



# Can community-based governance strengthen citizenship in support of climate change adaptation? Testing insights from Self-Determination Theory



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## ABSTRACT

Motivation plays a powerful role in guiding human decision-making and behaviour, including adaptation to climate change. This study aimed to determine whether community-based governance would increase behavioural support, in the form of donation behaviour, for a climate change adaptation trust fund. A sample of 548 Australians was randomly assigned to view one of two governance scenarios: (1) a community-based scenario in which community members were afforded a high level of autonomy in designing and allocating funding within a trust fund to help their community adapt to climate change, or (2) a government-centred scenario in which decision making regarding the trust fund remained with government officials. Path analysis revealed that the community-based scenario produced significantly higher levels of perceived autonomy support within the study's participants. High levels of perceived autonomy support predicted higher levels of autonomous motivation (indicating stronger citizenship) and lower levels of amotivation, a motivational pattern, which, in turn, predicted greater willingness to donate to the climate change adaptation trust. Results are interpreted in terms of Self-Determination Theory and Motivational Crowding Theory.

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## 1. Introduction

### 1.1. A growing role for citizenship in environmental management

As globalisation broadens the range of problems that governments are expected to address, their capacities to deal effectively with environmental challenges have become increasingly strained (Chen et al., 2009; Marshall, 2005). Lemos and Agrawal (2006 p. 305) remarked accordingly on “the decline of the state since the 1970s as the prime agent of environmental governance”. Corresponding with this shift has been growing recognition of a need for willing cooperation from individuals and other non-state actors in negotiating and implementing solutions to environmental problems (Chen et al., 2009; Lemos and Agrawal, 2006). Accordingly, there have been growing calls for environmentally responsible behaviour (Jin, 2013), environmental citizenship (Hawthorne and Alabaster, 1999) and ecological citizenship (Spaargaren and Oosterveer, 2010) among non-state actors. Climate change action

is one area where cooperative action from such actors has been identified as particularly crucial (Harris, 2008; O'Brien, 2015; Ostrom, 2014).

Governments nevertheless typically remain dominant players in the governance required to successfully address large-scale problems of collective action required to address major environmental problems such as climate change. Governance is required in such problems to overcome deficits in the levels of collective action that individuals are capable of self-organising (Marshall, 2008b; Marshall, 2011). This perspective reveals the importance of governing bodies treating individuals as co-producers of solutions to the collective action problems they face rather than as passive subjects (Ostrom, 1990).

The foregoing insights from the literature on institutional analysis, public administration and common-pool resource studies have potential to be sharpened though research informed by Self-Determination Theory (SDT) (Deci and Ryan, 1985; Ryan and Deci, 2000). According to SDT, individuals are most likely to optimise satisfaction of their psychological needs, and thus experience wellbeing, when they feel autonomous. Ryan and Deci (2011 pp. 59–60) observed that “when people act autonomously, rather than being controlled or amotivated, they act with a sense of choice, are more mindful, think flexibly, and express their values and

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interests.” Intentional actions are autonomous only to the extent that they are experienced as fully volitional.

In this paper we report research guided by SDT that investigated relationships between ‘governance style’ and individuals’ willingness to co-produce solutions to environmental problems guided by SDT. In the remainder of this section we present an overview of SDT concepts relevant to our study, review insights and research findings from application of these concepts to pro-environmental behaviours, and detail the aims and hypotheses of our study. Our research method is detailed in Section 2 and our results are reported in Section 3. A discussion of the results is presented in Section 4 along with concluding remarks.

1.2. Self-Determination theory

SDT distinguishes between different types of motivation based to their relative autonomy (Ryan and Deci, 2011), and research in this tradition (e.g., E. Ratelle et al. (2007, study 3)) suggests that most behaviours are driven by combinations of these motivation types. The most general distinction is between intrinsic and extrinsic motivation. Intrinsic motivation arises from the inherent satisfaction an individual experiences from an action; that is, from enjoying an activity for its own sake. Although intrinsic motivation is an important impetus for action in many circumstances, it is not the most important determinant of behaviour. As Ryan (1995 p. 405) notes:

Much of human behavior is not intrinsically motivated. Indeed, perhaps the lion's share of social development concerns the assimilation of culturally transmitted behavioral regulations and valuations that are neither spontaneous nor inherently satisfying. Learning to work rather than play, to follow social laws and rules, and to engage in practices of civil behavior often falls far short of being intrinsically motivating. Yet, the acquisition of such behaviors is crucial to socialization and to the integration of the individual within a larger culture.

This notion that much of human behaviour is regulated, initially at least, by factors outside of the self lies at the heart of the second key construct in SDT, extrinsic motivation. SDT distinguishes between four main types of extrinsic motivation that vary the extent to which behavioural regulations are internalised, thereby supporting personal autonomy (Ryan and Deci, 2011).

a) *External regulation*, the least autonomous type of extrinsic motivation, is present when individuals perform a behaviour to obtain external rewards or avoid external punishments. For example, when people purchase an energy-efficient appliance as a requirement of law or because government incentives make

it the only viable alternative, their behaviour is being determined by external regulation.

- b) *Introjected regulation* occurs when a person acts either to avoid feelings of guilt or disapproval, or to seek approval or boost their self-esteem. Although the source of this motivation is internal to a person, the motivation “has the phenomenal feel of forces acting on the self, as the person feels compelled by ‘shoulds’, by projected evaluations, or by the imagined opinions of others” (Ryan and Deci, 2011 p. 51). Introjected regulation is occurring, for example, when an individual purchases an energy-efficient appliance to avoid disapproval of family or friends.
- c) *Identified regulation*, the second most autonomous type of extrinsic motivation, occurs when a person consciously accepts a goal or outcome as personally important, but has not yet integrated the goal or outcome with other aspects of their identity and self. Identified regulation occurs, for example, when people choose energy-efficient appliances because they believe, in general, that people should strive to reduce their carbon footprint even though not all their beliefs and behaviours are consistent with this stated goal.
- d) *Integrated regulation* is regarded as the most autonomous type of extrinsic motivation. It occurs when individuals identify with a behavioural regulation or goal itself, and “are mindfully behind their actions and are volitional and wholehearted in carrying them out” (Ryan and Deci, 2011 p. 51). For example, people may purchase energy-efficient appliances because minimising environmental impacts has become integral to their values, lifestyle, and personal identity. Although behavioural regulation is more internalised with this type of extrinsic motivation than with the other three types, the source of motivation for this type nonetheless resides outside the self. In contrast, the source of intrinsic motivation is entirely internal to the self.

Given that intrinsic motivation, integrated regulation and identified regulation all involve a high degree of internalisation and volition, SDT theorists often group them into a more general motivational category called *autonomous motivation*. Similarly, introjected regulation and external regulation are often combined into a general category called *controlled motivation*, given that the main determinants of behaviour lie outside the self or are experienced as such (Lavergne et al., 2010). SDT also proposes a third general category, *amotivation*, which refers to an absence of motivation and behavioural regulation. Amotivated behaviour is often passive because the target behaviour or its outcome is not valued (Lavergne et al., 2010). The three-level categorisation of motivation types discussed above is encapsulated in Fig. 1.

Type of Motivation	Type of Regulation	Locus of Causality	General Category
Intrinsic	Intrinsic	Internal	Autonomous
Extrinsic	Integrated	Somewhat internal	Autonomous
	Identified	Somewhat internal	Autonomous
	Introjected	Somewhat external	Controlled
	External	External	Controlled
Amotivation	Non-regulation	Impersonal	Amotivation

Adapted from Deci and Ryan (2000).

Fig. 1. Motivation types as distinguished in Self-Determination Theory.

### 1.3. Influencing motivations for adopting pro-environmental behaviours

SDT has much to contribute in terms of understanding adoption of pro-environmental behaviours (PEBs). In a recent review of empirical SDT research on PEBs, Pelletier et al. (2011 p. 262) found that individuals who are autonomously motivated to perform PEBs are more likely to engage in such activities. Pelletier et al. (1998) found that level of controlled motivation was mostly unrelated to reported PEB frequency, and that high levels of amotivation were associated with a low reported frequency of PEB.

SDT offers a compelling psychological explanation of how behavioural changes that arise initially from controlled (i.e., externally-induced) motivations can become permanently internalised as socially-endorsed values, identities and rules become more fully integrated to the self, with Pelletier et al. (2011) reporting evidence that higher levels of autonomous motivation for PEBs are associated with higher maintenance of those behaviours over time. It proposes that this potential for internalisation of behaviour changes can be realised to the extent that the values, identities and rules are (a) transmitted to individuals in a manner that they perceive supports their autonomy rather than seeks to control them, and (b) not inconsistent with fulfilling their basic psychological needs for autonomy, competence, and relatedness. Both proximal and distal types of contextual influences on whether the manner on which transmission occurs is perceived as autonomy-supportive or controlling are recognised as relevant by SDT (Ryan and Deci, 2011). Proximal contextual influences include parents, peers, teachers, coaches and physicians who may interact regularly with an individual (Lavergne et al., 2010), while distal influences include the mass media, public role models and governments (Pelletier et al., 2011).

Most empirical SDT research has examined proximal influences on PEB motivations (Lavergne et al., 2010; Pelletier et al., 2011). However, Ryan and Deci (2011) emphasised how societal influences, including economic and political structures, can influence individuals' motivations in the degree to which they support versus thwart satisfaction of their basic psychological needs including autonomy. They observed, for instance, that "a democratic political system allows greater support for autonomy than does a totalitarian one . . . , yet small pockets of great wealth within a democratic system, as in the US, can wield undue control and influence over others in the system, leaving many people feeling amotivated and helpless in relation to politics and the resulting policies" (Ryan and Deci, 2011 p. 59).

An important Canadian study by Lavergne et al. (2010) examined how distal contextual features influence individuals' motivations for, and in turn adoption of, PEBs. It aimed to determine whether perception of government style (i.e., autonomy-supportive versus controlling) influenced PEB frequency, and whether this effect was mediated by relationships between individuals' perceptions of government style and their levels of autonomous and controlled motivation and amotivation (Lavergne et al., 2010). The authors recognised that although environmental laws and policies promulgated by governments are by definition a form of control, variation in individuals' dispositional tendencies would likely lead to differences in their perceptions about whether the interventions were autonomy-supportive or controlling.

Lavergne et al. found that participants' perceptions of government style predicted their motivations for PEBs. Participants who perceived government as being supportive of their autonomy reported significantly higher levels of autonomous motivation, which, in turn, was significantly positively associated with self-reported levels of PEBs. In contrast, participants who perceived government as controlling reported higher levels of controlled motivation and amotivation, which were unrelated and negatively

related to PEB frequency respectively. Overall, participants' perceptions of government style were found to significantly influence their PEB frequency. The influence was positive if the government style was perceived as autonomy-supportive, and negative if it was perceived as controlling. Referring to this study in their review of SDT research on PEB, Pelletier et al. (2011 p. 267) concluded "a critical socio-contextual factor [influencing individuals' motivations] is the government's approach toward the implementation of environmental programs and strategies that target PEB."

Lavergne et al. noted that a limitation in their research design was that their measure of government style referred to government simplistically as a monolithic entity rather than as the multi-centred (e.g., national, provincial and municipal) arrangement that it commonly involves. They suggested that a useful direction for further research would involve applying their method to test the relationship between perceived government style at each different level of government, PEB motivation, and PEB frequency. The research reported in the present article was triggered by this suggestion, although the direction ultimately followed was influenced also by ideas from the literature on Motivational Crowding Theory. These ideas are discussed below.

Motivational Crowding Theory (MCT) arose from the work of behavioural economists who took their lead from early developments in SDT (Deci, 1971; Deci, 1975; Deci and Ryan, 1985), which identified that, under certain conditions, monetary rewards undermine intrinsic motivation. The primary focus of this early SDT literature was on intrinsic motivation rather than autonomous motivation more broadly.<sup>1</sup> The accumulation of studies by MCT scholars provides empirical evidence of a *motivation crowding effect* whereby external intervention via monetary incentives or punishments may undermine (*crowd out*), and under different identifiable conditions strengthen (*crowd in*), intrinsic motivation (Frey, 2012; see also Gurney et al., 2016). Frey and Jegen (2001) observed how this evidence contrasts with the methodology followed in most strands of economic literature, in which intrinsic motivation is assumed to be an exogenously given constant or overlooked altogether.

Of particular relevance to the current study, Frey and Jegen (2001 p. 604) observed as follows that MCT can be useful in understanding how governing styles, reflected in laws, rules and policies, affect individuals' motivations:

Civic virtue (a particular manifestation of intrinsic motivation) is bolstered if the public laws convey the notion that citizens are to be trusted. Such trust is reflected in extensive rights and participation possibilities. Citizens are given the freedom to act on their own with respect to economic affairs, the freedom to freely express themselves, and to demonstrate and strike if they feel dissatisfied with particular government decisions and, most importantly, to take important political decisions by themselves via referenda and initiatives. The basic notion enshrined in the constitution that citizens are on average, and in general, reasonable human being thus generates a crowding-in effect of civic virtue. In contrast, a constitution implying a

<sup>1</sup> With respect to environmental behaviours, it seems likely that such evidence of motivational crowding effects would have been stronger if the focus of MCT scholars had been broadened from intrinsic motivation to all three types of autonomous motivation. Lavergne et al. (2010) reasoned that intrinsic motivation will normally not be the dominant type of autonomous motivation in play with pro-environmental behaviours because relatively few people are likely to find these behaviours inherently interesting or satisfying. Similarly, Webb et al. (2013) observed that integrated and identified regulation are likely to be the most relevant of the autonomous motivation types for adoption of household energy-saving behaviours. Empirical support for these propositions was provided by Pelletier et al. (1998) who found that autonomous motivation for PEB is driven mostly by identified regulation.

fundamental distrust of its citizens, and seeking to discipline them, tends to crowd out civic virtue and undermines the support which citizens are prepared to give towards the basic law. The effects of such a distrustful constitution show up in various ways. The citizens are dissatisfied with the political system and respond by breaking the constitution and its laws whenever they expect to be able to do so at low cost.

Building on this argument, E. Ostrom (2000 p. 13) observed that “much of contemporary policy analysis and the policies adopted in many modern democracies crowd out citizenship.” She explained that policy makers often expect only short-term selfish actions from individuals, which leads them in turn to presume that controlling policies, involving externally designed and monitored incentives, are required for individuals to act in the public interest. Reflecting later on this problem, she argued that “instead of relying on the state as the central, top-down substitute for all public problem solving, it is necessary to design complex, polycentric orders that involve both public governance mechanisms and private market and community institutions that complement each other . . . . Reliance primarily on national governments crowds out public and private problem solving at regional and local levels . . . .” (Ostrom, 2005 pp. 254–255; see also Gruby and Basurto, 2014).

Elinor Ostrom’s conception of citizenship accords with Vincent Ostrom’s (1991 p. 256) argument that “the character of a democratic society is revealed by the willingness of people to cope with problematical situations instead of presuming that someone else has responsibility for them”. It accords also with Heater’s (2004 pp. 182, 345) characterisation of “citizenship [as] more than a label. He who has no sense of a civic bond with his fellows or of some responsibility for civic welfare is not a true citizen whatever his legal status . . . . More than ever the ideal of civic virtue needs to be recaptured, reinterpreted and retaught in contemporary terms”. Wolf et al. (2009 p. 505) characterised ecological citizenship similarly as involving “a civic concern for the implications of individual actions”.

#### 1.4. Research aim and hypotheses

In this paper we build on the research of Lavergne et al. (2010) by shifting from their focus on *government* styles to the more inclusive one of *governance* styles, where governance refers to “all processes of governing, whether undertaken by a government, market or network, whether over a family, tribe, formal or informal organization or territory and whether through the laws, norms,

power or language” (Bevir, 2013 p. 1). The primary aim of our research was to contribute to SDT scholarship by empirically testing the proposition that assigning public problem solving at a given spatial (e.g., regional) level to a community-based style of governance would alleviate any crowding out of civic virtue and thus citizenship that results from the tendency of government-dominated styles of governance to be perceived by individuals as overly controlling and out of touch with community needs. Community-based governance is a form of polycentric governance that Berkes (2005 p. 34) described as “shorthand for governance that starts from the ground up but deals with cross-scale interactions”, and emphasised plays a vital role in addressing challenges from global environmental change. Guided by the subsidiarity principle, this form of governance ideally provides individuals and their communities with as much autonomy as they can capably utilise (Marshall and Stafford Smith, 2010).

We hypothesised accordingly that assigning substantive decision making rights over the management of environmental matters to local communities (as in a community-based governance style), rather than to government (as in a government-centred style), would stimulate perceived autonomy support, which, in turn, would lead to increased autonomous motivation and decreased amotivation in addressing environmental challenges. Lavergne et al. (2010 p. 172) did not test for a relationship between perceived autonomy support and controlled motivation “because this relationship has received little empirical support and both introjection and external regulation seem largely unrelated to perceptions of autonomy support”. In our study we tested for a relationship without making any specific predictions regarding its direction. Finally, we predicted that higher levels of autonomous motivation and lower levels of amotivation would be associated with increased PEB adoption. Our hypothesis that greater autonomous motivation is associated with increased PEB adoption is consistent with findings that strength of autonomous motivation is positively associated with effective and sustained environmental goal pursuit (Osbaldiston and Sheldon, 2003; Vansteenkiste et al., 2004) and a higher frequency of PEB (Lavergne et al., 2010; Pelletier et al., 1998). Given that the literature has produced mixed evidence for the relevance of controlled motivation in predicting adoption of PEB, we did not make any specific predictions about this variable. A summary of the hypothesised pattern of results is presented in Fig. 2.

We tested these general hypotheses in the context of climate change adaptation. Fielding et al. (2014) identified climate change adaptation as a particularly important focus for social

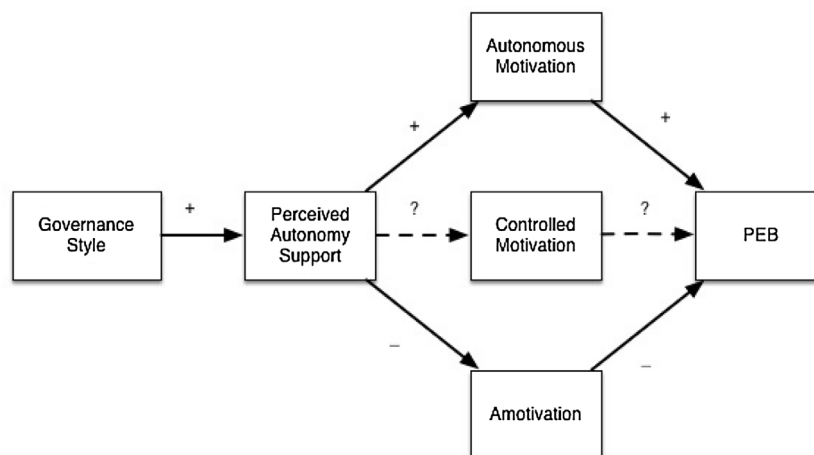


Fig. 2. Hypothesised path model of mediated relationships between governance style and pro-environmental behaviour, where the value for governance style is 1 for government-centred style, and 2 for community-based style.

psychologists seeking to contribute to the climate change research agenda, and identified the potential of SDT research to make useful contributions in this area. The relevance of SDT to climate change policy also has been identified by [Cooke et al. \(2016\)](#), [Webb et al. \(2013\)](#), and [de Boer et al. \(2013\)](#). The role of polycentric governance in mitigating and adapting to climate change has been highlighted by authors including [Ostrom \(2014\)](#) and [Cole \(2015\)](#).

## 2. Method

### 2.1. Participants

The sample consisted of 548 Australian residents recruited from a Qualtrics online panel. Ages ranged from 19 to 89 years ( $M = 48.85$ ,  $SD = 15.71$ ), and just over half were male (51%). In terms of education, 29% completed year 12 or less, 30% had a trade certificate or diploma, 26% had a bachelor degree, and 16% had completed a higher degree (e.g., a postgraduate diploma, masters or PhD). A majority of respondents (53%) lived in major cities with populations greater than 100,000 residents, 21% resided in urban centres with populations between 10,000 and 100,000, 20% lived in towns with populations under 10,000, and 6% lived in rural or regional areas comprised of less than 1000 residents.

### 2.2. Procedure

To be eligible, the recruited participants had to be over the age of 18 years, English speakers, and residing in New South Wales (NSW), a state of Australia. All participants read an information sheet describing the study prior to providing informed consent to participate. Respondents were paid a small amount by Qualtrics to complete the survey. In addition to the standard Qualtrics payment, participants were informed during the recruitment phase that they would be paid an additional \$10AUD worth of redeemable Qualtrics survey points for completing the survey.

Participants initially completed several demographic questions, and then were randomly assigned to view one of two climate change adaptation scenarios, which varied in terms of governance style and particularly in the degree of community autonomy in resource allocation and decision making. The scenarios described threats from climate change facing NSW residents, and noted that “a trust fund has recently been established to increase the funds available for investing in your region’s capacities to adapt to climate change impacts.” In the government-centred (i.e., low-community-autonomy) scenario, the trust “was established, and will be administered, by the regional office of the NSW Government agency responsible for helping communities adapt to climate change”. In the community-based (i.e., high-community-autonomy) scenario, the trust was established at “a meeting between community representatives of voluntary community groups . . . working on natural resource management issues in your region. The idea was further developed through a collaborative partnership between these community representatives and the regional office of the NSW Government agency responsible for helping communities adapt to climate change. The partners agreed that final decisions on how to invest the funds donated to the trust would be made by a committee comprised entirely of representatives from your regional community.” The content of the two scenarios was identical other than the description of the relative roles of government and community in establishing the regional climate adaptation trust and deciding how funds held in the trust would be invested. The full scenarios are presented in [Appendix A](#) (online supplementary material).

Following the administration of the experimental treatment, participants completed questions regarding the degree to which governance arrangements for the climate change adaptation trust

described in the scenario were perceived as supportive of their community’s autonomy, and about their personal motivations for supporting such a trust. Finally, participants were asked how much of their additional \$10 supplementary Qualtrics payment they would be willing to donate to the climate change adaptation trust described in the scenario, noting that they could keep what they chose not to donate. Immediately following their donation opportunity, participants were asked to explain why they decided to donate or not donate to the trust. Responses were anonymous. All survey questions required a response, so there were no missing data. Participants were fully debriefed following the study, informed that the trusts described in the scenarios did not exist, and that they could keep all of their supplementary payment regardless of what they had agreed to donate.

Our procedure advances prior SDT research on motivations for PEBs in two important ways. First, whereas the vast majority of prior SDT research in the PEB area has relied on self-reports, we assessed actual behaviour. [Webb et al. \(2013\)](#) highlighted the risk of self-reported behaviour data in this research suffering from social desirability bias, and observed that future studies in this area would benefit from using data on actual behaviour. Second, our procedure responds to the concern of [Pelletier et al. \(2011 p. 273\)](#), arising from their review of prior SDT research into PEBs, that “although the studies described in this chapter are consistent with SDT, more studies that use experimental methodologies are required to demonstrate causality.” Our procedure was experimental, with respondents randomly assigned to one of two governance treatments. Hence the relationships we estimate between governance treatment and each of the other variables included in the path model detailed below measure causation and not merely association.

### 2.3. Measures

#### 2.3.1. Demographics

Single items were used to assess participants’ gender, age, education level, and the size of the city/town in which they resided at the time of the survey.

#### 2.3.2. Perceived autonomy support

Participants’ perceptions about how much the climate change adaptation trust described in the experimental manipulation supported their community’s autonomy were assessed by six items, assessed on a 7-point scale ranges from strongly disagree (1) to strongly agree (7). Three items were positively worded reflecting a high level of perceived autonomy support (*I feel that this initiative provides my community with the flexibility to tailor climate change adaptation solutions that best fits our needs; This initiative provides my community with the freedom to make our own decision about the best way to adapt to climate change; I feel that this initiative leaves climate change adaptation in the hands of the community*), and three were negatively worded reflecting lower perceived support for community autonomy (*I think this initiative puts a lot of pressure on communities to adopt government strategies to respond to climate change; I feel this initiative is just another example of the government imposing their priorities about climate change on communities; I feel this initiative is the government trying to dictate what communities should and should not do about climate change*). These last three items were reversed scored. A composite index of perceived autonomy support was computed by taking the mean of all items (Cronbach’s  $\alpha = 0.80$ ).

#### 2.3.3. Motivation towards supporting the climate change adaptation trust

Participants’ motivations to support the climate change adaptation trusts described in the scenarios were assessed using

a modified version on Pelletier et al.'s (1998) Motivation Towards the Environment Scale (MTES). Participants were told that there are many things that people can do to help their communities to adapt to climate change, including donating money to initiatives that strengthen their community's capacities to deal with climate change related threats such as bushfires, droughts, floods and severe storms. They were then provided with 18 common reasons that people give to explain why they donate to community initiatives, and were asked to indicate the degree to which each reason corresponds to why they might consider donating to the "climate change adaptation trust" described in the scenario presented earlier in the survey (1 = does not correspond at all, 7 = correspondents exactly). Following Lavergne et al. (2010), we created three subscales assessing: autonomous motivation (based on the activity's value, importance and relevance to one's core values and interests), controlled motivation (reflecting external reasons for engaging in an activity including peer and regulatory pressure or internal reasons such as guilt), and amotivation (the absence of motivation). Autonomous motivation was assessed by nine items including: *For the pleasure I experience when I find new ways to help my community adapt to climate change*, and *Because responding to climate change is an integral part of my life* (Cronbach's  $\alpha=0.95$ ). Controlled motivation was assessed using six items, including: *For the recognition I get from others*, and *Because I would feel bad if I didn't do anything to help my community respond to climate change* (Cronbach's  $\alpha=0.88$ ). Finally, amotivation was assessed by three items, including: *Honestly, I don't know; I truly have the impression that I am wasting my time helping my community adapt to climate change*, and *I don't know; I can't see how my donation will assist my community to adapt to climate change* (Cronbach's  $\alpha=0.85$ ). For all three motivation variables, composite scores were computed by taking the mean of all subscale items.

### 3. Results

#### 3.1. Descriptive statistics

Descriptive statistics and zero-order correlations are presented in Table 1. Examination of the correlation matrix revealed that higher levels of perceived autonomy support were associated with increased autonomous and controlled motivation and decreased amotivation. Higher levels of autonomous and controlled motivation and lower levels of amotivation were significantly associated with donation amount. On average, participants donated just under one third of their supplementary payment of \$10 worth of survey points to the climate change adaptation trust. Those administered the community-based governance scenario donated \$3.27, somewhat more on average than the \$2.95 donated on average by those administered the

government-centred scenario, although this difference did not reach statistical significance ( $t(546)=1.20, p=0.12$ , one-tailed). Examination of the donation variable revealed a strong positive skew with 38% of all respondents making no donation. To address this non-normality problem, we transformed donation into a dichotomous variable (0 = did not donate, 1 = did donate). Following the transformation, treatment significantly correlated with donation ( $\Phi=0.07, p<0.05$ , one-tailed), indicating that participants in the community-based condition were significantly more likely to donate to the climate change adaptation fund (65%) than participants in the government-centred condition (58%) ( $\chi^2(1)=2.83, p<0.05$ , one-tailed). Finally, in answering the open-ended question about the reason for donating or not donating to the trust, no respondent indicated any scepticism about the experimental manipulation.

#### 3.2. Mediation analysis

To determine whether the governance style for a climate change adaptation trust (community-based vs government-centred) would influence participants' willingness to provide financial support for the trust indirectly through three motivational pathways (autonomous motivation, controlled motivation and amotivation), we conducted a path analysis using MPLUS 7. We employed means and variance adjusted weighted least squares (WLSMV) estimation given the outcome variable was dichotomous (no donation versus donation). This produces results equivalent to probit regression (Muthén and Muthén, 2015).

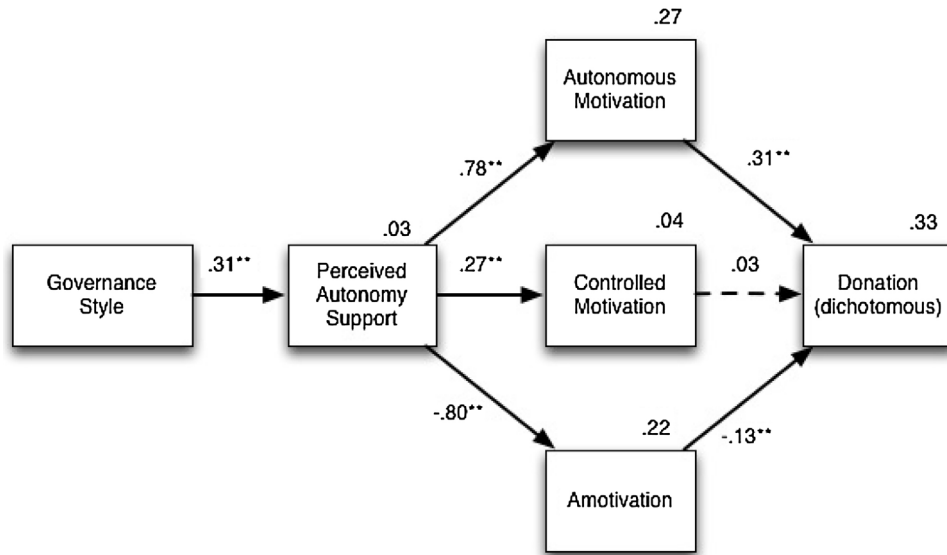
The path model, depicted in Fig. 3, exhibited excellent fit,  $\chi^2(5)=9.05, p=0.11, \chi^2/df=1.81, CFI=0.99, TLI=0.97, RMSEA=0.04$ , (90% CI 0.00–0.08), and explained 33% of the variance in donation behaviour. As predicted, the community-based governance scenario was perceived to afford greater autonomy support than the government-centred scenario. In turn, higher levels of perceived autonomy support were associated with (1) increased autonomous motivation and controlled motivation to support the climate change adaptation trust, and (2) decreased amotivation. Finally, higher levels of autonomous motivation and lower levels of amotivation significantly predicted whether participants would donate to the trust fund. Controlled motivation was unrelated to donation behaviour.

Examination of the significance tests for the indirect effects revealed significant mediation paths running from: (1) governance style through perceived autonomy support and autonomous motivation to donation behaviour ( $B=0.08, p<0.01$ ), and (2) governance style through perceived autonomy support and amotivation to donation behaviour ( $B=0.03, p<0.05$ ). The mediation path running through controlled motivation was not significant ( $B=0.00, p=0.63$ ).

**Table 1**  
Zero-order Correlations and Descriptive Statistics.

Variable	1	2	3	4	5	6
1 Governance treatment	–					
2 Perceived autonomy support	0.15*	–				
3 Autonomous motivation	0.08*	0.48**	–			
4 Controlled motivation	0.10*	0.20**	0.73	–		
5 Amotivation	–0.06	–0.45**	–0.24**	0.09*	–	
6 Donation (dichotomous)	0.07	0.32**	0.39**	0.30**	–0.24**	
Mean		4.11	3.31	2.71	3.61	
SD		0.97	1.67	1.31	1.51	
Observed min/max	1–2	1–7	1–7	1–7	1–6.5	0/1
Possible min/max	1–2	1–7	1–7	1–7	1–7	0/1

\*  $p<0.05$ , \*\*  $p<0.01$ , 2 tailed. For governance treatment, government-centred scenario = 1, community-based scenario = 2. For donation, no donation = 0, donation = 1.



**Fig. 3.** Path model showing the effect of governance style for the climate change adaptation fund (government-centred = 1, community-based = 2) on donation behaviour mediated by perceived autonomy support and three types of motivation. Values on pathways represent unstandardized regression weights. Squared multiple correlations are reported in the top right hand corner for each endogenous variable. The errors associated with the three types of motivation were permitted to correlate in the model. \*  $p < 0.05$ , \*\*  $p < 0.01$ .

## 4. Discussion

### 4.1. Overview

The goal of this study was to test whether a community-based, relative to government-centred, governance style would reduce crowding out of citizenship related to support for climate change adaptation. We hypothesised that assigning rights and responsibilities for public problem solving to the community would strengthen individuals' perceptions of support for their community's autonomy, which in turn would lead to increased autonomous motivation, decreased amotivation, and stronger behavioural support for a trust to support climate change adaptation in their region.

As predicted, participants perceived greater autonomy support under a community-based governance style compared to a government-centred one, and this perception was associated with strengthened citizenship by way of (a) a significant increase in individuals' autonomous motivations to contribute to collective action in climate change adaptation, and (b) a significant decrease in their amotivation with respect to such contributions. Our additional hypotheses that higher levels of autonomous motivation and lower levels of amotivation would be associated with increased contributions to the climate change adaptation trust fund were also supported. Overall, our study provides evidence that community-based governance may be an effective strategy for reducing crowding out effects, and thereby strengthening citizenship, in institutional initiatives to facilitate climate change adaptation.

Although we made no prediction regarding the direction of the relationship between perceived autonomy support and controlled motivation, estimation of the path model revealed a significant positive relationship between these variables. The positive direction of this relationship may have arisen through devolution of governance functions to a community-based body strengthening controlled motivation (comprising introjected and/or external regulation) at the same time as strengthening autonomous motivation. Although individuals perceived community-based governance as more supportive of their community's autonomy, this does not preclude them from also perceiving that external

pressures on them individually to support their community's climate change adaptation efforts have increased. Such a strengthening of external pressures might arise from greater effectiveness of a community-based, compared with a government-centred, governance style in monitoring and enforcing their policies due to their strengthening of social normative pressures to cooperate, enhancement of access to local knowledge about individuals' behaviours, and increased local support for formal monitoring and sanctioning procedures (Ostrom, 1990).

Our research contributes to knowledge of how governance style influences citizenship in a number of ways. It addressed a key limitation that Lavergne et al. (2010) identified in their research into the influence of government style on individuals' motivations for, and adoption of, PEBs; namely, that their measure of government style defined government as an undifferentiated entity rather than the multi-faceted arrangement it usually involves. A related limitation was that their research examined only governmental influences when it is increasingly recognised among scholars of environmental and natural resources management (Lemos and Agrawal, 2006) that the relevant focus nowadays needs to be broadened to governance comprising crucial inputs from civil society and the private sector as well as from multiple distinct arms of government. We responded to these limitations by randomly assigning participants to one of two scenarios, each involving a particular governance style (i.e., government-centred or community-based) operating at the regional level. We were thereby able to test whether these distinct governance styles differed in their implications for perceived autonomy support, motivations to adopt PEBs, and adoption of PEBs.

Our findings also extend previous scholarship on MCT (e.g., Frey and Jegen, 2001; Ostrom, 2000) by evaluating the effect of governance style on strength of citizenship. This literature took its lead from early developments in SDT, which focused primarily on intrinsic motivation, and which thus conceptualised citizenship strength narrowly as level of intrinsic motivation rather than in terms of the three types of autonomous motivation that SDT now recognises individuals experience as fully volitional. Our definition of citizenship strength in terms of autonomous motivation accords with current SDT literature and thus provides a more valid measure against which the propositions made in the MCT

literature regarding the influence of governance style on this construct can be tested.

#### 4.2. Limitations and future research

Several limitations should be kept in mind when assessing the results from this study. First, although we collected data from a large diverse group of respondents, the sample was not representative since respondents were recruited from an online panel rather than randomly sampled. Thus, the results may not generalise to all NSW residents. Second, the experimental treatments employed in the study were devised to clearly distinguish between two styles of governance: community-based and government-centred. Outside of the research laboratory, the differentiation between the two styles may be less clear, with various possible hybrids (Lemos and Agrawal, 2006). Third, the governance-style treatment effects were modest in magnitude. Governance style did not significantly predict donation amount, although it did significantly predict whether participants donated (as opposed to not donating) to the climate change adaptation fund. Although we believe that this discrepancy is most likely attributable to attenuated statistical power associated with skewed data, further research is needed to establish the robustness of our findings.

On a related note, the low correlation between governance style treatment and perceived autonomy support ( $r=0.15$ ) is noteworthy given the marked distinction in how the two governance treatments were described in terms of characteristics relevant to assessing autonomy support. The distinction in how the treatments were described to respondents was evidently dominated by other considerations in the process of them contemplating the level of community autonomy support that would actually occur under each treatment. One such consideration can be deduced from the observation by Lavergne et al. (2010 p. 175) that it is “likely that a person’s existing motivation might color their perceptions of whether . . . contextual factors support versus thwart their basic psychological needs.” Individuals who have been primarily driven in the past by controlled motivation or amotivation as a result of contextual factors perceived as controlling may therefore persist with this perception after the context has actually (e.g., through shifting to community-based governance) become more autonomy supporting. The broader literature on environmental governance recognises the significance of such “lock-in” of mental models for attempts to promote adoption of PEBs through community-based governance (e.g., Marshall and Alexandra, 2016), with some in this tradition (e.g., Curtis et al., 2014) highlighting how mistrust of such governance persists within communities due to repeated past failures of sponsors of such arrangements to deliver on their rhetoric of community “empowerment” and “ownership”. Research examining how individuals’ past experiences with environmental governance influence their current motivations to adopt PEBs (including for climate change adaptation), and how these “legacy” motivations limit the ability of new community-based initiatives to strengthen environmental citizenship, would provide crucial knowledge about how to design and implement such initiatives to loosen lock-in of mental models so that the potential of such initiatives to strengthen this citizenship might be more fully realised.

Given a likelihood that governance arrangements tend to be perceived by individuals as more supportive of their community’s autonomy more localised they are, our two governance treatments were positioned at the same spatial level (i.e., regional level) in order to elicit from respondents their perceptions only of how governance style, and not spatial level of governance, influenced their motivations to contribute to the climate change adaptation

trust. The regional level was chosen since it is a level at which government-centred and community-based governance arrangements have both operated, such as in regionalised arrangements for natural resource management in Australia where the arrangements in some regions have been government-based and in others have been community-based (Marshall, 2008a; Marshall, 2009). Future research could examine whether relationships between governance styles, individuals’ motivations and PEB adoption are influenced by the spatial level at which the governance occurs.

#### 4.3. Conclusion

With governmental capacities to solve escalating problems from environmental, including climate, change increasingly stretched, it is crucial that citizenship be fostered by finding ways to strengthen individuals’ motivations to willingly co-produce solutions to these problems. Our research findings contribute to knowledge of how this might be achieved. We have provided experimental evidence that a community-based approach to governance of climate change adaptation efforts can, compared with a government-centred approach, strengthen individuals’ autonomous motivations to contribute to such efforts. Our confidence in this finding is boosted from having used data on actual rather than self-reported behaviour, and from employing an experimental procedure that enables hypotheses of causation to be tested.

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#### Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.envsci.2017.02.010>.

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