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Perceptions of Cyclone Preparedness: Assessing the Role of Individual Adaptive Capacity and Social Capital in the Wet Tropics, Australia

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Abstract: Given projections of future climate-related disasters, understanding the conditions that facilitate disaster preparedness is critical to achieving sustainable development. Here, we studied communities within the Wet Tropics bioregion, Australia to explore whether people's perceived preparedness for a future cyclone relates to their: (1) perceived individual adaptive capacity (in terms of flexibility and capacity to plan and learn); and (2) structural and cognitive social capital. We found that people's perceived cyclone preparedness was only related to their perceived individual flexibility in the face of change. Given that people's perceived cyclone preparedness was related to individualistic factors, it is plausible that individualism-collectivism orientations influence people's perceptions at an individual level. These results suggest that in the Wet Tropics region, enhancing people's psychological flexibility may be an important step when preparing for future cyclones. Our study highlights the need to tailor disaster preparedness initiatives to the region in question, and thus our results may inform disaster risk management and sustainable development policies.

Keywords: climate change; climate related disasters; disaster risk management; sustainable development; perceived disaster preparedness; cyclones; sustainability; adaptive capacity; place attachment; social capital

1. Introduction

Climate change is expected to bring about changes to the magnitude and frequency of extreme events and natural disasters [1]. Climate-related disasters can negatively impact people's livelihoods and physical and mental health [2,3] and significantly impede progress towards sustainable development [4]. Therefore, it is necessary that people feel prepared to deal with a future disaster. Indeed, disaster preparedness is an important element of disaster risk reduction that can contribute to and gain from the implementation of sustainable development policies [5]. Building people's disaster preparedness is also critical to achieving the Sustainable Development Goals, in particular goal 11, which explicitly calls for holistic disaster risk management [6,7].

Disaster preparedness is a multidimensional construct comprising individual physical and psychological preparedness as well as community preparedness [8]. At an individual level, people need to be both physically and psychologically prepared for natural disasters [9]. Physical preparedness activities could include the storage of food and water or the preparation of a household emergency plan; these activities often reduce damage and enable people to temporarily cope with the impacts of a disaster [10,11]. On the other hand, psychological preparedness refers to an intra-individual and

psychological state of awareness, anticipation, and readiness: an internal capacity to anticipate and manage one's psychological response [12].

It is necessary to distinguish between objective and subjective measures of disaster preparedness. Objective measures are considered to be 'hard' measures of preparedness, such as whether people undertake preparatory actions (e.g., store food and water supplies) before a disaster occurs. On the other hand, subjective measures refer to people's perceptions of whether they are able to prepare for a disaster (e.g., people's feelings of whether they have adequate resources to prepare for a disaster). To date, researchers have tended to focus on objective measures of preparedness, but understanding people's perceptions of their physical and psychological preparedness is critical because subjective indicators are often more significant determinants of individual well-being and behaviour than objective indicators [13]. Indeed, studies show that natural disasters can present a significant worry and concern for some individuals and negatively influence their well-being [3]. This is particularly because one disaster event, such as an earthquake, tsunami, or cyclone, can destroy infrastructure and people's livelihoods thereby threatening sustainable development [14]. Further, although conventional disaster preparedness messaging focuses largely on promoting survival actions (e.g., encouraging people to take up preparatory behaviours), it is increasingly becoming evident that there is a need for disaster planning that builds personal resilience—*preventatively*—to persevere through prolonged recovery timeframes [15]. Therefore, examining people's perceived preparedness is a step in moving beyond the promotion of survival actions and focusing on what is important for people in the long run. Hence, given that it is important for people to *feel* (i.e., perceive) that they are psychologically and physically prepared for a natural disaster, we examine people's perceived preparedness for a tropical cyclone in this study.

There is an extensive body of literature examining people's preparedness for cyclones and other natural disasters. Much of this scholarship has examined the factors that influence people's adoption of protective behaviours (rather than perceived preparedness) in a variety of different hazard contexts, such as earthquakes (e.g., [16]), volcanoes (e.g., [17]), floods (e.g., [18]), cyclones (e.g., [19–21]), and wildfires (e.g., [22]). Some of the factors thought to influence hazard preparedness include an individual's perception of risk (e.g., [23]), which often differs from expert assessments (e.g., [24]), past experiences of natural disasters (e.g., [25]), and perceived self-efficacy (e.g., [10]). However, people's disaster preparedness may also be influenced by: (1) their perceived individual adaptive capacity [26,27] and (2) social capital in their community [28].

People's capacity to adapt to the impacts of climate change and climate-related disasters (i.e., adaptive capacity) can be described as their ability to respond to challenges through learning, managing risk and impacts, developing knowledge, and devising novel solutions. It is important to examine an individual's perceived adaptive capacity because people's perceptions of available options and their own capacities as agents of change can influence their disaster preparedness [26,27]. Much of the discourse on individual adaptive capacity has centred on objective indicators of adaptive capacity, such as people's access to external resources [26,29,30]. However, there is now increasing recognition that even if resources to facilitate adaptation are available, if people perceive barriers to adaptation then their adaptive actions may be limited [26,30]. Therefore, given that people often act upon their subjective perceptions rather than their objective adaptive capacity [26,29], complementary research on people's perceptions of their own adaptive capacity is required [26].

Several dimensions of perceived individual adaptive capacity have been proposed in the literature [31] and these provide an indication of people's capacities to respond constructively to a changing environment [30]. An individual's perceived flexibility in the face of change, ability to plan, and capacity and interest to learn are dimensions of adaptive capacity that are relevant when preparing for climate-related disasters. Flexibility has been highlighted as a key factor when preparing for and responding to disasters [32]. People's perceptions of their own flexibility in the face of change are useful to consider because people need to acknowledge the inherent uncertainty associated with natural disasters [6] and reorganize themselves to come up with and implement novel solutions [31]

to effectively deal with natural disasters. Indeed, the construct of psychological flexibility may be important when preparing for disasters and this has been defined in the literature as the capacity to 'persist with or change one's (even inflexible, stereotypical) behaviour in the pursuit of goals and values' [33]. Importantly, psychological flexibility can reflect behavioural or cognitive channels and is revealed by how a person is able to adapt to changing situations [34]. The relationships between an individual's perceived ability to plan and their perceived preparedness is of interest in this study because people's ability to plan for a disaster often influences whether they adopt anticipatory or reactive strategies and whether there will be an opportunity for input from other sources [31]. The relationships between an individual's learning and interest in adaptation and their disaster preparedness are also useful to consider, as some scholars have posited that an interest in adaptation is necessary for individuals to be able to identify potential adaptation options [35,36].

People's perceived preparedness for natural hazards may be influenced by social capital in the community [28,37]. Social capital can be defined as the 'connections among individuals: social networks, and the norms of reciprocity and trustworthiness that arise from them' [38] (p. 19). Social capital has structural and cognitive dimensions; structural forms of social capital are external and objectified (e.g., social networks, roles, formal and informal institutions), whereas cognitive forms are internal and often subjective (e.g., shared norms, trust, reciprocity, and values) [39]. To date, the application of social capital concepts to natural disasters has largely focused on the role of social capital in disaster recovery processes (e.g., [40,41]). However, there has been a more recent focus on the utility of social capital when preparing for disasters, with scholars advocating the importance of 'building' new social capital in order to prepare for and effectively manage disasters [37].

People's perceived disaster preparedness may be influenced by both structural and cognitive dimensions of social capital. For example, individuals that are involved in community groups (structural social capital) may be more prepared for disasters since these groups can provide people with access to resources [42,43] and enhance disaster preparedness through collective socialization and preparation [37]. People involved in community groups may also have better knowledge of natural hazards, their impacts, and how to prepare for them because participating in community activities provides opportunities to discuss natural hazards and people's experiences of them [44]. In regards to the cognitive dimensions of social capital, people's beliefs regarding the generosity of others can support mutually dependent collective action [45,46]. Social trust is also important to consider because it influences people's perceptions of others' motives and the credibility of the information they provide [47].

Given that climate-related disasters can threaten sustainable development, it is critical to understand the factors that influence people's perceived preparedness to deal with a future disaster. Therefore, using data collected from five communities in Mission Beach within the Wet Tropics bioregion, Australia (after the occurrence of two tropical cyclones), we examine how people's perceived preparedness for a future cyclone is related to their: (1) perceived individual adaptive capacity (hereafter referred to as IAC); and (2) structural and cognitive social capital.

2. Materials and Methods

2.1. Study Site

The Wet Tropics bioregion is characterised by its tropical climate, spectacular scenery, cultural values, and economic significance [48]. Mission Beach is located on the coastline of the Wet Tropics bioregion (Figure 1) and lies in close proximity to two World Heritage Areas (the Wet Tropics World Heritage Area and the Great Barrier Reef). Mission Beach has a resident population of around 784 people [49] and is comprised of smaller beach centres, including Wongaling Beach, North Mission Beach, South Mission Beach, and Bingil Bay. However, Mission Beach was hit by two category 4 cyclones, Cyclone Larry in 2006 and Cyclone Yasi in 2011, and these cyclones caused serious damage to property and vegetation in the region. Mission Beach presents an interesting study site because

the region has experienced two recent cyclones and climate projections suggest that there may be an increase in the frequency of higher-intensity cyclones in the future [50]. Therefore, it is necessary that Mission Beach residents feel prepared for a future cyclone.

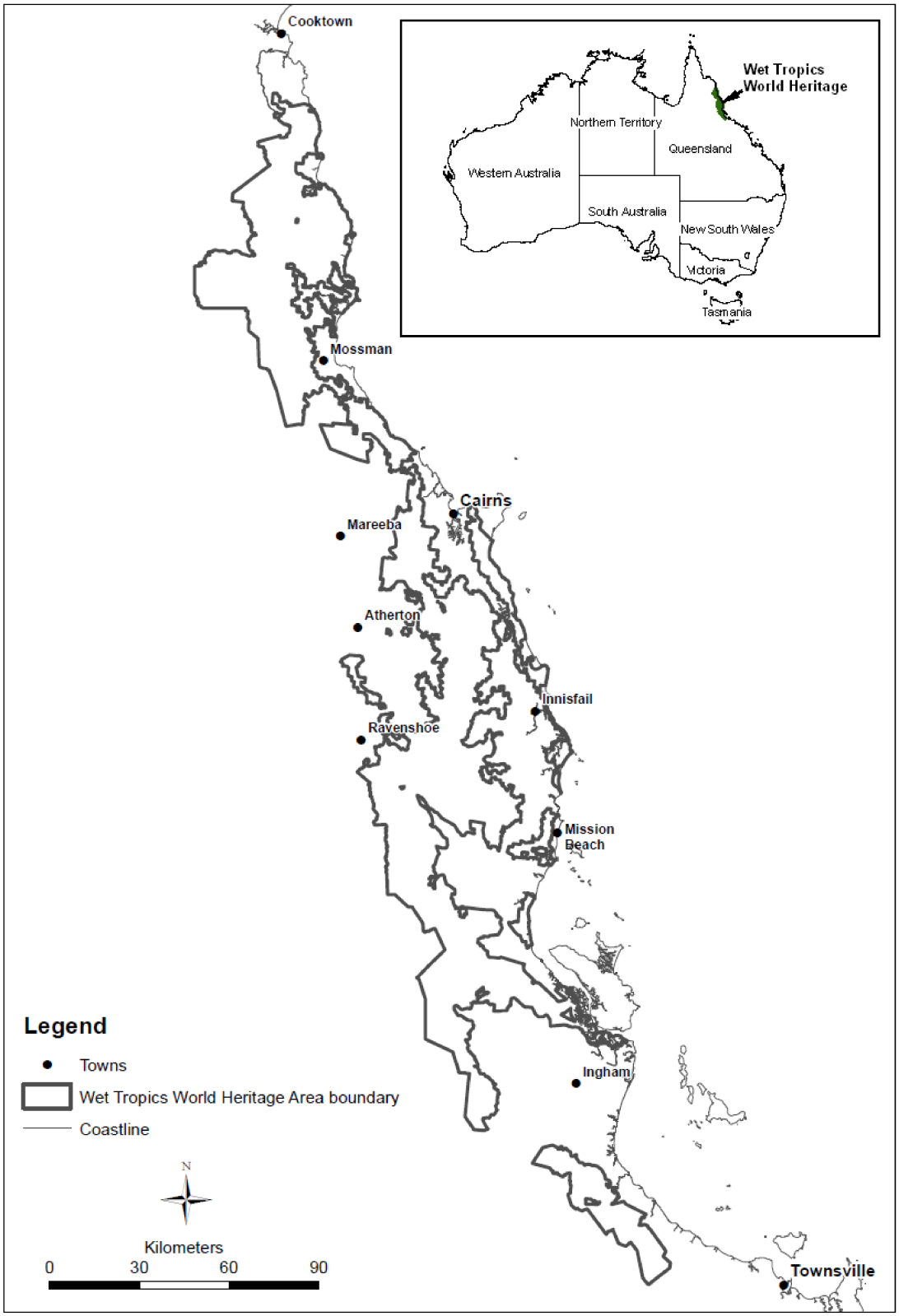

Figure 1. Location of Mission Beach within the Wet Tropics World Heritage Area.

2.2. Sample

We surveyed five communities in the Mission Beach region, namely: Kurrimine Beach, Bingil Bay, Wongaling Beach, North Mission Beach, and South Mission Beach. A random sampling approach was undertaken, whereby households were numbered consecutively on a map and the statistical program SPSSv20 was used to generate a random selection of 40 numbers for each community. These were selected as the quota sample of 40 households from each community. Household-level self-complete questionnaires were then administered in each of the communities. The primary income earner in the household was targeted as they would be best informed to address all of the household-level questions on the survey. We only surveyed people that had experienced both Tropical Cyclone Larry and Tropical Cyclone Yasi to ensure some consistency with regard to past cyclone exposure. If a resident declined to respond the survey, a neighbouring household was chosen, and this process was continued until a household in the vicinity of the one initially selected was sampled. In total, we collected data from 173 respondents with a positive response rate of 86.5%. This study was approved by the James Cook University Human Research Ethics Committee.

2.3. Survey Instrument

A combination of open-ended and ordinal response questions was presented. For the ordinal response questions, respondents were asked to rate how much they agreed or disagreed with a particular statement (1 = strongly disagree, 2 = slightly disagree, 3 = neutral, 4 = slightly agree, 5 = strongly agree). We drew from both the global environmental change and social science literature in order to examine the relative role of perceived IAC and social capital dimensions for people's perceived cyclone preparedness.

We selected three key dimensions of IAC from Marshall et al.'s [31] framework, namely an individual's flexibility, ability to plan, and their level of learning and interest in adaptation, since these may influence people's perceived cyclone preparedness. Planning is an important dimension of adaptive capacity because it often influences whether there will be opportunity for input from other sources [31]. Flexibility in the face of change is required so that people are able to reorganize themselves and come up with novel solutions [6,31]. Learning and interest in adaptation are important because these factors can enhance people's ability to identify potential adaptation options [36]. The perceived IAC dimensions were then operationalised using six indicators from Marshall et al. [31] (Table 1). We assessed the relationships between structural and cognitive dimensions of social capital on people's perceived cyclone preparedness using indicators from Diedrich et al. [51]. Structural social capital (in the form of community group involvement) and cognitive social capital (in the form of generosity and social trust) have been widely represented using these indicators (e.g., [52,53]) and these factors have been found to be important when dealing with natural disasters [46,47].

Table 1. Descriptive statistics for the dimensions of perceived individual adaptive capacity and social capital used in the regression models. Responses were indicated on a five-point rating scale (1 = strongly disagree, 2 = disagree, 3 = unsure or neutral, 4 = agree, 5 = strongly agree). * Community group membership was also on a five-point rating scale (1 = no groups, 2 = one group, 3 = two groups, 4 = three groups, and 5 = four or more groups). SE = standard error; NA = not applicable.

Social Capital	Data Type	Mean	SE	% of Respondents Who Strongly Agreed
Social Networks				
People in my community are generous and share what they have with other people	Ordinal	3.75	0.08	61.8
Community group membership *	Ordinal	1.64	0.08	NA

Table 1. *Cont.*

Social Capital	Data Type	Mean	SE	% of Respondents Who Strongly Agreed
Social Trust				
I trust my local decision-makers	Ordinal	2.68	0.1	27.2
I trust people in this community	Ordinal	3.98	0.08	68.2
Perceived Individual Adaptive Capacity				
Planning skills				
I have planned for my financial future	Ordinal	4.04	0.09	59
When I heard that Tropical Cyclone Yasi was around, the members of my household immediately developed a plan to minimize its impacts	Ordinal	4.79	0.04	82
Flexibility in the face of change				
I am more likely to adapt to changes resulting from natural disasters than other people I know.	Ordinal	3.95	0.08	65.9
I will move to another community if there is another strong cyclone	Ordinal	3.85	0.11	19.6
Learning and interest in adaptation				
I would like to learn more about how to prepare for future cyclones	Ordinal	2.84	0.1	27.2
I often talk to other community members about how they prepare for cyclones	Ordinal	3.58	0.09	54.9

2.4. Analysis

We operationalized people's perceived preparedness for a future cyclone using the sum of two survey statements representing both the psychological and physical dimensions of cyclone preparedness. People's perceived physical preparedness was represented using a statement regarding people's thoughts of whether they had adequate material resources to survive another strong cyclone. People's perceived psychological preparedness was represented in terms of whether they felt psychologically prepared to deal with another strong cyclone.

To assess how people's perceived preparedness for future cyclones was related to perceived IAC and social capital, we used a multiple regression model (with the ordinary least squares estimation method). Multicollinearity among the independent variables was assessed using variance inflation factors (VIFs) and tolerance values. The VIFs did not exceed a value of 4 and the tolerance values were below 0.2, indicating that multicollinearity was minimal [54]. The assumptions of multiple linear regression (i.e., linearity, homoscedasticity, and normality of residuals) were checked by visual inspection of standardized residual plots. Since the inspection of residuals and a subsequent Breusch–Pagan test indicated the presence of heteroscedasticity, we used White's [55] heteroscedasticity-consistent covariance matrix adjustment for all of our standard errors. Regression analyses were conducted in R (version 3.2.5).

3. Results

In the following, we first outline our results in terms of respondents' perceived level of preparedness for a future cyclone, our dependent variable. Next, we present the results for our independent variables, perceived IAC, and social capital. Finally, we outline the results of our regression analysis relating perceived IAC and social capital to perceived cyclone preparedness.

3.1. Respondents' Perceived Cyclone Preparedness

The majority of Mission Beach residents felt prepared for a future cyclone, with 89% of respondents reporting that they had the necessary material resources to survive a future cyclone and 70% reporting that they felt psychologically prepared for a future cyclone.

3.2. Respondents' Perceived IAC

There was significant variability in the responses to the statements relating to Mission Beach residents' perceived IAC. The majority of respondents felt that they had strong planning skills, with most people reporting that they had: (1) planned for their own financial future (59% of respondents) and (2) developed a plan to minimize the impacts of Cyclone Yasi (82% of respondents). Most residents (65.9%) believed that they were quite flexible and could adapt better to changes resulting from natural disasters than others around them. However, 19.6% of respondents reported that they would move to another community in the event of a future cyclone. The responses to statements relating to perceived learning and interest in adaptation were heterogeneous. More than half of the respondents (54.9%) reported that they spoke to other members of their community about how to prepare for cyclones, but a lower percentage of respondents (27.2%) stated that they would like to learn more about how to prepare for cyclones.

3.3. Structural and Cognitive Dimensions of Social Capital

Of the respondents, 61.8% did not belong to any community groups with 18.5% of respondents belonging to one group, 8.1% belonging to two groups, and 9.2% belonging to three or more groups. Mission Beach residents had varied perceptions of social capital in the community. When considering perceptions of generosity, respondents generally felt that people in the community were generous and willing to share (61.8% of respondents). However, although most respondents felt that they trusted other members of their community (68.2%), fewer people (27.2% of respondents) trusted their local decision-makers (see Table 1).

3.4. The Role of Perceived IAC and Social Capital for People's Perceived Cyclone Preparedness

Results of the multiple regression analysis indicated that two of the IAC variables were significantly related to people's perceived cyclone preparedness (Figure 2). Respondents who reported that they would not move to another community in the event of another strong cyclone (i.e., the people who wanted to stay in Mission Beach) felt more prepared for a future cyclone. Likewise, individuals that felt they were more likely to adapt to changes resulting from natural disasters (compared to others) also felt more prepared. Interestingly, our analysis indicated that none of the social capital variables were associated with people's perceived cyclone preparedness (see Table 2).

Table 2. Multiple Regression analysis investigating factors relating to people's perceived preparedness for future cyclones in Mission Beach. β = regression coefficient, * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$.

Variable	β	Robust Std Error	Upper CI	Lower CI	*t*-Value	Pr (>|t|)
Trust in the community	−0.1298	0.1822	0.2273	−0.4870	−0.715	0.4766
Trust in local decision makers	0.1133	0.1242	0.3568	−0.1302	0.912	0.3639
Perceived generosity of people in the community	0.0355	0.1850	0.3981	−0.3271	0.193	0.8477
Community group involvement	0.0813	0.1571	0.3892	−0.2267	0.572	0.5688
Talks to others about cyclone preparation	−0.1685	0.1402	0.1063	−0.4432	−1.226	0.2230
Interested in learning more about cyclone preparation	−0.1897	0.1283	0.06180	−0.4413	−1.680	0.0962

Table 2. *Cont.*

Variable	β	Robust Std Error	Upper CI	Lower CI	*t*-Value	Pr (>|t|)
More likely to move in the event of a future cyclone	−0.3759	0.1272	−0.1266	−0.6251	−3.612	<0.001 ***
More likely to adapt to change than others	0.5631	0.1712	0.8987	0.2275	3.790	<0.001 ***
Planned for Cyclone Yasi	0.2546	0.3917	1.0223	−0.5131	0.776	0.4399
Planned for financial future	0.2690	0.1613	0.5852	−0.0472	1.843	0.0684

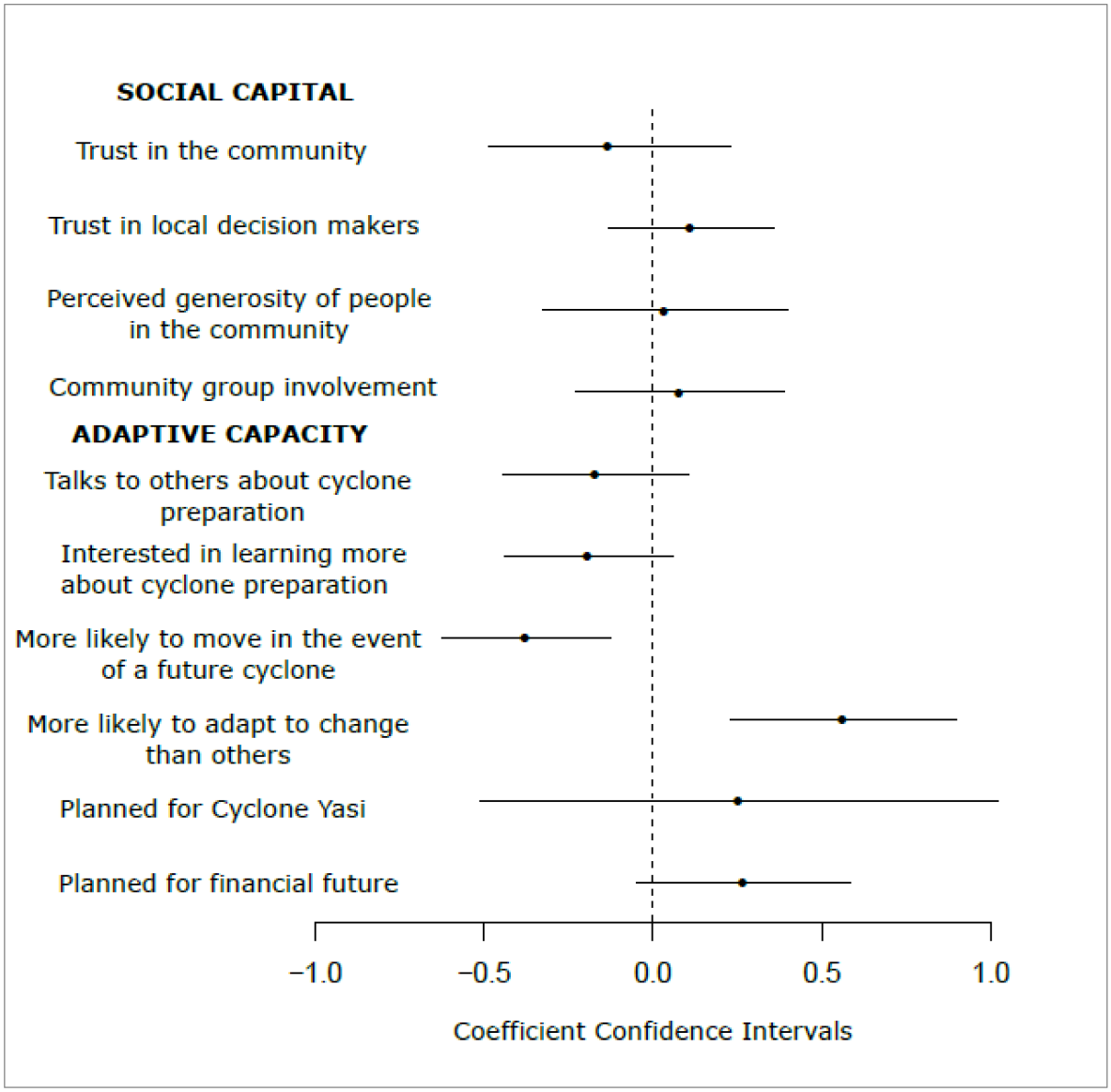

Figure 2. Coefficient estimates (dots) and ±95% confidence intervals (horizontal lines) for perceived individual adaptive capacity and social capital independent variables from the regression model of people's perceived preparedness for a future cyclone. Intersection of a confidence interval with zero indicates a lack of a relationship between a variable and perceived preparedness for a natural disaster.

4. Discussion

The majority of Mission Beach residents perceived that they were physically and psychologically prepared for a future cyclone. Our findings suggest that people's perceived cyclone preparedness was significantly related to their perceived individual flexibility but not to other dimensions of their perceived IAC. Notably, we found no evidence that people's perceived cyclone preparedness was related to their structural and cognitive social capital. In this section, we first discuss the significant relationship between flexibility and perceived cyclone preparedness. We then focus on the lack of a relationship between perceived cyclone preparedness and people's capacity to plan and learn. Next, we examine the lack of a relationship between perceived cyclone preparedness and social capital in the community and discuss the relative role of perceived IAC and social capital for people's perceived cyclone preparedness. Finally, we outline the implications of our research for disaster risk management initiatives and identify avenues for future research.

4.1. Perceived Flexibility in the Face of Change

People's perceived preparedness for a future cyclone was related to their perceived flexibility in the face of change; respondents who felt that they were more adaptable than others they knew and were willing to stay in Mission Beach in the event of another strong cyclone reported greater cyclone preparedness. Adapting to change often requires flexibility in multiple domains, including financial [56], institutional [57], and psychological [34]. The variables we used here were designed to capture perceptions of individual flexibility in the face of change following Marshall et al. [31] and it is likely that the respondents who were flexible in regards to adjusting their mental state and behaviour to deal with the situation after Cyclone Yasi felt more prepared for a future cyclone. Mission Beach residents who considered themselves to be more adaptable to change than others reported greater levels of perceived cyclone preparedness; this finding indicates that the construct of psychological flexibility may play a key role when preparing for natural disasters. Mission Beach residents who reported that they were more adaptable to change than others may have possessed higher levels of cognitive flexibility and thus may have reported greater perceived cyclone preparedness because of their ability to correct for situational influences and reconfigure their mental resources in order to effectively prepare for future cyclones.

Residents who reported that they were willing to continue staying in Mission Beach in the event of a future cyclone generally had greater perceived cyclone preparedness and this could be because they were more attached to Mission Beach. Place attachment refers to the degree of connection that people have with a natural or human-made place [58], and is suggested to be an important predictor of disaster preparedness [8,59]. Studies have shown that if people have an emotional connection to a place, they are more likely to be inspired to plan and reorganize themselves for a disaster in order to continue staying there [60,61]. Indeed, perseverance is considered to be a flexibility-related strength [34,62] because perseverance is sometimes required to reach valued outcomes [63]. Therefore, it is plausible that the people who wanted to stay in Mission Beach in the event of a future cyclone possessed high levels of perseverance and cognitive flexibility, and were willing and capable of adapting and reconfiguring their mental resources in order to continue staying there. It must be noted, however, that a willingness to move in the event of future disasters could indicate high or low levels of psychological flexibility. Migration as a response to natural hazards has generally been viewed as a mal-adaptive response, but emerging evidence suggests that migration can sometimes be a viable adaptation strategy when livelihood provisions are met and individuals are in control of the decision-making process surrounding resettlement [64]. Thus, migration may be a worthwhile adaptation strategy for some individuals and a mal-adaptive response for others.

Although our results do not reveal the cognitive processes behind how psychological flexibility influences perceived disaster preparedness, we found that perceived flexibility was more important for people's perceived disaster preparedness than the other dimensions of individual adaptive capacity and social capital. Therefore, our findings suggest that the construct of psychological flexibility should

be considered when preparing for climate-related disasters because it relates to how individuals can use their thoughts and behaviour to extract the best possible outcomes for themselves and manage their lives under uncertain environmental conditions [34].

4.2. Perceived Capacity to Plan and Learn

Mission Beach residents' perceived cyclone preparedness was not related to their perceived ability to plan or their learning and interest in adaptation. Although it is known that both a lack of planning for cyclones [65] and inadequate training in disaster preparedness and management [2] can lead to adverse outcomes, our results here may differ because the Mission Beach residents sampled in our study had already lived through at least two cyclones and may have felt that they already knew enough about planning and preparing for cyclones. Therefore, this might be a potential explanation for why people's perceived cyclone preparedness was not related to their perceived ability to plan or learn. These findings highlight the importance of understanding the dimensions of perceived IAC that are important for people's perceived disaster preparedness in different contexts.

4.3. Structural and Cognitive Dimensions of Social Capital

Mission Beach residents' perceived preparedness for a future cyclone was not related to either structural or cognitive aspects of social capital. The lack of an association between structural social capital (i.e., people's reported community group involvement) and perceived cyclone preparedness is likely because there was little variation in the number of community groups that our respondents belonged to; very few Mission Beach residents belonged to community groups. These findings are similar to those reported by Reininger et al. [28] who found that community group involvement did not influence perceived disaster preparedness for the same reason.

We found no association between the cognitive aspects of social capital (such as trust and generosity) and people's perceived preparedness for a future cyclone; one potential explanation for this result is that Mission Beach residents were more self-reliant given their familiarity with cyclones. Indeed, Paton (2007) found that the relationship between trust and disaster preparedness was contingent on situational cues, such as people's familiarity with the hazard and the availability of information about it. He found that when people were familiar with the hazard and adequately informed about it, civic trust was not a significant predictor of preparedness, positing that this could be because people felt less of a need to acquire and evaluate information from outside sources, such as civic agencies [47]. Therefore, although other studies (e.g., [28,41]) have found that community trust affects people's disaster preparedness by influencing information dissemination and uptake, it is likely that our respondents were self-reliant (particularly because respondents had lived in Mission Beach for an average of 16 years) and did not feel the need to rely on external sources for information because they had already experienced two cyclones. Indeed, most respondents in our study reported that they knew enough about cyclone preparation. In sum, our results suggest that disaster risk management initiatives need to be tailored to the local context and preparation for future cyclones in the Mission Beach region may require activities aimed at building people's psychological flexibility. It is important to note, however, that although we found that cognitive social capital was not related to perceived cyclone preparedness, social capital may still play an important role during recovery processes and/or when dealing with large-scale disasters [40].

4.4. Relative Role of Perceived IAC and Social Capital

Mission Beach residents' perceived cyclone preparedness was more related to their perceived IAC than social capital, and this may be due to the individualistic rather than collectivist orientations [66] of our respondents. Individualistic societies (e.g., Western European, American, and Australian societies) tend to emphasise independence, freedom, and achievement [67], and the emphasis is on becoming different from others by expressing one's unique attributes [68]. In contrast, collectivist societies (e.g., Asian, Latin-American, and African societies) often emphasize a harmonious interdependence among

individuals [67,68]. In an interdependent society, there is a focus on inhibiting the 'I' perspective and instead processing from a 'thou' perspective [68,69]. Although we did not directly measure individualism or collectivism, our IAC indicators that were significant predictors of perceived cyclone preparedness emphasized the 'I' perspective and the maintenance of one's independence (e.g., 'I am more likely to adapt to changes resulting from natural disasters than others I know' and 'I will move to another community if there is another strong cyclone'). Notably, the IAC indicator 'I am more likely to adapt than others I know' emphasised one's independence and a differentiation between the self and others. On the other hand, our social capital indicators that emphasised interdependence (i.e., 'I often talk to other community members about how to prepare for cyclones', 'people in my community are generous and share what they have with other people', 'I trust my local decision-makers', and 'I trust members of my community') were not significant predictors of perceived cyclone preparedness. Our findings point to the importance of individualism-collectivism orientations when preparing for natural hazards. We therefore suggest that initiatives aimed at fostering cyclone preparedness may need to be tailored to the specific context, in particular, in relation to the collectivist or individualistic nature of the region to strengthen disaster resilience and contribute to sustainable development.

4.5. Implications for Disaster Risk Management Initiatives

Our results highlight that IAC factors (such as people's perceived flexibility) are important for people's perceived cyclone preparedness. These findings are important to consider during the creation of policies and programs aimed at fostering disaster resilience and sustainable development. When planning for future cyclones in Mission Beach, it is necessary to identify ways of enhancing people's psychological (both behavioural and cognitive) flexibility. Providing people with psychological preparedness advice (pre-impact psychological interventions) may be more useful and help them better prepare for a future cyclone [3]. Cognitive approaches, such as cognitive behavioural coping skills training and stress inoculation training, have been suggested in the literature but their application to the management of natural hazards and disasters has been inconsistent [3]. These approaches influence people's cognitive structures and behavioural acts [70] and may be important for increasing psychological flexibility.

4.6. Limitations and Opportunities for Future Research

In this study, we set out to examine people's perceptions of their cyclone preparedness, and thus relied on self-report data. Therefore, when extrapolating the implications of our findings in terms of actual preparedness, it is important to note that although research on human behaviour often relies on self-reporting, discrepancies between self-reported and observed behaviour can occur [71]. For instance, it is known that people can sometimes perceive levels of preparedness which are different from actual preparedness levels [72]. Thus, future work could compare people's subjective and objective preparedness and whether the factors that were found to influence subjective preparedness, such as psychological flexibility, also influence objective preparedness.

Results obtained here indicate that Mission Beach residents have a high level of self-reported cyclone preparedness; however, one caveat is that some people who had experienced both cyclones (i.e., Cyclone Larry and Yasi) could have moved out before the administration of this survey. Since the people that were sampled in this study were the ones that did not leave after both cyclones, they are likely to be feel more prepared for a future cyclone. It is also important to note that there are cases where a high level of perceived preparedness and confidence can cause people to underestimate risk and stop taking effective action [73]. An overly high level of perceived preparedness may therefore instead lead to avoidant mal-adaptation.

Our research examined the perceived cyclone preparedness of residents who had experienced cyclones in the Mission Beach area. We focused specifically on people with prior experience of cyclones to ensure that there was some level of consistency with regard to past cyclone exposure and so we could interpret variability in our independent variables more effectively. However, due to this reason,

our findings and recommendations may be biased towards this group. Future work could extend this study by comparing the perceived cyclone preparedness of long-term residents who had experienced cyclones and newer residents who had not.

Future research could also expand on the individual-level factors assessed here and examine how perceived preparedness is related to other individual-level factors (e.g., individual risk perception). We found that people's perceived flexibility in the face of change was important for perceived disaster preparedness and future studies can expand on the indicators used here and draw from the latest psychology literature to examine how psychological flexibility may influence both perceived and actual preparedness for natural disasters. A limitation of our study is that we did not assess the influence of gender on perceived cyclone preparedness; future research could utilise methods similar to those used here to examine the influence of gender on perceived preparedness. In addition, future work could assess the demographic and cultural factors for people's perceived disaster preparedness in countries and regions with different individualism-collectivism orientations. This study focused on small regional communities and therefore it is important to undertake research using similar methods in metropolitan areas to assess whether there are differences in the demographic and socio-cultural factors that influence people's perceived preparedness in those regions. Indeed, it may be the case that social capital is less important for perceived disaster preparedness in metropolitan areas. For instance, Kashima et al. [74] found that in Australia, people living in metropolitan areas de-emphasized the collective self (i.e., the self in relation to ingroups) relative to their co-nationals from regional areas and the authors suggested that highly urbanized metropolitan environments may reduce the psychological sense of longingness to groups. Another interesting avenue for further enquiry would be to compare factors affecting people's perceived ability to deal with the impact of a hazard as well as the recovery after the event.

5. Conclusions

Mission Beach residents reported a high level of perceived preparedness for a future cyclone. We found that residents' perceived cyclone preparedness was strongly related to perceptions of their own flexibility and not to other dimensions of their perceived IAC, such as their ability to plan or learn. Notably, people's perceived cyclone preparedness was not related to social capital in their community. Our findings highlight the importance of identifying ways of building Mission Beach residents' psychological flexibility when preparing for future cyclones. Providing people with pre-impact psychological preparedness advice as well as trialling cognitive approaches (e.g., cognitive behavioural coping skills training) may enhance people's psychological flexibility and perceived cyclone preparedness and therefore contribute to disaster risk reduction. Our findings emphasize the importance of considering individualism-collectivism orientations when preparing for climate-related natural disasters and suggest a need to tailor any disaster risk management initiatives to the collectivist or individualistic nature of the region in question. Given that initiatives aimed at disaster risk reduction may both contribute to and gain from the implementation of sustainable development policies, our study may inform the pursuit of achieving the Sustainable Development Goals.

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