MR case study areas expect the intervention to impact ecosystem service availability and how these expectations influence their level of support. By incorporating theoretically well-defined psychological constructs, we complement the findings of Bax et al. (2023) and provide a more comprehensive assessment of the underlying determinants of MR support.

2. Theoretical background

People's attitudes and behavior are shaped by a complex interplay of social, cognitive (e.g. beliefs, thought processes) and affective constructs (e.g. feelings, mood states) (e.g. Loewenstein et al., 2001; Slovic et al., 2005). A recent meta-analysis identified social norms, negative affect, perceived self-efficacy and outcome efficacy as the socio-psychological constructs most strongly associated with climate adaptive behavior (Van Valkengoed and Steg, 2019). Conceptually, public support or opposition reflects people's attitudes towards an organization's (e.g. a government) policy and decision making. Whereas adaptive behavior often refers to actively engaging in mitigation and preparedness behavior, public support or resistance can be both passive (e.g. silent disagreement) or active (e.g. organized protest). The factors that explain adaptive behavior can similarly explain how people react to landscape interventions such as MR. In the following, we present a brief overview of concepts and theories that could serve as a basis for understanding perceptions of MR.

Relationship to landscape and place attachment: The implementation of MR projects primarily takes place in sparsely developed rural areas, often on land that was formerly reclaimed from the sea (MacDonald et al., 2020). Reclaimed areas have typically been inhabited for many decades or centuries, often spanning multiple generations. People living in a place over a long time tend to become increasingly connected to that place. This bonding between people and places is commonly referred to as place attachment. Brown and Perkins (1992) define place attachment as "positively experienced bonds, sometimes occurring without awareness, that are developed over time from the behavioral, affective and cognitive ties between individuals and/or groups and their socio-physical environment". Hence, from a place attachment perspective, opposition against MR could be viewed as a place-protective reaction that emerges when people perceive the intervention as disrupting or threatening the bonds they have with their socio-physical surroundings (Devine-Wright, 2009). Place attachment has been conceptualized along multiple dimensions, including place identity, which reflects emotional or symbolic attachments to a place (e.g. memories, experiences), and place dependence, which captures functional or physical attachments (e.g. livelihood opportunities) (Anton and Lawrence, 2014). More recent work has pointed to the role of other aspects in shaping place attachment, including social networks and bonding with nature (Raymond et al., 2010). Place attachment has clarified social responses to various landscape interventions, like river floodplain management (Buijs, 2009) and renewable energy projects (Devine-Wright, 2009), but consideration of the concept in MR studies remains limited.

Outcome expectancies and loss aversion: With the prospect of losing traditional landscapes and associated values, inhabitants may struggle to recognize or believe in the potential benefits of MR. Beliefs about the outcomes of MR can be conceptualized as outcome expectancies – a psychological construct that captures the anticipated gains or losses resulting from specific actions (Bandura, 1986). In the MR context, outcome expectancies reflect what people expect to gain or lose from the landscape intervention, potentially shaping their inclination towards supporting or opposing the intervention. As such, positive outcome expectancies about MR may contribute to supportive attitudes. However, people tend to be more sensitive to losses than equivalent gains, which is reflective of the "loss aversion" principle (Kahneman and Tversky, 1979). In line with this principle, positive outcome expectancies may be insufficient to compensate for the anticipated losses, potentially leading to opposition to MR (Bax et al., 2023). In the specific case of MR, loss aversion is further compounded by the fact that losses and gains are not equivalent – losses tend to be concrete and personal in nature (e.g. impacts on livelihoods) and may overshadow the more abstract and communal benefits of MR (e.g. enhanced biodiversity and long-term flood resilience). In addition, the natural predisposition of people to prioritize immediate benefits over future ones (known as time-preference (Frederick et al., 2002)) may further exacerbate their aversion to short-term losses, and could obscure their appreciation for the gains of MR in the long run.

Perceptions of risk: Risk perception refers to the subjective judgement that people make about the severity and probability of a risk (Slovic, 1987). As a fundamental concept in behavioral theories, such as Protection Motivation Theory (Rogers, 1975), risk perception has received considerable attention in previous research on climate adaptive behavior, particularly in relation to flood risk management (Bubeck et al., 2012; Van Valkengoed and Steg, 2019). Despite the vast body of research, there continues to be much debate about the role and relevance of risk perception (Van Valkengoed and Steg, 2019). Within the context of flooding, it is reasonable to assume that flood-protective policies such as MR are supported by people who perceive high risks, such as those with prior flood experiences (Wachinger et al., 2013) or those living in flood-prone areas (Brilly and Polic, 2005). However, the relationship between risk perception and support for MR may be more nuanced and complex. Importantly, MR may be viewed as a departure from traditional flood risk management strategies (e.g. construction of dams and dikes) in which people generally have major confidence (Terpstra, 2011). With people favoring the status quo, they may be less accepting of alternative approaches, such as MR. Research on risk perception has furthermore shown that people often downplay their susceptibility to potential hazards – a cognitive distortion referred to as the "optimism bias" (Tversky and Kahneman, 1981). For instance, people residing in areas unprotected by dikes have been found to underestimate flood risks (Botzen et al., 2009), which has been associated with a decreased willingness to take self-protective actions (Wachinger et al., 2013) and lower support for MR (Dachary-Bernard et al., 2019).

Emotions and affect: There is extensive literature on the role of feelings and emotions in people's risk attitudes. Fear plays a central role in theories of risk perception and adaptive behavior including the Psychometric Paradigm (Slovic, 1992), Protection Motivation Theory (Rogers, 1975), and the Extended Parallel Process Model (Witte and Allen, 2000), which explains how individuals respond to fear-based messages by weighing the perceived threat against their perceived ability to manage the threat. Fear is among the most studied factors in flood adaptation behavior (e.g., see reviews by Bubeck et al. (2012), Kellens et al. (2013) and Van Valkengoed and Steg (2019). When aroused through risk communication, fear provides a strong cue for a (temporary) increase in risk perception, which in turn motivates consideration of coping strategies. (e.g. Kievik and Gutteling, 2011). People with previous flood experience are more likely to perceive higher flood risk compared to people without such experience due to the recollection of fear-related feelings (e.g Siegrist and Gutscher (2008)). Next to fear previous flood experiences have been associated with other emotions, both negative and positive, which can amplify or attenuate flood risk perceptions and trust in flood risk management institutions (Terpstra, 2011). Including a wide range of emotions and feelings is important since the affect heuristic (Slovic et al., 2007) and risk-as-feelings hypothesis (Loewenstein et al., 2001) posit that people refer to a readily available 'affect pool' in their memory, containing all the positive and negative tags that are consciously or unconsciously associated with an event, topic or situation. Since people typically rely on affect and emotion to guide their judgement in the context of complex and emotionally charged issues (Slovic et al., 2013) we expect these to play a role in attitudes towards MR. Importantly, previous research has associated MR with negative emotions such as fear (Roca and Villares, 2012), concern (Myatt et al., 2003a) and anger (Parrott and Burningham, 2008), which suggests a negative influence of these emotions on public support for MR. However, the relationship between such negative emotions and MR has seldom been made explicit. The potential role that *positive* emotions could play has received even less attention in prior studies.

Institutions and trust: Trust among citizens in government institutions (i.e. laws and government organizations) is essential for the uptake of public policies (Cologna and Siegrist, 2020). Government institutions may foster a sentiment of trustworthiness and reliability when they engage with the public in a fair and transparent manner (Kaasa and Andriani, 2022) and demonstrate technical competence in their decision-making (Chryssochoidis et al., 2009). Being able to rely on the government is especially important in the case of complex policy interventions like MR. In such cases, people will be unable to fully inform themselves about all the possible consequences of the intervention, leaving them with little choice but to place their trust in the government's capacity to make impartial and well-informed decisions. In view of this, people may "employ" their sense of trust as a heuristic to shift personal risk and uncertainty to institutions, thereby absolving themselves from making rational judgements about MR on their own (Wachinger et al., 2013). A high level of trust could thus increase the level of support for MR. However, previous research on MR provides examples of where the level of trust in institutions was already low and where the implementation of MR caused people to become even more distrustful towards the government (Roca and Villares, 2012). Distrust tends to reinforce and perpetuate distrust (Slovic, 1999), making it increasingly difficult to successfully implement and maintain public policies like MR.

3. Methods

3.1. MR case study areas

Our three MR cases are all situated in the Southwest Delta at the North Sea coast in the southwest of the Netherlands (Fig. 1). The Southwest Delta has a highly diverse topography consisting of islands, peninsulas, lakes, and two major estuaries – the Eastern Scheldt and the Western Scheldt. Both estuaries are Natura 2000 protected areas due to their vast areas of intertidal ecosystems, including salt marshes and tidal flats. These ecosystems have been deteriorating steadily over the past century, primarily driven by changes in tidal dynamics because of human interventions in the water system. For instance, in the Western Scheldt, dredging activities are conducted on a regular basis to maintain its navigation channels and allow for commercial shipping from and to the harbor of Antwerp in Belgium. In the case of the Eastern Scheldt, a storm surge barrier has been constructed to close off the estuary from the North Sea, following a disastrous flood event in 1953 (Gerritsen, 2005). To compensate for the loss of intertidal ecosystems and comply with Natura 2000 objectives, the Dutch government has designated multiple sites in the Eastern Scheldt and Western Scheldt to implement nature restoration measures, including MR. Beyond the primary goal of nature restoration, MR delivers various environmental co-benefits, including coastal protection, carbon sequestration, nutrient retention and improved water quality (Andrews et al., 2006; Spencer and Harvey, 2012). Our analysis covers three MR interventions: (1) Rammegors, (2) Perkpolder, and (3) Hedwigepolder (Fig. 1, Table 1). A brief overview of these study areas is given below, further details can be found in Bax et al. (2023).

Rammegors was formerly a freshwater nature reserve and served as a recreation area for the nearby community, offering opportunities for walking, birdwatching, and ice-skating during the wintertime. In 2014, a tidal inlet was placed in the primary sea dike adjacent to Rammegors to connect the area with the Eastern Scheldt and facilitate the establishment of intertidal saline ecosystems. While Rammegors remains physically an inner-dike area due to the intact primary sea dike, the reintroduction of tidal exchange through the new inlet connects the inner dike system functionally with the outer dike system. The local community strongly opposed the MR intervention. In particular, because the area became inaccessible for recreation and concerns were raised about adverse impacts on freshwater biodiversity and salinization of surrounding agricultural polders.

Perkpolder is a former reclaimed agricultural polder and the departure point for a ferry service that operated across the Western Scheldt. After the ferry service ended in the 1990s, a coalition of government institutions and private actors developed a spatial development plan to repurpose the area, which included the creation of an estuarine nature reserve along with new housing and recreation facilities. To create the nature reserve, a MR intervention was implemented. This involved the partial removal of the existing primary sea defense and the establishment of a new sea defense further inland. Two years after the intervention, it was discovered that the soil substrates employed as part of the intervention were contaminated with heavy metals, causing pollution of the groundwater and nearby surface waters. Health and environmental risks were deemed negligible, but widespread media coverage nonetheless fueled public concerns and opposition to the redevelopment of Perkpolder more broadly.

The Hertogin Hedwigepolder (hereafter Hedwigepolder) is a former reclaimed agricultural polder along the Western Scheldt. The area has been reconnected with the Western Scheldt in 2022. The plans to transform the Hedwigepolder faced significant controversy and opposition from both the local community and the wider region. Over the years, the community engaged in various collective actions, including protests, demonstrations, political lobbying, and legal procedures to oppose and prevent the MR project. In 2018, the Supreme Court of the Netherlands ultimately ruled in favor of the MR intervention, after

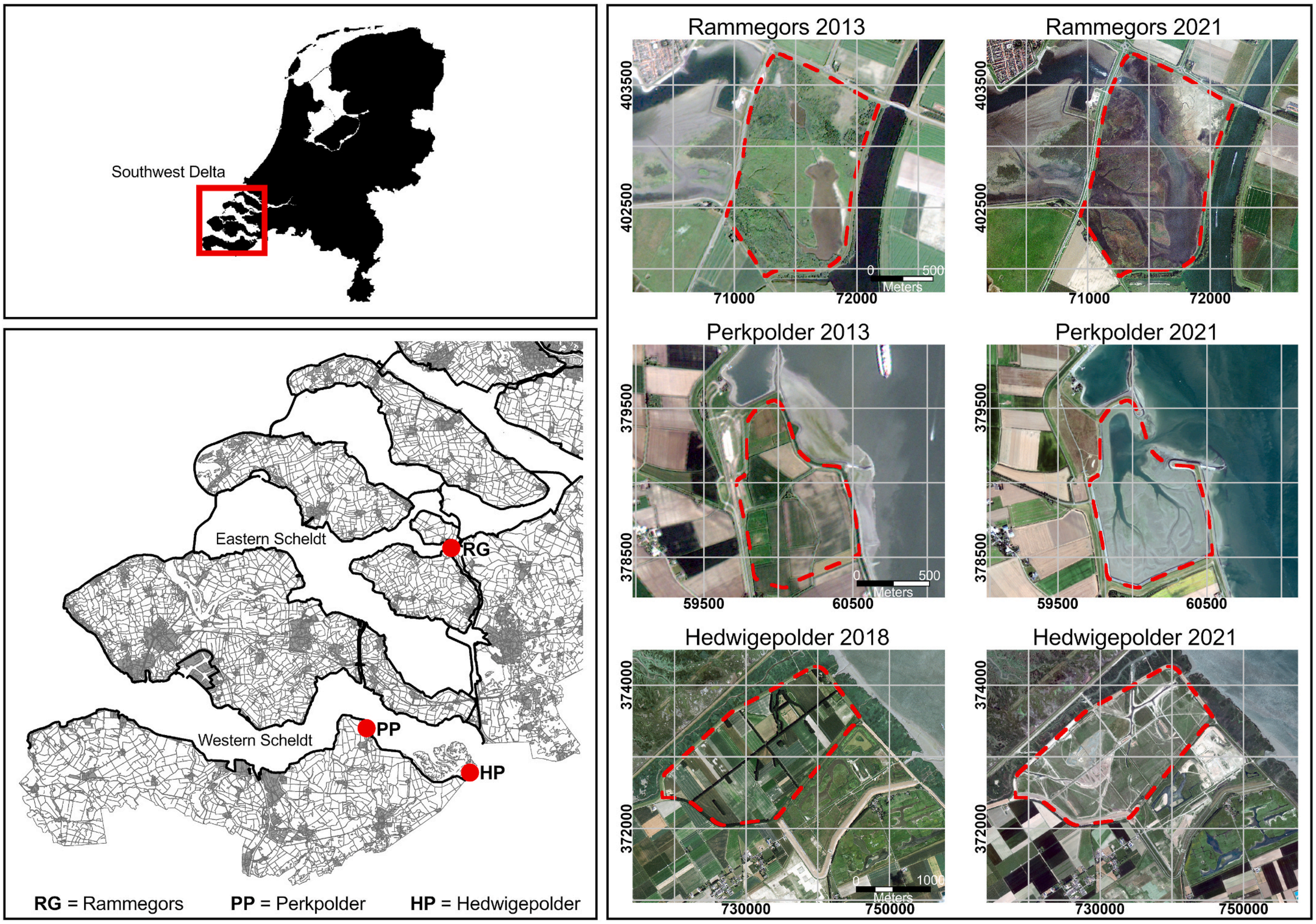

Fig. 1. Study area. Top left: Location of the Southwest Delta in the Netherlands. Bottom left: Location of the Eastern Scheldt, the Western Scheldt and the three MR case study areas. Primary flood defenses are depicted by the bold black lines. Right: Satellite imagery of the three MR case study areas, with the project locations indicated by the red dashed lines. The images of Rammegors and Perkpolder display the landscape before and after the implementation of MR (in 2013 and 2021, respectively). The images of Hedwigepolder display the landscape approximately 4 years and 1 year before the implementation of MR (in 2018 and 2021, respectively). The figure is adapted from Bax et al. (2023).

Table 1
Overview of the MR case study areas.

	Rammegors	Perkpolder	Hedwigepolder
Location	Eastern Scheldt	Western Scheldt	Western Scheldt
Area (ha)	145	75	300
Prior use	Fresh water nature reserve, recreation area	Agricultural polder, former ferry terminal	Agricultural polder
MR purpose	Compensation measure for human-induced loss of intertidal ecosystems in the Eastern Scheldt	Compensation measure for human-induced loss of intertidal ecosystems in the Western Scheldt, redevelopment of the area	Compensation measure for human-induced loss of intertidal ecosystems in the Western Scheldt
MR intervention	Tidal inlet in existing primary sea dike	Partial removal of primary sea dike, new dike further inland	Partial removal of primary sea dike, new dike further inland
Year of completion	2014	2015	2022

which the primary sea defense around the Hedwigepolder was partially removed at the end of 2022. As a consequence of the intervention, the Hedwigepolder and the adjacent Prosperpolder on the Belgian side of the border will undergo a gradual transformation into an intertidal nature reserve, becoming part of the Saeftinghe marshes Natura 2000 protected area, situated to the west. At the time of conducting questionnaires, the actual dike breach was still to take place but preliminary preparations such as removing buildings, clearing trees and establishing a new coastal defense further inland had already been completed.

3.2. *Questionnaire and data collection*

We designed a questionnaire to measure public support for MR along with the socio-psychological constructs that are expected to explain support, including place attachment, risk perception, concerns, emotions, social norms, information needs, outcome expectancies and institutional trust. A subset of findings from this questionnaire, specifically regarding outcome expectancies on ecosystem service availability, has been reported in Bax et al. (2023). In the present study, we focus on outcome expectancies in conjunction with the other socio-psychological constructs included in the questionnaire to evaluate MR support.

Each construct except emotions was measured using multiple items on bipolar five-point Likert-type scales (e.g., 1) very much disagree, 2) somewhat disagree, 3) neutral, 4) somewhat agree, 5) very much agree). Emotions were measured by instructing respondents to tick emotions and feelings which they associate with the redevelopment of the area from a list of thirteen. Emotions were coded as 0 (not selected) or 1 (selected) and hence treated as binary variables in subsequent analyses.

A team of six research assistants administered the questionnaire in three villages closest situated to the MR project sites, including Sint Philipsland (~1 km from Rammegors), Kloosterzande (~1 km from Perkpolder), and Hulst (~10 km from the Hedwigepolder). To approximate a random and representative sample, the assistants conducted a door-to-door sampling strategy across different neighborhoods in each village to cover a broad geographic area and avoid overrepresentation of any particular section of the villages. All households had an equal opportunity to participate, and no prior screening was used to pre-select participants. The research assistants were instructed to follow a standardized protocol, including a structured invitation process, informed consent procedures, and ethical guidelines (e.g. Kelley et al., 2003) to ensure consistent data collection. Questionnaires were left behind with respondents and collected at the end of the day to give respondents sufficient time to answer all questions and think about their answers. Allowing respondents to fill out the questionnaire independently was furthermore expected to reduce interviewer effects and social desirability bias. Data collection activities were conducted in pairs, and the pairs were randomized over the course of the data collection period to reduce differences in recruitment style and potential interviewer effects. To minimize nonresponse bias, residents who were not available at the time of the visit were provided with a postcard containing a weblink to complete the questionnaire online. This ensured that participation was not limited to those at home during fieldwork. Data collection took place over 10 days (December 2021–January 2022) and included both mornings and afternoons to reach participants with different daily routines.

The questionnaire was completed by a total of 324 individuals across the three case study areas (average response rate of 45 %). We noted some differences in the sociodemographic characteristics of respondents in our sample compared to census data (CBS, 2024) of the case studies (Table 2). Respondents tended to have a higher educational level compared to census data and male respondents were slightly overrepresented. The sample of Kloosterzande (MR Perkpolder) displayed an overrepresentation of older individuals (>70 years) and an underrepresentation of younger individuals (<49 years). The age distribution of respondents in the sample of Sint Philipsland and Kloosterzande (MR Rammegors and MR Perkpolder correspondingly) was fairly similar compared to census data.

3.3. Data analysis

We used multiple imputation to account for missing data in our dataset, as 99 out of the 324 questionnaires were found to have missing data. Missing data per questionnaire item was <10 %, which is generally considered an acceptable threshold value to impute missing data (Bennett, 2001). Subsequently, to explore sample bias, we computed correlations between sociodemographic characteristics of respondents in our sample and the response variable of our study (i.e., level of support for MR). The correlation with age was statistically significant ($r = -0.15$; $p < 0.01$), indicating that disparities in age distribution between our sample and census data could potentially be a source of bias. Consequently, to account for any potential age-related bias in subsequent statistical procedures, we computed a weight variable by assigning proportionally higher/lower weights to underrepresented/overrepresented age groups.

Constructs measured with Likert scale items were validated through principal components analysis (PCA) with promax rotation to allow for nonzero correlations between extracted factors. This approach aligns with the idea that constructs shaping public support for MR may be intercorrelated. Questionnaire items on social norms showed substantial cross-loadings on multiple factors and were therefore removed. Items on information needs were removed due to their low correlation with the response variable (public support for MR). The final PCA resulted in a six-factor solution explaining 75 % of the variance, with each construct loading uniquely on a separate factor (Table 3). Emotions were subjected to a separate PCA resulting in a four-factor solution explaining 54 % of the variance (Table 4). Factor one represents the 'negative' emotions and factor two the 'positive' emotions. Factor three and four were discarded due to low construct reliability. To test scale reliability, we computed Cronbach's alphas for factors consisting of three or more items, while inter-item correlations were computed for factors consisting of two items. We used a threshold of 0.7 to define an acceptable value for Cronbach's alpha, following guidelines by (Hair et al., 2010). One factor (negative emotions) had a Cronbach's alpha of 0.665, which is slightly below this threshold. However, the value was considered sufficiently close to 0.7, and factor analysis confirmed that the included items were conceptually aligned and measured a theoretically meaningful construct. Hence, given its coherence and relevance to the study, the factor was retained in the analysis.

To analyze whether the three communities differ in attitudes towards MR in their environment a MANCOVA was performed with the eight validated constructs as dependent variables and a numeric variable to discriminate between case study areas as fixed factor. Gender, age, and

Table 2
Comparison of the respondents' demographic characteristics to census data.

Census data (CBS, 2024)			Rammegors	Perkpolder	Hedwigepolder
			Sint Philipsland	Kloosterzande	Hulst
Municipality	Tholen	Hulst	Tholen (N = 103)	Hulst (N = 111)	Hulst (N = 110)
Gender [%]					
Male	50,0	50,0	55,7	51,9	55,8
Female	50,0	50,0	44,3	48,1	44,2
Age [%]					
18,19 years	3.1	2.3	3.0	1.9	1.9
20–29 years	15.6	10.5	16.0	13.1	6.7
30–39 years	14.9	12.4	17.0	9.3	9.6
40–49 years	14.3	14.1	15.0	10.3	8.7
50–59 years	19.0	20.2	17.0	19.6	19.2
60–69 years	15.2	18.1	17.0	24.3	20.2
70–79 years	17.8	22.5	15.0	21.5	33.7
Educational level [%]					
Low	35.8	31.4	25.8	23.0	20.4
Medium	47.5	45.9	43.3	51.0	39.8
High	16.6	22.7	30.9	26.0	39.8

Table 3
Factor analysis on questionnaire items measured on a Likert-scale.

Factors and questionnaire items	Factor loading	Standard deviation	Cronbach's alpha
Public support for MR (mean = 2.65; eigenvalue = 1.79; variance explained = 6.4)			0.947
I fully agree with the decision to implement MR	0.897	1.312	
I fully understand the decision to implement MR	0.926	1.291	
I have very positive feelings about the decision to implement MR	0.870	1.235	
Place attachment (mean = 3.23; eigenvalue = 1.97; variance explained = 7.0)			0.920
The landscape and residents in this area are very special to me.	0.720	1.102	
I identify strongly with the landscape and residents in this area.	0.697	1.074	
The landscape and community in this area provide the best environment for doing what I love most.	0.898	1.140	
For me, no other area compares to the landscape and community in this area.	0.918	1.137	
The landscape and community in this area better meet my needs than any other area.	0.959	1.110	
Place familiarity (mean = 3.37; eigenvalue = 5.72; variance explained = 20.4)			0.908
I am very familiar with the history of this area	0.923	1.144	
I have an extensive social network in this area	0.794	1.185	
I am familiar with the local culture and customs in this area	0.877	1.152	
I am well informed about developments and plans in this area	0.813	1.129	
I know the local roads and routes in this area like the back of my hand	0.859	1.152	
Risk perception (mean = 3.06; eigenvalue = 1.12; variance explained = 4.0)			0.804
Perceived threat of sea level rise	0.887	1.105	
Perceived threat of storm surges	0.895	1.037	
Perceived threat of precipitation in the winter half-year	0.751	0.882	
Trust in institutions (mean = 2.42; eigenvalue = 2.57; variance explained = 9.2)			0.919
The involved authorities carefully balance the interests of water safety, nature, and the economy.	0.869	1.007	
The involved authorities are competent enough to make well-informed decisions.	0.859	1.028	
The involved authorities pay attention to the concerns of the public.	0.886	0.949	
The involved authorities always provide the public with full information	0.887	0.950	
The decisions made by the involved authorities are fair.	0.855	0.958	
Outcome expectancies (mean = 2.83; eigenvalue = 7.74; variance explained = 27.6)			0.905
Expected effect of MR on biodiversity	0.877	1.142	
Expected effect of MR on preventing dike breaches	0.557	1.075	
Expected effect of MR on the quality of the soil	0.713	1.086	
Expected effect of MR on pollination	0.830	1.182	
Expected effect of MR on landscape attractiveness	0.810	1.346	
Expected effect of MR on recreation and tourism	0.847	1.236	
Expected effect of MR on physical and mental health	0.788	0.993	

Note: Principal components factor analysis with promax rotation and Kaiser normalization (eigenvalue >1).

Table 4
Factor analysis on questionnaire items measured on a binary scale.

Factors and questionnaire items	Factor loading	Standard deviation	Cronbach's alpha
Negative emotions (mean = 0.158; eigenvalue = 2.09; variance explained = 26.08)			0.665
Anger	0.79	0.386	
Frustration	0.76	0.393	
Sadness	0.76	0.304	
Positive emotions (mean = 0.212; eigenvalue = 1.40; variance explained = 17.47)			0.587[a]
Joy	0.89	0.340	
Happiness	0.90	0.366	
Factor 3 (mean = 0.215; eigenvalue = 1.12; variance explained = 14.01)			0.090[a]
Concern	0.80	0.450	
Hope	0.63	0.357	
Factor 4 (mean = 0.050; eigenvalue = 1.01; variance explained = 12.61)			
Indifference	0.92	0.217	–

Note: Principal components factor analysis with promax rotation and Kaiser normalization (eigenvalue >1).
[a] Inter-item correlation.

educational level were specified as covariates. The output included multivariate and univariate test statistics to assess statistical differences between communities. To control for multiple comparisons, significance levels for univariate effects were adjusted using the Bonferroni correction. We computed effect sizes (partial eta squared) to examine the proportion of variance in the dependent variables explained by the fixed factor while controlling for other variables in the model. Effect sizes of 0.01, 0.06, and 0.14 are commonly used as benchmarks for small, moderate, and large effects, respectively (Richardson, 2011). Marginal means were estimated to further characterize variation across case study areas.

We computed correlations between constructs to explore their interrelationships. To explain local community perspectives of MR, we conducted three hierarchical multiple regression analyses separately, with the level of support for MR as the response variable and all other factors resulting from our factor analysis as the explanatory variables. We centered the explanatory variables to reduce multicollinearity. Conceptually similar explanatory variables were entered in steps to the regression model to examine their joint contribution to the model fit. Interaction terms were included to evaluate whether the effect of one variable on MR support depends on the level of other variables, thereby capturing potential synergies or moderating effects. All data preprocessing and statistical analyses were carried out using SPSS version 28.

4. Results

4.1. Multivariate results

The MANCOVA showed a statistically significant multivariate effect ($F_{2,321} = 7.53$, $p < 0.01$) indicating that the three communities differ from each other in their scores on the eight constructs. Fig. 2 shows six constructs with significant univariate effects (adjusted using the Bonferroni correction), including public support for MR ($F_{2,321} = 9.29$), place attachment ($F_{2,321} = 12.17$), place familiarity ($F_{2,321} = 18.57$), risk perception ($F_{2,321} = 5.93$), outcome expectancies ($F_{2,321} = 15.24$) and positive emotions ($F_{2,321} = 14.86$). The largest effect sizes were observed for place familiarity (0.105), outcome expectancies (0.088), and positive emotions (0.086). This indicates that a moderate proportion of variance in these constructs can be attributed to community specific context and characteristics.

Fig. 2 displays the tendencies observed in the data in terms of estimated marginal means. Respondents from Perkpolder are considerably more supportive of MR (3.05) compared to respondents from Rammegors and Hedwigepolder (2.33 and 2.56, respectively). Similarly, respondents from Perkpolder tend to be more attached and familiar with the local landscape compared to respondents from Hedwigepolder and Rammegors. Respondents from Perkpolder also demonstrate a more positive expectancy in terms of the outcomes of MR (3.13 compared to 2.88 and 2.43 for Hedwigepolder and Rammegors, respectively). Respondents from the Hedwigepolder associate MR with considerably more negative than positive emotions, whereas the opposite is true for respondents from Perkpolder and Rammegors (i.e. more positive than negative emotions). Respondents from Hedwigepolder furthermore report a relatively high level of risk perception (3.27). The estimated marginal means associated with the level of trust in institutions were similar across all three cases.

4.2. Correlations and regression analysis

The correlation matrix in Table 5 displays similar and consistent patterns among the three case studies. Specifically, in all study areas, the level of support for MR is strongly and positively correlated with three constructs (i.e. trust in institutions, positive emotions and outcome expectancies) whereas moderate to strong negative correlations are found with one construct (i.e. negative emotions). Notably lower (i.e. moderate or non-significant) correlations are found between public support for MR and other constructs, including place attachment, place familiarity and risk perception. Furthermore, all case study areas show strong and positive correlations between place attachment and place familiarity, and moderate to strong negative correlations between positive and negative emotions. The level of trust in institutions is negatively correlated with negative emotions, and positively correlated with outcome expectancies. Outcome expectancies are furthermore positively correlated with positive emotions.

4.2.1. Rammegors MR project

The regression analysis conducted on the Rammegors dataset yielded an R^2 of 0.54, indicating that about 54 % of the variance in the level of public support for MR can be accounted for based on the socio-psychological constructs incorporated in the model. Three constructs stand out as having the highest explanatory power, including trust in institutions, positive emotions and outcome expectancies (Fig. 3). These constructs are statistically significant ($p < 0.01$) and positively associated with the level of MR support. Negative emotions appear to have a limited influence in the model ($p > 0.05$), even though the correlation matrix in Table 5 shows that negative emotions are strongly (negatively) correlated with the level of MR support. Notably, the interaction term between outcome expectancies and negative emotions is statistically significant, while the other interaction terms are not. Other constructs, including place attachment, place familiarity and risk perception, are also not statistically significant. The changes in R^2 as constructs are added at each step to the core model indicate that the level of trust in institutions and emotions make a considerable contribution to the overall explanatory power of the model.

4.2.2. Perkpolder MR project

The Perkpolder regression model yielded an R^2 of 0.55. Trust in institutions and outcome expectancies are identified as the two most influential constructs. Both constructs are statistically significant ($p < 0.01$) and positively associated with the level of public support for MR. The changes in R^2 associated with these constructs indicate that their inclusion in the model considerably enhances the explained variance in MR support. Positive emotions are also statistically significant ($p < 0.05$), but the contribution to the model's R^2 is considerably lower compared to the other significant constructs. Negative emotions, place attachment, place familiarity and risk perception are not statistically significant, and their inclusion has a limited impact on the R^2 of the model. None of the interaction terms are statistically significant.

4.2.3. Hedwigepolder MR project

The Hedwigepolder regression model yielded an R^2 of 0.53. The regression coefficients show that the variance in MR support is mainly explained by four constructs, including outcome expectancies, trust in institutions, positive emotions and negative emotions ($p < 0.01$ or $p < 0.05$). The other constructs in the model, including place attachment, place familiarity and risk perception, are less influential and not

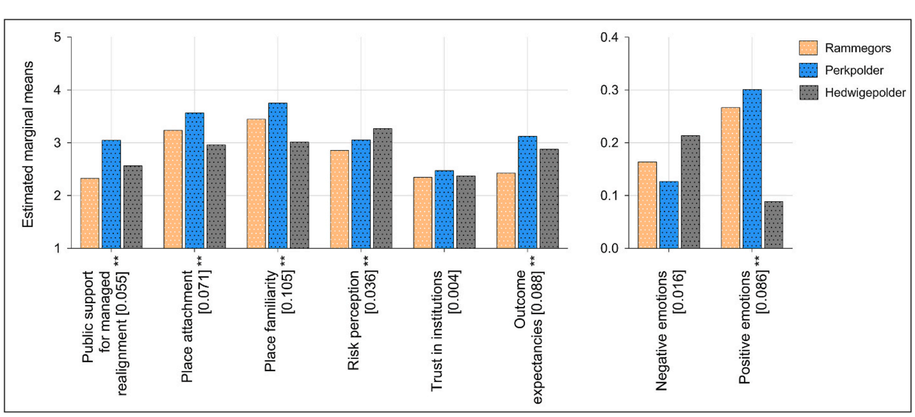

Fig. 2. Variation across the three case study areas in terms of eight constructs, derived from MANCOVA. Estimated marginal means indicate the differences in mean scores across the study areas, while controlling for potential confounding constructs. The scale of negative and positive emotions ranges from 0 to 1. Effect sizes (partial eta squared) are indicated within the square brackets, statistical significance is indicated with asterisks (* = $p < 0.05$; ** = $p < 0.01$).

Table 5
Pearson correlations among constructs. Statistical significance is indicated with asterisks (* = $p < 0.05$; ** = $p < 0.01$).

		Public support for managed realignment	Place attachment	Place familiarity	Risk perception	Trust in institutions	Negative emotions	Positive emotions
Place attachment	Rammegors	0.114						
	Perkpolder	−0.051						
	Hedwigepolder	−0.192*						
Place familiarity	Rammegors	−0.101	0.341**					
	Perkpolder	−0.124	0.557**					
	Hedwigepolder	−0.123	0.587**					
Risk perception	Rammegors	0.131	0.15	−0.002				
	Perkpolder	0.099	0.086	0.043				
	Hedwigepolder	0.112	0.071	−0.024				
Trust in institutions	Rammegors	0.465**	0.169	−0.047	0.185			
	Perkpolder	0.453**	−0.103	−0.142	−0.014			
	Hedwigepolder	0.344**	−0.282**	−0.197*	−0.117			
Negative emotions	Rammegors	−0.367**	−0.093	0.246*	−0.255**	−0.389**		
	Perkpolder	−0.226*	−0.027	0.038	0.108	−0.396**		
	Hedwigepolder	−0.375**	0.14	0.223*	−0.081	−0.283**		
Positive emotions	Rammegors	0.535**	0.390**	0.117	0.119	0.326**	−0.434**	
	Perkpolder	0.293**	0.085	−0.032	−0.151	0.201*	−0.255**	
	Hedwigepolder	0.412**	0.008	0.135	0.074	0.02	−0.211*	
Outcome expectancies	Rammegors	0.611**	0.183	−0.262**	0.273**	0.520**	−0.533**	0.451**
	Perkpolder	0.701**	0.002	−0.088	0.18	0.447**	−0.168	0.270**
	Hedwigepolder	0.635**	−0.064	−0.084	0.025	0.436**	−0.371**	0.342**

statistically significant. Furthermore, none of the interaction terms are statistically significant. The changes in R^2 indicate that the inclusion of emotions, outcome expectancies and trust in institutions results in a considerable improvement of the overall explanatory power of the model.

5. Discussion

MR is a strategy that provides significant benefits for flood protection and ecosystem restoration, yet its implementation is often opposed by local communities. Quantitative empirical research into the socio-psychological constructs that shape public support for MR is notably lacking from the literature. This study has aimed to fill this gap by quantitatively examining these constructs and comparing them across multiple case study areas to allow for generalization. The results of our study reveal clear consistencies between the study areas, albeit with some nuances, pointing to a common set of socio-psychological constructs that shape public support for MR across various implementation contexts.

Our regression analysis shows that consistently across the three MR projects their public support is primarily shaped by three constructs: trust in institutions, outcome expectancies, and emotions. These constructs are statistically significant across the three MR case study areas and consistently show either a positive or negative association with the level of support for MR. Specifically, we found a positive association between trust in institutions and support for MR, which is consistent with our expectations and previous studies (Jones et al., 2014; Myatt et al., 2003b). Our multivariate results show that the level of trust among residents is generally low (on average about 2.3 on a 5-point scale), which appears to contribute to the low level of public support for MR. The mistrust of the government may be attributed to a variety of reasons. One similarity across case studies is the general perception that the involved government institutions are not acting in the community's best interests, but place priority on other goals instead. For instance, the transformation of Rammegors to achieve the government's nature restoration goals resulted in access restrictions that hindered the community's recreational use of the area. In the case of Hedwigepolder, nearby residents perceived the government as acting primarily in the interests of others (i.e. MR aimed to offset ecological impacts associated with dredging to maintain the Port of Antwerp accessible) and felt they were left to bear the consequences. These cases illustrate how MR policies are perceived as lacking fairness and equity. As noted in previous studies, fairness and equity are crucial preconditions for establishing trust in governments (see Davenport et al., 2007; Lockwood et al., 2010) and should therefore be central to the formulation of MR policies.

The perceived divide between government actions and community interests relates to what people expect from the government, but also what they expect from the intervention itself. Our multivariate results show that the outcome expectancies of MR in Perkpolder are perceived as more positive compared to Rammegors and Hedwigepolder. This seems to contribute to a considerably higher level of support (3.0 on a five-point scale, compared to 2.3 and 2.6 for Rammegors and Hedwigepolder, respectively). Previous research has already shown and discussed the influence of outcome expectancies on MR support (see Bax et al., 2023). With the present study, we are complementing these findings, by showing the relative importance of outcome expectancies compared to other influential socio-psychological constructs, such as trust in institutions and emotions.

When it comes to emotions, our results show that MR evokes both positive and negative emotions, though negative emotions were reported more frequently. Positive emotions are consistently associated with increased support for MR across all three case study areas. By contrast, negative emotions only play a role in the Hedwigepolder area, which is somewhat surprising given the controversy around MR in Rammegors as well as Perkpolder. Various studies have associated MR with negative emotions. For instance, Myatt et al. (2003a) documented concerns among farmers and inhabitants over the loss of agricultural land, while Roca and Villares (2012) found that people feared the potential shortcomings of MR as a flood management strategy. It is important to note that these studies reported such negative emotional responses to ongoing or recently completed MR projects. However, emotional arousal tends to decrease with the passage of time – a psychological tendency known as the "fading affect bias" (Walker and Skowronski, 2009). This bias is especially pronounced for negative emotions, which are more likely to fade or be replaced by positive emotions as time passes (Skowronski et al., 2014), and as benefits of MR interventions start to manifest. In the context of our study, the questionnaires in Rammegors and Perkpolder were administered about seven years after the intervention had been implemented. Hence, consistent with the fading affect bias, any strong negative emotions that people experienced initially may have subsided over time or evolved into more positive emotions about MR. For instance, our results show that positive outcomes of MR have become apparent, particularly in the case of Perkpolder, which may now be contributing to positive feelings about

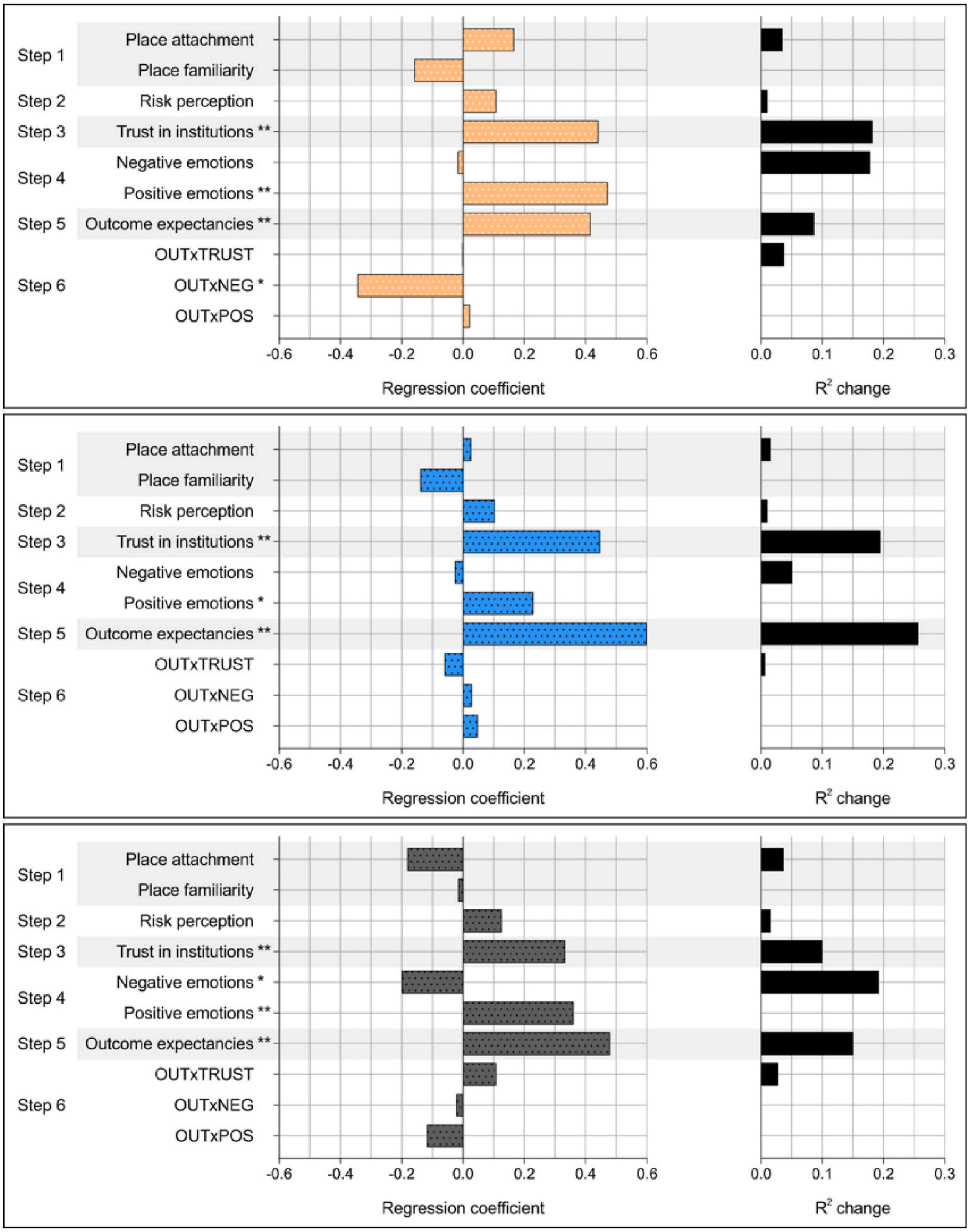

Fig. 3. Results of the hierarchical regression analysis of public support for three MR projects: Rammegors (top), Perkpolder (middle) and Hedwigepolder (bottom). Left panels display standardized regression coefficients (beta) associated with the additional constructs added at each step of the hierarchical regression analysis. Interaction terms are capitalized (OUT=Outcome expectancies, TRUST = Trust in institutions, POS=Positive emotions, and NEG=Negative emotions). Statistical significance is indicated with asterisks (* = $p < 0.05$; ** = $p < 0.01$). Coefficients and significance levels associated with each step of the models are included in Appendix 1. Right panels display the contribution of the constructs added at each step to the explained variance in public support for MR.

the intervention. Meanwhile, in contrast to Rammegors and Perkpolder, the transformation of Hedwigepolder was in progress when questionnaires were administered. This recentness of the intervention could explain the more pronounced effect of negative emotions on MR support. Additionally, the Hedwigepolder MR received significant media attention, and several Dutch governments of different political alignments attempted to reverse the decision. This prolonged controversy likely aroused negative emotions over a longer period and intensified their impact.

As discussed above, our regression analysis points to the importance of trust in institutions, outcome expectancies and emotions. In addition, our correlation analysis shows that these constructs are intercorrelated (correlations ranging from $r = 0.20$ to $r = 0.53$), suggesting that they do not operate in isolation but interact with each other and collectively shape MR support. In line with this, the regression analysis of Rammegors indicates that the effect of outcome expectancies on support for MR is moderated by the degree to which people experience negative emotions. Existing psychological literature could provide some insight into the nature of these interactions. Importantly, as noted by Slovic et al. (2013) and Siegrist (2021), people strongly rely on heuristics related to emotions and trust to allow for quick and effective judgements of complex issues such as MR. Making quick judgements often goes at the expense of a more rational analysis of the pros and cons (Slovic et al., 2007). In view of this, it is reasonable to assume that people employ their level of trust in institutions and emotions as heuristics to form an opinion about the outcomes of MR. People's outcome expectancies about MR could be partly the result of their level of institutional trust and the emotions they experience when they consider the idea of MR. Similarly, the strong positive relation between people's outcome expectancies and MR support, as shown by our regression results, could be partly inflated by their institutional trust and emotions. Additional research on the cause-effect relationships among these socio-psychological constructs could offer further insight into the heuristics at play and their collective impact on public support for MR.

From a policy perspective, the intercorrelations between institutional trust, emotions, and outcome expectancies suggest that strategies to increase MR support can be more effective when they address these constructs in an integrated manner. This could allow for synergistic effects, as addressing one construct may have indirect effects on the others due to their interconnectedness (see e.g. Areia et al., 2024). Previous communication and information strategies around MR policies have typically targeted cognitive processes to increase public support, for instance by emphasizing the importance and objectives of MR (De La Vega-Leinert et al., 2018; Goeldner-Gianella, 2007; Schernewski et al., 2018). However, such strategies could be considered limited in their scope, given that they overlook the crucial role that emotions and affect play in human thinking and judgement. In a recent perspective, Brosch and Steg (2021) explore how to design and implement emotion-based interventions aimed at promoting sustainable behavior change. They emphasize that emotions can only be activated when people feel that the things they value are being threatened (resulting in negative emotions) or supported (resulting in positive emotions). In the MR context, people attach limited value to key policy objectives of MR, like flood risk management and increased biodiversity. Specifically, flood safety is often taken for granted (Baan and Klijn, 2004) and restored coastal fringe ecosystems are less appreciated by the public than original landscapes prior to MR (Bax et al., 2023). Instead, investments in local economic opportunities, recreation and landscape aesthetics have been found to be much more important (Bax et al., 2023), potentially providing a pathway to evoke positive emotions and increase MR support among the local community. Moving forward, policymakers should explore how communication strategies can be tailored to leverage positive emotions better and how MR design can better align with location-specific priorities to strengthen public support for MR.

Given the potential relevance of our findings to inform policy and decision making on MR, it is important to reflect on the limitations of our study and explore possible directions for further research. First, the results and conclusions of our study are derived from three independent case studies, each involving a modest number of study participants (Rammegors N = 103, Perkpolder N = 111 and Hedwigepolder N = 110). As pointed out in a previous paper using the same dataset (Bax et al., 2023), these small sample sizes may be a source of sampling bias, potentially affecting how well the samples represent the target population. Nonetheless, the results across case studies were notably consistent, as the same socio-psychological constructs were identified and the direction of their effects on the response variable was uniform. This suggests that our results are reflective of a broader trend and may be generalized to a broader population – potentially to other communities near MR project locations elsewhere. In addition, the sociodemographic characteristics of our study samples compare well with census data (CBS, 2024), which is another indication that our samples are representative of a broader population. Second, our study indicates that place attachment is not an important socio-psychological construct of public support for MR. This contrasts with our expectations and previous studies (e.g. De La Vega-Leinert et al., 2018). In our study, we used a validated and widely employed scale to measure place attachment (Raymond et al., 2010), aiming to enhance consistency and comparability with existing place attachment research. However, with this scale, we measured contemporary place attachment, which may have primarily captured respondents' current feelings toward the post-MR landscape, rather than their attachment to the area prior to the intervention. This may particularly be the case for the Rammegors and Perkpolder areas, where the MR interventions were implemented about seven years before the questionnaires were conducted. As such, our measure of place attachment may not have been sensitive enough to detect feelings of loss or resistance associated with changes to the pre-MR landscape, which could explain why place attachment was not a significant predictor of public support.

Future research could proceed in several directions. Firstly, expanding both the sample size and the type of respondents – not only focusing on residents living in the immediate vicinity of MR projects but in the wider region – will help understand the wider societal benefits of MR projects as well as their distributional impacts. Secondly, since the temporal dimension appeared so crucial, it will be valuable to conduct a longitudinal study to examine how perceptions change throughout different stages of the implementation process (i.e., before, during, and after the intervention). Lastly, the understanding of the place attachment in the MR context could be further expanded by refining the place attachment questionnaire items. An in-depth understanding of various dimensions of place attachment will help exploring its interactions and causal relationships with other socio-psychological constructs. Together, the present and forthcoming research will offer a comprehensive understanding of public support for MR and how its determinants evolve over time and space, allowing for more informed and socially acceptable decision-making in future MR projects.

6. Conclusions

This study examined the socio-psychological determinants of public support for MR across three case study areas. Based on our findings, we conclude that trust in institutions, outcome expectancies, and emotions are the main determinants of MR support. Trust in institutions was consistently low across all cases and positively associated with MR support. Notably, residents perceived MR policies as unfair and misaligned with community interests, which contributed to skepticism and opposition towards the interventions. Meanwhile, outcome expectancies of MR varied across the three case study areas, with support being higher when MR was viewed as providing clear benefits to the local community. When it comes to emotions, both positive and negative emotions were found to play an important role. Positive emotions contributed to support in all three case study areas, whereas the role of negative emotions was more pronounced in the context of an ongoing MR intervention that had been the subject of prolonged public and political opposition.

These findings highlight the importance of building institutional trust and managing both expectations and emotions to increase public support for MR. Given the interrelationships between trust, emotions and expectations, information and communication strategies aimed at increasing support may be more effective when these determinants are addressed in an integrated manner. Future research should further investigate these interrelationships and explore how communication strategies can be designed to influence both cognitive and emotional responses. Longitudinal studies could provide insight into how these relationships evolve over time and how trust, emotions, and expectations interact at different stages of the MR implementation process.

CRediT authorship contribution statement

Vincent Bax: Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Teun Terpstra:** Writing – review & editing, Writing – original draft, Supervision, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Wietse I. van de Lageweg:** Writing – review & editing, Writing –

original draft, Supervision, Project administration, Funding acquisition, Data curation. **Jean-Marie Buijs:** Writing – review & editing, Writing – original draft, Project administration, Investigation, Funding acquisition, Data curation. **Tatiana Filatova:** Writing – review & editing, Writing – original draft, Methodology, Investigation.

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.

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Appendix. Regression model results

Table A1
Regression model Rammegors

Step		Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
1	(Constant)	2.304	0.118		19.458	<0.001
	Place_attachment	0.204	0.127	0.167	1.602	0.112
	Place_familiarity	−0.186	0.123	−0.158	−1.509	0.134
2	(Constant)	2.304	0.118		19.476	<0.001
	Place_attachment	0.182	0.129	0.149	1.408	0.162
	Place_familiarity	−0.178	0.123	−0.151	−1.445	0.152
	Risk_perception	0.148	0.136	0.108	1.088	0.279
3	(Constant)	2.304	0.107		21.545	<0.001
	Place_attachment	0.084	0.118	0.069	0.707	0.481
	Place_familiarity	−0.122	0.112	−0.103	−1.085	0.281
	Risk_perception	0.053	0.124	0.039	0.427	0.670
	Trust_institutions	0.621	0.129	0.441	4.811	<0.001
4	(Constant)	2.304	0.095		24.318	<0.001
	Place_attachment	−0.112	0.111	−0.092	−1.009	0.315
	Place_familiarity	−0.125	0.104	−0.106	−1.198	0.234
	Risk_perception	0.037	0.113	0.027	0.328	0.744
	Trust_institutions	0.436	0.123	0.310	3.541	<0.001
	Negative_emotions	−0.071	0.411	−0.017	−0.173	0.863
	Positive_emotions	1.685	0.345	0.472	4.880	<0.001
5	(Constant)	2.304	0.088		26.191	<0.001
	Place_attachment	−0.155	0.104	−0.127	−1.498	0.137
	Place_familiarity	0.000	0.101	0.000	−0.005	0.996
	Risk_perception	−0.032	0.106	−0.023	−0.298	0.766
	Trust_institutions	0.253	0.123	0.180	2.062	0.042
	Negative_emotions	0.285	0.391	0.068	0.728	0.468
	Positive_emotions	1.325	0.333	0.371	3.980	<0.001
	Outcome_expectancies	0.556	0.138	0.416	4.044	<0.001
6	(Constant)	2.084	0.122		17.148	<0.001
	Place_attachment	−0.123	0.103	−0.101	−1.194	0.236
	Place_familiarity	−0.060	0.103	−0.051	−0.582	0.562
	Risk_perception	0.041	0.109	0.030	0.375	0.708
	Trust_institutions	0.307	0.123	0.218	2.485	0.015
	Negative_emotions	−1.037	0.626	−0.248	−1.656	0.101
	Positive_emotions	1.111	0.350	0.311	3.171	0.002
	Outcome_expectancies	0.389	0.149	0.291	2.606	0.011
	INT_OUTxTRUST	−0.004	0.132	−0.002	−0.029	0.977
	INT_OUTxPOS	0.115	0.454	0.022	0.253	0.801
	INT_OUTxNEG	−1.489	0.619	−0.345	−2.406	0.018

Table A2
Regression model Perkpolder

Step		Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
1	(Constant)	3.027	0.101		29.892	<0.001
	Place_attachment	0.034	0.152	0.026	0.225	0.822
	Place_familiarity	−0.176	0.146	−0.139	−1.208	0.230
2	(Constant)	3.027	0.101		29.915	<0.001
	Place_attachment	0.022	0.152	0.017	0.144	0.886
	Place_familiarity	−0.175	0.146	−0.138	−1.202	0.232
	Risk_perception	0.127	0.118	0.103	1.080	0.283

(continued on next page)

Table A2 (*continued*)

Step		Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
3	(Constant)	3.027	0.091		33.289	<0.001
	Place_attachment	0.042	0.137	0.032	0.305	0.761
	Place_familiarity	−0.106	0.132	−0.083	−0.802	0.425
	Risk_perception	0.130	0.106	0.106	1.233	0.220
	Trust_institutions	0.588	0.114	0.446	5.148	<0.001
4	(Constant)	3.027	0.089		34.101	<0.001
	Place_attachment	−0.013	0.135	−0.010	−0.096	0.924
	Place_familiarity	−0.078	0.129	−0.062	−0.606	0.546
	Risk_perception	0.179	0.105	0.145	1.701	0.092
	Trust_institutions	0.512	0.123	0.389	4.179	<0.001
	Negative_emotions	−0.113	0.392	−0.027	−0.287	0.775
	Positive_emotions	0.700	0.271	0.229	2.585	0.011
5	(Constant)	3.027	0.072		42.194	<0.001
	Place_attachment	−0.044	0.109	−0.033	−0.400	0.690
	Place_familiarity	−0.037	0.104	−0.029	−0.352	0.725
	Risk_perception	0.020	0.088	0.017	0.233	0.816
	Trust_institutions	0.185	0.108	0.140	1.710	0.090
	Negative_emotions	−0.195	0.317	−0.046	−0.615	0.540
	Positive_emotions	0.293	0.226	0.096	1.300	0.196
	Outcome_expectancies	0.850	0.113	0.599	7.498	<0.001
6	(Constant)	3.048	0.079		38.501	<0.001
	Place_attachment	−0.052	0.110	−0.039	−0.469	0.640
	Place_familiarity	−0.018	0.107	−0.014	−0.163	0.871
	Risk_perception	−0.001	0.093	−0.001	−0.007	0.994
	Trust_institutions	0.209	0.114	0.158	1.839	0.069
	Negative_emotions	−0.188	0.333	−0.045	−0.566	0.572
	Positive_emotions	0.258	0.233	0.084	1.105	0.272
	Outcome_expectancies	0.831	0.124	0.585	6.689	<0.001
	INT_OUTxTRUST	−0.087	0.118	−0.060	−0.739	0.462
	INT_OUTxPOS	0.125	0.347	0.029	0.359	0.720
	INT_OUTxNEG	0.181	0.317	0.048	0.569	0.570

Table A3
Regression model Hedwigepolder

Step		Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
1	(Constant)	2.585	0.120		21.594	<0.001
	Place_attachment	−0.235	0.151	−0.182	−1.557	0.122
	Place_familiarity	−0.021	0.153	−0.016	−0.140	0.889
2	(Constant)	2.585	0.119		21.671	<0.001
	Place_attachment	−0.256	0.151	−0.199	−1.693	0.093
	Place_familiarity	−0.005	0.153	−0.004	−0.032	0.974
	Risk_perception	0.188	0.142	0.126	1.330	0.186
3	(Constant)	2.585	0.113		22.810	<0.001
	Place_attachment	−0.153	0.147	−0.119	−1.045	0.298
	Place_familiarity	0.021	0.146	0.016	0.142	0.888
	Risk_perception	0.238	0.135	0.160	1.762	0.081
	Trust_institutions	0.475	0.135	0.332	3.526	<0.001
4	(Constant)	2.585	0.101		25.690	<0.001
	Place_attachment	−0.113	0.131	−0.088	−0.862	0.391
	Place_familiarity	−0.028	0.134	−0.022	−0.211	0.833
	Risk_perception	0.158	0.121	0.106	1.306	0.194
	Trust_institutions	0.377	0.124	0.264	3.043	0.003
	Negative_emotions	−0.855	0.378	−0.199	−2.264	0.026
	Positive_emotions	1.934	0.449	0.360	4.308	<0.001
5	(Constant)	2.585	0.089		29.117	<0.001
	Place_attachment	−0.180	0.116	−0.140	−1.554	0.123
	Place_familiarity	0.014	0.119	0.010	0.115	0.909
	Risk_perception	0.141	0.107	0.095	1.316	0.191
	Trust_institutions	0.106	0.120	0.074	0.886	0.378
	Negative_emotions	−0.455	0.341	−0.106	−1.334	0.185
	Positive_emotions	1.163	0.420	0.217	2.770	0.007
	Outcome_expectancies	0.624	0.113	0.479	5.505	<0.001
6	(Constant)	2.481	0.103		24.131	<0.001
	Place_attachment	−0.182	0.119	−0.141	−1.527	0.130
	Place_familiarity	−0.020	0.121	−0.015	−0.163	0.871
	Risk_perception	0.183	0.107	0.123	1.712	0.090
	Trust_institutions	0.090	0.122	0.063	0.743	0.459
	Negative_emotions	−0.747	0.376	−0.173	−1.984	0.050
	Positive_emotions	1.223	0.541	0.228	2.261	0.026
	Outcome_expectancies	0.627	0.114	0.481	5.502	<0.001
	INT_OUTxTRUST	0.153	0.113	0.108	1.357	0.178
	INT_OUTxPOS	−0.099	0.431	−0.022	−0.230	0.818
	INT_OUTxNEG	−0.511	0.379	−0.118	−1.346	0.181

Data availability

Data will be made available on request.

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