

Coping with change in rural landscapes: The psychological stress of rural residents experiencing unconventional gas developments

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ABSTRACT

Rural landscapes in many parts of the world are experiencing increasing pressure from competing uses. One particular use, unconventional natural gas extraction, has received considerable attention over the past decade owing to its rapid growth and associated impacts on rural landscapes. This study examined how a sample of Australian rural residents experienced the processes of psychological stress induced by a coal seam gas project that created perceived undesirable changes to resources they valued. Its effect on residents' psychological well-being slowly unfolded over several years. We deconstructed the stress processes by investigating primary appraisal, secondary appraisal, and subsequent emotional and coping responses guided by the cognitive theory of stress and coping. Primary appraisal measured how the impacts of change on personal and communal resources were assessed while secondary appraisal gauged the options available to individuals to cope. Our results show that when primary appraisal alerts individuals of resource loss, negative emotions are more likely experienced. Such an appraisal directly drives engagement in eight coping strategies classified into four categories: problem-focused, support-based, emotion-focused, and maladaptive coping. It also motivates coping indirectly except for one strategy of emotion-focused coping mediated by negative emotions. While secondary appraisal also directly contributes to four coping strategies that each pertains to one of the four coping categories, it has no effect on negative emotions and four remaining coping strategies that are emotion-focused and maladaptive. These findings shed light on our understanding of the psychological consequences of undesirable change of land use on rural communities. Implications for land use policy are discussed with an emphasis on the need for considering a holistic perspective on the multi-dimensional nature of rural resources valued by community residents and establishing procedural fairness and legitimacy for proposed changes.

1. Introduction

Rural landscapes are experiencing increasing pressure from competing uses, including agriculture, urban encroachment, energy projects, tourism and amenity developments, and ecosystem conservation (García-Martín et al., 2016). One particular use, unconventional natural gas extraction (e.g., shale, coal seam and tight gas), has received considerable attention over the past decade owing to its rapid growth, and associated land use conflicts and impacts on rural communities (Ladd, 2013; Woods, 2012). This growth is driven in part by the increased energy demand of urban populations (Argent and Measham, 2014). Often portrayed as a source of clean energy, natural gas is more appealing than traditional oil and coal due to the growing global concern about the effect of increased greenhouse gases in the atmosphere (Jacquet and Stedman, 2014). Recent technological developments (e.g., hydraulic fracturing or fracking) have made previously inaccessible

unconventional gas now available. The growth in this energy sector has resulted in unprecedented change in rural landscapes with rich gas reserves. Concomitant with this growth is increasing concern over the socioeconomic and psychological impacts among rural residents and the lingering uncertainty stemming from such form of land use (Jacquet and Stedman, 2014; Measham et al., 2016).

Rural landscapes are imbued with meanings of significance to rural residents who have been investing personal (e.g., a house, land) and communal (e.g., ecosystem health, community cohesiveness) resources therein to support a way of life, manifest a self-identity, and maintain a sense of well-being (Anderson et al., 2017; Lai and Kreuter, 2012). Land use policies that encourage rural areas to accommodate multiple functions such as producing mineral and energy resources and maintaining cultural ecosystem services that support a sense of place and identity ingrained in an image of rural landscapes desired by rural residents can lead to land use conflicts and impose stress on community

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residents (Lai et al., 2017a; Ribeiro et al., 2016). Residents' psychological stress can begin to overwhelm when a proposed use of land is perceived to threaten or harm the area and valued resources, and when such a perception continues unabated and coping strategies adopted by residents individually or collectively fail to result in desirable outcomes (Folkman and Lazarus, 1985; Hobfoll et al., 1995; Matthies et al., 2000). Widespread psychological stress can contribute to psychological vulnerability and adversely affect individual and community capacity to cope (McGee, 1999; Norris et al., 2008).

Given that the recent and rapid adoption of fracking technology, many questions relating to the psychological impacts resulting from this driver of change remain unanswered (Jacquet and Stedman, 2014). To help fill this void, our study explored the effect of a coal seam gas (CSG) (also known as coalbed methane) development on the psychological stress experienced by rural residents. Our aim was to better understand the perceived impact arising from this growing source of change on the material and non-material resources that are owned by individual rural residents or shared by their communities as a whole and to draw associated implications for land use policy and planning. The cognitive theory of stress and coping (SAC) (Lazarus et al., 1980; Lazarus and Folkman, 1984) has been applied to examine the psychological effects of changes induced by environmental hazards and developments (e.g., Bachrach and Zautra, 1985; Jordan, 2015). However, its application to examining the psychological consequence of land use changes and related conflicts induced by unconventional gas developments is new. This theory was adopted and expanded to guide our research that was conducted in a rural community in the Australian state of New South Wales (NSW).

2. Literature review

According to SAC, psychological stress arises when an encounter between an individual and his/her surrounding environment “is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being” (Lazarus and Folkman, 1984). The theory contends that the person-environment relationship in a specific encounter is influenced by cognitive appraisal, and subsequent emotions and coping.

Cognitive appraisal comprises three interdependent processes (Lazarus and Folkman, 1984). Individuals engage firstly in primary and secondary appraisal followed by reappraisal. The purpose is to determine whether and to what extent the encounter presents a stressful situation and how well-being may be affected. Primary appraisal involves assessing how perceived changes affect the resources that are essential to attaining individuals' values, goals, and identities, and their psychological well-being (Lazarus and Folkman, 1984). This appraisal process then determines whether there is a need for attention and mobilisation of coping. Changes induced by unconventional gas developments can be assessed to be irrelevant if the person has nothing to gain or lose. It can be assessed to be beneficial if the subsequent outcome leads to resource gain and is conducive to the attainment of important values, goals, identities, and well-being. Conversely, changes can drive psychological stress if they are appraised to be harmful when valued resources are damaged, threatening when loss is anticipated, or challenging when potential gain is expected.

Secondary appraisal involves evaluating what can be done to avoid or reduce resource loss or increase the prospect for resource gain (Lazarus et al., 1980). Individuals assess whether anything can be done to mitigate loss, decide whether more information is needed, or simply wait. Primary and secondary appraisals influence each other to determine the type and extent of emotional outcomes and the coping responses that follow (Folkman and Lazarus, 1988a). For example, an encounter that is appraised to be threatening (i.e., primary appraisal) and where options limit effective coping due to a lack of coping resources (i.e., secondary appraisal) is likely to reinforce negative emotions.

Emotional reactions to appraisals of changes are considered by SAC to be of significant diagnostic value as they signal the resilience capacity of individuals' resources in the face of threats, challenges, and opportunities, and associated implications for important values, goals and identities (Folkman and Lazarus, 1985). Positive (e.g., happiness, hope) or pleasurable (e.g., excitement, eagerness) emotions are likely to follow a beneficial or challenging appraisal due to the implications for improved well-being. Conversely, negative emotions (e.g., anger, anxiety) tend to result from an appraisal that flags harm or threat to one's values, goals, identity and subsequent well-being (Folkman and Lazarus, 1985). The appraisal of resource gain or loss and coping options, and concomitant emotional responses also affects the types of coping that are subsequently enacted (Folkman and Lazarus, 1988b).

Coping involves a process of regulating cognitions and behaviours to manage a stressful encounter (Folkman and Lazarus, 1980). Three coping mechanisms have been identified. When engaging in problem-focused coping (e.g., active coping, planning), individuals direct their resources to manage the source of stress. Emotion-focused coping (e.g., positive reframing, acceptance, denial) is often employed when insufficient resources are available to manage the stressor. Consequently, resources are directed primarily to regulate emotions arising from the stressful encounter (Lazarus and Folkman, 1984). Often problem-focused and emotion-focused coping are simultaneously adopted to manage the stressor and induced emotions (Folkman and Lazarus, 1985). When both coping mechanisms fail, maladaptive coping (e.g., self-distraction, avoidance, or finding an outlet to express related emotions) is likely employed (Carver, 1997). The implementation of coping changes the person-environment relationship leading to reappraisal where individuals reassess the implications of the new person-environment relationship for their well-being that, in turn, drives subsequent emotional and coping responses. The processes of appraisal, emotions, coping, and reappraisal tend to persist until the stress is alleviated or resolved (Folkman and Lazarus, 1980).

Our study explored the stress processes driven by CSG as an undesirable form of land use. We scrutinised how psychological stress became manifest among residents of a rural community by investigating how impacts induced by CSG development were appraised and how appraisals contributed to emotions and coping. Fig. 1 shows the conceptual model examined in our study. We hypothesised that primary appraisal and secondary appraisal influence coping directly and indirectly through emotions. The community, Gloucester Shire, which experienced the introduction of a CSG project that was considered undesirable to the majority of its residents (GSC, 2011), provides a suitable study area for examining the model.

3. Study area

Gloucester Shire encompasses a rural landscape of almost 3000 km² and is home to approximately 5000 residents. Agriculture, forestry, and fisheries have been a major source of local employment (Campbell and Gedye, 2013). In the meantime, traditional agricultural activities have

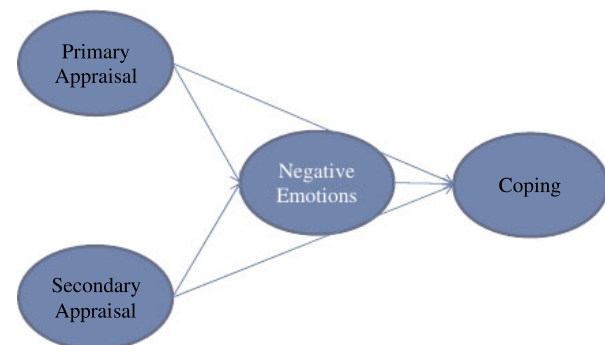


Fig. 1. Conceptual model.

been gradually replaced by more diverse and small-scale practices such as organic farming, viticulture, horticulture, aquaculture, and agri-tourism. Forests as a dominant form of ecosystems in the area are managed not only for conservation but also for logging, the importance of which has been gradually diminished. More recently, the area’s natural (e.g., protected areas, open pastures, clean rivers) and rural (e.g., small-town atmosphere with a strong sense of community) amenities have been attracting nature-based tourists and amenity migrants seeking a lifestyle based on a rural environment. The aspiration of Gloucester community for a sustainable future that relies on healthy ecosystems and environmental quality is illustrated in the community strategic plan for 2012–2022 (GSC, 2012).

Gloucester’s natural resource base and existing infrastructure also supports a mining industry with its first coal mine introduced in 1995. A CSG project was proposed in 2010 to supply 15% of the state’s gas need by 2018. The NSW Planning Assessment Commission initially approved the proposal in 2011; however, the decision was resisted by residents who were concerned about the issues that could arise from CSG extraction. A community survey revealed that residents’ perceptions of related issues varied (GSC, 2011); while some welcomed the mining industry for its potential economic benefits, the majority of survey respondents (79.1%–89.2%) expressed concern about its social and environmental impact on the community. Moreover, 75.2% responded positively to the need of economic assessments to determine whether the economic benefit of mining outweighed existing economic activity and adverse social, environmental and community impacts. Despite of the continuing resistance from most residents, the project was conditionally approved by the Federal Minister for the Environment in 2013. However, the persistence of local residents’ opposition to the CSG project eventually led to the company that put forward the project to withdraw in early 2016.

It is important to note that the dominance of opposition against CSG among Gloucester residents was in part resulting from the widespread representation of the area as a rural idyll supported by its extensive natural and agricultural landscapes that form the basis of its tourism, recreation and amenity migration industries (Lai et al., 2017b; Sherval and Hardiman, 2014). The introduction of CSG was, therefore, mostly considered as incompatible with this image. Residents’ responses to CSG in other rural communities in Australia are more diverse and show a higher level of adaptation to changes induced by CSG developments (e.g., Leonard et al., 2016; Walton et al., 2013).

4. Method

4.1. Data collection

Our survey was conducted in Gloucester in early 2013 before the conditional approval to the CSG proposal was granted by the Federal Government. All the requirements for research that involves human participants were rigorously followed and approval was obtained from the Human Research Ethics Committee at the University of Newcastle. Prior to the administration of the survey, residents were informed about the study and forthcoming questionnaire using posters that were placed in visible locations throughout the community and a newspaper advertisement. A survey packet containing a cover letter, questionnaire, and postage paid return envelope addressed to the resident of each household was sent to 2124 Gloucester households registered with Australia Post. Two postcards, sent one week apart, were posted to respondents encouraging them to complete and return the questionnaire. Because not all residents register with Australia Post, an additional 40 questionnaires were distributed at a farmers’ market and community meeting event. One adult member from each household was asked to complete and return the questionnaire. After excluding 176 undeliverable survey packets and 80 returned questionnaires in which more than 15% of the survey questions were unanswered (Hair et al., 2014), an effective response rate of 30.0% was obtained (N = 572).

Given the focus of our investigation on the stress processes driven by unwanted land use, only those respondents who gave a negative response to the survey question—whether you agree or disagree that having CSG exploration and production in the Gloucester Shire is in the best interest of the community—were included in the analyses reported here (n = 428). These respondents were more likely to experience threat related appraisal, emotions, and coping. Little’s MCAR test showed that missing observations were missing completely at random ($\chi^2 = 3381.73$, $df = 3319$, $p = .220$) and were replaced.

4.2. Measurements

An introduced land use can drive changes that impact not only privately owned resources but also the resources that all community residents share. As such, resources that were invested in individually and collectively were included in the scale of Primary Appraisal (PA) to assess personal and communal resources that could be affected by the stressor. The appraisal of individually owned resources was adapted from Hobfoll and associates’ resource scale (Hobfoll and Lilly, 1993; Hobfoll, 2010). The scale has been applied to examine both immediate and chronic psychological stress resulting from resources impacted by natural (e.g., a hurricane that exerted immediate impacts on resources) (Freedy et al., 1992) and human-made (e.g., an oil spill the effect of which lasted for years, ongoing political violence that constantly challenged individuals’ resource reservoir) (Arata et al., 2000; Hobfoll et al., 2011) events. Only items that measured four dimensions of PA (i.e., material resources, health, family and friends, and self-efficacy) pertaining to personal resources and were most relevant to our study context were used to reduce respondent burden. They included five items that measured appraisal of CSG impacts on material resources, such as property value, housing, and land; five items pertaining to health, such as personal health, time for leisure and work; three items relating to family and friends, such as health of family/friends and support from family/friends; and two items representing self-efficacy, such as ability to manage one’s life in the area (Table 1).

Local residents not only invest in resources that they desire and

Table 1
Primary appraisal, secondary appraisal and negative emotions.

Items	Mean (SD)	Factor loading (z score) ^d
Primary Appraisal (PA)^a	2.11 (.46)	
PA1: Material resources	2.03 (.70)	.76 (34.19)
PA2: Health	1.98 (.64)	.70 (24.64)
PA3: Family/friends	2.46 (.50)	.78 (35.77)
PA4: Self-efficacy	2.39 (.53)	.70 (22.49)
PA5: Natural environment	1.26 (.37)	.60 (19.88)
PA6: Social environment	2.11 (.67)	.70 (25.09)
PA7: Economic environment	2.56 (.82)	.69 (25.83)
Composite reliability	0.87	
AVE	0.50	
Secondary Appraisal (SA)^b		
SA1: You feel you can change or do something about it	2.52 (1.32)	– (–)
Negative Emotions (NE)^c	3.51 (1.17)	
NE1: Anxious	3.29 (1.29)	.75 (28.50)
NE2: Fearful	3.33 (1.31)	.82 (43.82)
NE3: Frustrated	3.77 (1.29)	.93 (96.07)
NE4: Angry	3.67 (1.36)	.89 (55.86)
Composite reliability	0.91	
AVE	0.72	

^a Items measured based on a 5-point scale: 1: substantial loss; 3: neither gain nor loss; 5: substantial gain.

^b Items measured based on a 5-point scale: 1: strongly disagree; 3: neither agree nor disagree; 5: strongly agree.

^c Items measured based on a 5-point scale: 1: never; 3: sometimes; 5: very often.

^d All factor loadings are significant at $p < .001$.

possess, but also in the natural, social and economic resources shared by the entire community. The personal and communal resources in which residents invest provide a resource base that underpins the meanings they ascribe to the community and allows them to meet everyday demands, practice desired activities, pursue identity-related goals, and forge a sense of attachment to the place (Manzo and Perkins, 2006; Stedman, 2002). Consequently, three additional aspects of Primary Appraisal relating to communal resources were constructed. They were comprised of four items appraising the effect of CSG on the natural environment, such as scenic quality and healthy ecosystem; three items on the social environment, such as friendly local people and community cohesiveness; and four items about the economic environment, such as infrastructure and availability of local labour (Table 1). These items were identified from the Gloucester community strategic plan (GSC, 2012) and encompassed the attributes the community aimed to sustain. Respondents were asked to what extent they believed they would gain or lose the seven dimensions of personal and communal resources due to the CSG project using a five-point scale where 1 represented substantial loss, 3, neither gain nor loss, and 5, substantial gain (See Appendix A for all 26 measurement items).

The scale of Secondary Appraisal (SA) was adopted from Folkman and Lazarus (1986) to assess four coping options individuals could choose in response to the unfolding change induced by CSG. Respondents were asked to what extent they agreed that 1) they could change or do something about the proposed CSG project; 2) there was nothing they could do about it; 3) they needed to know more before deciding what action to take; and 4) they had to hold themselves back from doing what they wanted to do. In the findings reported below, only Item One was included in model testing because the four coping options did not load on one single scale (composite reliability = .25). Moreover, only the retained item significantly contributed to the three coping-mechanisms examined in our study. Respondents indicated the extent of their agreement with this coping option on a five-point scale where 1 indicated strongly disagree, 3, neither agree nor disagree, and 5, strongly agree (Table 1).

The scale of Negative Emotions (NE) was adapted from Folkman and Lazarus (1986) to measure respondents' emotional responses to threat appraisal. Items were designed with reference to the common emotional expressions identified from the aforementioned council survey on mining (GSC, 2011). Survey participants were asked to indicate how often they experienced anxiety, fear, frustration, and anger since they became aware of the CSG project using a five-point scale with 1 showing never, 3, sometimes, and 5, very often (Table 1).

Carver (1997) developed a short version of a coping inventory that encompassed 14 coping strategies: three strategies that are problem-focused—active coping, planning, and using instrumental support; six emotion-focused—using emotional support, positive reframing, acceptance, denial, humour, and religion; and five maladaptive—venting, behavioural disengagement, self-distraction, substance use and self-blame. Previous research (e.g., Carver, 1997) has shown that some of these coping strategies may not always be clearly distinguishable from each other. This was examined in our study by using exploratory factor analysis to first refine the coping scales (Netemeyer et al., 2003). The result suggested cross-loading of the item that measured planning on active coping, and the item measuring emotional support on instrumental support—the same issue identified by Carver and associates (Carver et al., 1989; Carver, 1997). Consequently, Active Coping and Planning were combined into a single coping strategy (ACP) to represent problem-focused coping. Further, emotional support and instrumental support were merged into a coping strategy we labelled Support Seeking (SS) to represent support-based coping. These two coping strategies along with three emotion-focused coping strategies—Positive Reframing (PR), Acceptance (ACC), Denial (DE)—and three maladaptive coping strategies—Self-Distraction (SD), Venting (VE), Avoidance (AV)—comprised the eight coping strategies examined in our study (Table 2). Respondents were asked to report how often they

engaged in the 16 items that measured these coping strategies using a five-point scale (1: never; 3: sometimes; 5: very often).

4.3. Model testing

Unlike the scales of Secondary Appraisal, Negative Emotions, and Coping that were comprised of one or more items that directly measured their respective dimensions, Primary Appraisal was represented by seven resource dimensions with each dimension measured by a number of items. Before testing our hypothesised model, item parcels were constructed for each of these resource dimensions (Little et al., 2002). The procedure involved constructing new variables based on the means of the items pertaining to each of the resource dimensions. Parcelling that uses an aggregate-level indicator consisting of the sum or mean of the items measuring the dimension of one or more constructs in a tested model has been applied to multivariate approaches to psychometrics (e.g., Sass and Smith, 2006; Yang et al., 2009). One of the major reasons for this approach is to reduce the number of parameters measured in a tested model to obtain model parsimony and improve model fit. In our study, applying the procedure of parcelling substantially reduced the number of indicators of Primary Appraisal in model testing from 26 measurement items to seven parcels.

Mplus (Version 7.0) (Muthén and Muthén, 2010) was used to test the measurement and structural portion of the hypothesised model. Model performance was assessed using the root mean-square error of approximation (RMSEA), the comparative fit index (CFI), the Tucker-Lewis index (TLI), and the standardized root mean square residual (SRMR). An estimate of the $RMSEA \leq .05$, CFI and TLI $\geq .95$, and SRMR $\leq .05$ provides evidence for a good model fit (Geiser, 2012).

Our hypothesised model (Fig. 2) tested the direct effect of Primary Appraisal and Secondary Appraisal as independent variables on the dependent variables of eight Coping strategies. The indirect effect of Negative Emotions as a mediator that intervened in the relationship between the independent and dependent variables was also examined. Conventional approaches to testing the strength and significance of indirect effects (e.g., the Sobel test) assume normality of the sampling distribution of the product terms that represent the indirect effects by multiplying the effects of the independent variable on the mediator and of the mediator on the dependent variable. However, this assumption is often violated (Hayes, 2009). To address this issue, bootstrapping that creates a bias-corrected confidence interval of the estimated indirect effect has been recommended (MacKinnon et al., 2004). Mplus uses the Sobel test as the default significance test for indirect effects. To correct for the biased results of the Sobel test due to the violation of normality, bias-corrected bootstrapping was applied to examine the estimated parameters based on 1000 bootstrap samples.

5. Results

5.1. Respondent characteristics

Our respondents were evenly divided between males and females. Approximately 12% were younger than 45 years of age and 41.7% were 65 years or older. Most of them (68.7%) attained less than a bachelor degree and over half (55.5%) had an annual household income less than AUD\$50,000. These socio-demographic characteristics of our sample differed from the ones attributable to Gloucester's population of 18 years old and above reported by the Australian Bureau of Statistics except for gender (ABS, 2012). According to ABS, 35.9% of this population was at least 65 years old, 90.5% of those who were at least 15 years old obtained less than a bachelor degree, and the median annual household income was AUD\$42,120.

It is important to note that, from a resource perspective (Hobfoll, 2010), the over-representation of the elderly group in our sample could have arisen from a higher level of concern about CSG impacts experienced by this group as they tended to be more constrained by the

Table 2
Coping strategies.

Items ^a	Mean (SD)	Factor loading (z score) ^b
Active Coping and Planning (ACP)	2.93 (1.12)	
ACP1: Gathered information from different sources to better understand associated impact	3.25 (1.25)	.79 (36.76)
ACP2: Exchanged thoughts and concerns with others interested in CSG related issues via meetings, events, social media, etc.	3.44 (1.26)	.84 (49.59)
ACP3: Found different ways to have your voice heard	2.82 (1.33)	.92 (80.53)
ACP4: Planned specific strategies to deal with related issues	2.20 (1.25)	.80 (41.65)
Composite reliability	.90	
AVE	.70	
Support Seeking (SS)	2.24 (1.16)	
SS1: Sought emotional support from others	2.13 (1.21)	.85 (49.99)
SS2: Sought advice/help from others about what to do	2.35 (1.25)	.92 (66.61)
Composite reliability	.88	
AVE	.78	
Positive Reframing (PR)	2.33 (.88)	
PR1	2.19 (.99)	.67 (13.95)
PR2	2.46 (1.00)	.86 (16.63)
Composite reliability	.74	
AVE	.59	
Acceptance (ACC)	1.96 (1.01)	
ACC1: Accepted it	1.89 (1.09)	.81 (29.20)
ACC2: Learned to live with CSG activities	2.04 (1.08)	.90 (35.76)
Composite reliability	.84	
AVE	.73	
Denial (DE)	2.37 (1.21)	
DE1: Refused to believe that the CSG project would go ahead	2.30 (1.28)	.64 (15.43)
DE2: Said to yourself that "this isn't real"	2.44 (1.47)	.83 (21.72)
Composite reliability	.71	
AVE	.55	
Self-Distraction (SD)	2.43 (1.23)	
SD1: Turned to work/other activities to take your mind off	2.48 (1.35)	.89 (36.38)
SD2: Spent more time doing things that distract you from thinking about it	3.83 (1.29)	.83 (29.02)
Composite reliability	.85	
AVE	.74	
Venting (VE)	3.63 (1.18)	
VE1: Expressed your negative feelings about it	3.63 (1.18)	– (–)
Avoidance (AV)	3.57 (1.43)	
AV1: Wished the situation would go away or somehow be over with	3.57 (1.43)	– (–)

^a Items measured based on a 5-point scale: 1: never; 3: sometimes; 5: very often.

^b All factor loadings are significant at $p < .001$.

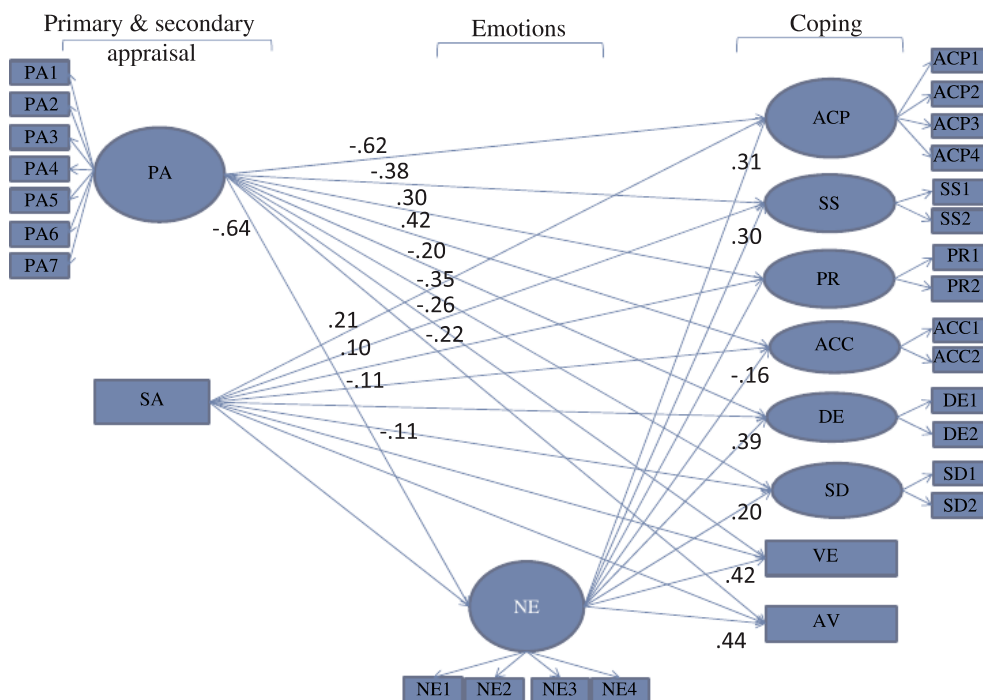


Fig. 2. Hypothesised model.
Note. Only significant path coefficients are shown. PA = Primary Appraisal; SA = Secondary Appraisal; NE = Negative Emotions; ACP = Active Coping and Planning; SS = Support Seeking; PR = Positive Reframing; ACC = Acceptance; DE = Denial; SD = Self-Distraction; VE = Venting; AV = Avoidance.

coping resources available to them due to, for example, limited financial and employment opportunities, and physical strength (Lai et al., 2017a). On the other hand, the potentially higher representation of our respondents with higher educational attainment could have been motivated by a wider range of coping resources (e.g., social networks with related means and knowledge) available to this group, that could have driven their resistance to the CSG project and willingness to voice their concern. As such, the findings reported below are not intended to be generalised to the population of the area and need to be interpreted with caution.

5.2. Descriptive statistics

Table 1 displays the means and standard deviations of the indicators measuring Primary Appraisal (PA), Secondary Appraisal (SA), and NE (Negative Emotions). Our respondents perceived that they would gain no personal nor communal resources as a result of the CSG project (PA_M = 2.11, PA_{SD} = .46). Health was the personal resource perceived to be most damaged followed by material resources, self-efficacy, and family/friends. Among the three communal resources, the respondents perceived that CSG would most severely damage the natural environment followed by the social and economic environment. With regard to Secondary Appraisal, the respondents somewhat disagreed that they could do something about the CSG project (SA_M = 2.52, SA_{SD} = 1.32) suggesting a sense of powerlessness. The feeling of Negative Emotions was prevalent (NE_M = 3.51, NE_{SD} = 1.17) with many respondents reporting anxiety, fear, frustration, and anger.

The two most frequently utilised maladaptive coping strategies were Venting (VE_M = 3.63, VE_{SD} = 1.18) and Avoidance (AV_M = 3.57, AV_{SD} = 1.43) followed by Self-Distraction (SD_M = 2.43, SD_{SD} = 1.23) (Table 2). Respondents also reported using problem-focused coping by involving themselves in Active Coping and Planning to address the stressor—the CSG project (ACP_M = 2.93, ACP_{SD} = .12). Strategies of emotion-focused coping, including Positive Reframing (PR_M = 2.33, PR_{SD} = .88), Acceptance (ACC_M = 1.96, ACC_{SD} = 1.01), and Denial (DE_M = 2.37, DE_{SD} = 1.21), were less often reported. Respondents were also less likely to cope by seeking emotional and instrumental support from others (SS_M = 2.24, SS_{SD} = 1.16).

5.3. Hypothesis testing

Prior to testing the hypothesised model, the measurement portion of the model was assessed. The results showed that the internal consistency of all measurement scales was obtained evident in their composite reliability estimate $\geq .60$ (Bagozzi and Yi, 1988) and AVE estimate $\geq .50$ (Netemeyer et al., 2003) (Tables 1 and 2). Additionally, all items loaded significantly on their intended factor at $p < .001$. The combined measurement portion of the model was tested to further confirm the relationship of the measurement items to their respective latent variables (Netemeyer et al., 2003). Goodness of fit indices revealed that the measurement model fit the data well with all the fit indices meeting the recommended cut-off criteria (Table 3). Testing of the structural model also resulted in a model that fit as shown in Table 3. The direct and indirect effects of Primary Appraisal and

Table 3 Summary of fit indices.

	S-B χ^2 (df)	RMSEA (90% CI)	p (RMSEA \leq .05)	CFI	TLI	SRMR
Measurement model	597.56 (298)	.048 (.042–.054)	.666	.96	.95	.037
Structural model	600.46 (299)	.049 (.043–.054)	.659	.96	.95	.038

The error term of SA1, VE1, and AV1 was fixed to 0 to solve the identification issue as they each represented a one-item measure of SA, VE, and VE.

Table 4 Standardised effects of primary appraisal and secondary appraisal on negative emotions.^{a,b,c}

Independent variable (IV)	Dependent variable (DV)									
	NE β , SE	ACP β , SE	SS β , SE	PR β , SE	ACC β , SE	DE β , SE	SD β , SE	VE β , SE	AV β , SE	
Direct effect										
PA (95% CI)	-.64 ^{***} , .04	-.33, .07 (-.47 – .20)	-.38, .07 (-.53 – .24)	.30, .09 (.13 – .48)	.42, .07 (.28 – .55)	-.20, .09 (-.37 – .03)	-.35, .07 (-.48 – .22)	-.26, .07 (-.40 – .12)	-.22, .07 (-.35 – .09)	
SA (95% CI)	-.03, .04	.21, .04 (.12 – .29)	.10, .04 (.01 – .18)	.00, .06 (-.11 – .11)	-.11, .04 (-.20 – .03)	.01, .06 (-.10 – .13)	-.11, .05 (-.20 – .02)	.03, .04 (-.05 – .11)	.03, .04 (-.05 – .12)	
NE		.31 ^{***} , .06	.30 ^{***} , .07	.05, .07	-.16 ^{**} , .06	.39 ^{***} , .07	.20 ^{**} , .06	.42 ^{***} , .06	.44 ^{***} , .06	
Indirect effect										
PA (95% CI)		-.20, .05 (-.29 – .11)	-.19, .05 (-.29 – .09)	-.03, .05 (-.13 – .07)	.10, .05 (.01 – .19)	-.25, .05 (-.36 – .15)	-.13, .04 (-.21 – .04)	-.027, 0.06 (-0.38 – -0.16)	-.28, .05 (-.38 – .18)	
SA (95% CI)		-.01, .01 (-.04 – .02)	-.01, .01 (-.04 – .02)	.00, .01 (-.01 – .01)	.01, .01 (-.01 – .02)	-.01, .02 (-.05 – .02)	.00, .01 (-.02 – .01)	-.01, .02 (-.05 – .02)	-.02, .02 (-.05 – .02)	
R ²	40.6%	37.9%	39.2%	7.7%	29.7%	29.4%	26.1%	38.3%	36.9%	

***p < .001; **p < .01.

PA: Primary Appraisal; SA: Secondary Appraisal; NE: Negative Emotion; ACP: Active Coping and Planning; SS: Support Seeking; PR: Positive Reappraisal; ACC: Acceptance; DE: Denial; SD: Self-distraction; VE: Venting; AV: Avoidance.

^a 95% CI was established based on 1000 bootstrap samples.

^b Significant effects are shown in boldface (p < .05).

^c Bias-corrected bootstrapping in Mplus produced the direct effects of the IVs on the DVs, the indirect effects of the IVs via the ME (mediator), and the CIs for the effects. The direct effects of the ME on the DVs were derived using the MLM estimator in Mplus to correct for non-normality.

Secondary Appraisal on Negative Emotions and Coping are reported in Table 4 with all significant direct effects also illustrated in Fig. 2.

5.4. Effects of primary and secondary appraisal on negative emotions

Secondary Appraisal exerted no significant effect on Negative Emotions ($\beta_{\text{direct}(SA \rightarrow NE)} = -.03$, $SE_{SA \rightarrow NE} = .04$). By contrast, Negative Emotions was significantly and negatively affected by Primary Appraisal ($\beta_{\text{direct}(PA \rightarrow NE)} = -.64$, $SE_{PA \rightarrow NE} = .04$) suggesting that a higher level of perceived loss contributed to the experience of negative emotions. Primary Appraisal alone explained 40.6% of the variance in Negative Emotions.

5.5. Effects of negative emotions on coping

Negative Emotions directly influenced all coping strategies except Positive Reframing. The more negative emotions were experienced due to CSG, the more likely respondents were to engage in problem-focused coping ($\beta_{\text{direct}(NE \rightarrow ACP)} = .31$, $SE_{NE \rightarrow ACP} = .06$), support-based coping ($\beta_{\text{direct}(NE \rightarrow SS)} = .30$, $SE_{NE \rightarrow SS} = .07$), all three maladaptive coping ($\beta_{\text{direct}(NE \rightarrow SD)} = .20$, $SE_{NE \rightarrow SD} = .06$; $\beta_{\text{direct}(NE \rightarrow VE)} = .42$, $SE_{NE \rightarrow VE} = .06$; $\beta_{\text{direct}(NE \rightarrow AV)} = .44$, $SE_{PA \rightarrow AV} = .06$), and Denial as an emotion-focused coping strategy ($\beta_{\text{direct}(NE \rightarrow DE)} = .39$, $SE_{NE \rightarrow DE} = .07$). Conversely, Negative Emotions had a negative effect on the emotion-focused coping strategy of Acceptance ($\beta_{\text{direct}(NE \rightarrow ACC)} = -.16$, $SE_{NE \rightarrow ACC} = .06$). That is, the more negative emotions were experienced, the less likely CSG was deemed acceptable.

5.6. Effects of primary appraisal and secondary appraisal on coping

Our analysis also revealed that Primary Appraisal not only directly contributed to engagement in all eight coping strategies, it also indirectly influenced coping except for Positive Reframing through Negative Emotions. That is, the more a respondent concluded that CSG would damage important resources, the more inclined he/she would be to engage in problem-focused ($\beta_{\text{direct}(PA \rightarrow ACP)} = -.33$, $SE_{PA \rightarrow ACP} = .07$), support-based ($\beta_{\text{direct}(PA \rightarrow SS)} = -.38$, $SE_{PA \rightarrow SS} = .07$), emotion-focused ($\beta_{\text{direct}(PA \rightarrow DE)} = -.20$, $SE_{PA \rightarrow DE} = .09$), and maladaptive ($\beta_{\text{direct}(PA \rightarrow SD)} = -.35$, $SE_{PA \rightarrow SD} = .07$; $\beta_{\text{direct}(PA \rightarrow VE)} = -.26$, $SE_{PA \rightarrow VE} = .07$; $\beta_{\text{direct}(PA \rightarrow AV)} = -.22$, $SE_{PA \rightarrow AV} = .07$) coping. Conversely, perceived loss of resources led to decreased coping using the emotion-focused coping strategy of Acceptance ($\beta_{\text{direct}(PA \rightarrow ACC)} = .42$, $SE_{PA \rightarrow ACC} = .07$). The engagement in these coping strategies was, in part, influenced by the indirect effect of Negative Emotions arising from perceived loss (Table 4). Positive Reframing as an emotion-focused coping strategy was only directly affected by Primary Appraisal ($\beta_{\text{direct}(PA \rightarrow PR)} = .30$, $SE_{PA \rightarrow PR} = .09$) suggesting that the more the perceived loss to valued resources was experienced, the less likely this coping strategy would be adopted. Negative Emotions had no bearing on this coping strategy.

Secondary Appraisal directly affected four coping strategies, including Active Coping and Planning ($\beta_{\text{direct}(SA \rightarrow ACP)} = .21$, $SE_{SA \rightarrow ACP} = .04$), Support Seeking ($\beta_{\text{direct}(SA \rightarrow SS)} = .10$, $SE_{SA \rightarrow SS} = .04$), Acceptance ($\beta_{\text{direct}(SA \rightarrow ACC)} = -.11$, $SE_{SA \rightarrow ACC} = .04$), and Self-Distraction ($\beta_{\text{direct}(SA \rightarrow SD)} = -.11$, $SE_{SA \rightarrow SD} = .05$). That is, when the respondent felt a stronger sense of control over the stressor, they were more likely to engage in active coping and planning, and to seek support. Alternatively, a lower level of acceptance and self-distracting behaviours that took the respondents' mind off the stressor was a product resulting from the respondents' assessment of their sense of control. Negative Emotions played no substantial role in mediating the effect of Secondary Appraisal on Coping since none of the indirect effects were significant (Table 4).

In sum, Primary Appraisal, Secondary Appraisal, and Negative Emotions collectively accounted for a moderate share of the variance in Active Coping and Planning ($R^2 = 37.9\%$), Support Seeking ($R^2 = 39.2\%$), Acceptance ($R^2 = 29.7\%$), and Self-Distraction

($R^2 = 26.1\%$). The variance in Denial ($R^2 = 29.4\%$), Venting ($R^2 = 38.3\%$), and Avoidance ($R^2 = 36.9\%$) was explained by Primary Appraisal and Negative Emotions. Positive Reframing, had the lowest variance explained ($R^2 = 7.7\%$) only by Primary Appraisal.

6. Discussion

Both desirable and undesirable land uses constantly shape different aspects of rural landscape. Research on the processes of psychological stress caused by changes in the rural landscape helps improve our understanding of how rural residents are affected and their capacity to manage and adapt to troublesome encounters stemming from changes driven by land use policies. Guided by and expanded from SAC (Lazarus and Folkman, 1984), we hypothesised that when stress processes are mobilised, individuals continuously appraise relevant implications for valued resources (i.e., Primary Appraisal) and their coping options (i.e., Secondary Appraisal). Primary and Secondary Appraisals then influence Coping directly and indirectly mediated through the experience of Negative Emotions. The hypothesised model was mostly supported by our study findings. The adoption of different coping strategies often results in varied effects on psychological health and well-being depending on the specific context of research (Folkman and Moskowitz, 2004; Marques and Lima, 2011). Below we discuss our findings pertaining to each of the coping mechanisms and associated implications for residents' psychological well-being in our study context.

6.1. Problem-focused coping

Consistent with SAC and past research (Folkman and Lazarus, 1988b; Freedy et al., 1992), our findings show that Active Coping and Planning as a problem-focused coping strategy is driven directly by both Primary and Secondary Appraisal, and also indirectly by Primary Appraisal through Negative Emotions. The appraisal of a stressor that is perceived to damage resources and evoke negative feelings is likely to motivate plans and actions to manage the stressor. The belief that something can be done about the stressor reinforces this coping strategy.

Active Coping and Planning that results in desirable outcomes can eliminate or alleviate the adverse effect of a stressor (Folkman and Lazarus, 1988b). However, Lazarus and Folkman (1984) indicated that this coping strategy may also contribute to further stress if the person-environment relationship remains unchanged and the stressor continues to affect individuals unfavourably. More resources may then need to be allocated to support continuing coping that can deplete individuals' resource reservoir and reinforce negative affect as a consequence of reappraisal (Hobfoll, 2010). In our study context, many Gloucester residents became actively involved in opposing the CSG project since it was proposed. It is likely that these residents continued to experience negative emotions over a period of six years in response to the project since it stretched their coping resources. For this group of residents, their sense of well-being was adversely affected.

6.2. Support-based coping

Efforts to seek support from others (Support Seeking) is suggested by SAC and, like problem-focused coping, is shown in our study to be influenced directly by Primary Appraisal and Secondary Appraisal, and indirectly through Primary Appraisal and Negative Emotions. Following previous research (Freedy et al., 1992), our study revealed that perceived threats to individuals' resources (Primary Appraisal) directly drive their efforts to seek support. This relationship is also mediated by Negative Emotions. Past research has shown that seeking social support most often emerges when individuals feel they have little control over a stressful encounter (Bachrach et al., 1985; Folkman and Lazarus, 1980). Our findings, however, reveal a small but positive effect of Secondary Appraisal on Support Seeking—a higher level of perceived

control leading to a higher level of support seeking. This is likely because, at the time of data collection, the CSG project created a lot of controversies within the community. The division of the community is reflected in our overall sample ($N = 572$) that was comprised of 25% of respondents supportive of the CSG project and 75% unsupportive. Additional evidence was provided by the finding that community cohesiveness was rated as one of the worst impacted resources by our respondents. Conversations with local residents revealed that most residents avoided discussing the project with others to prevent further deterioration in the sense of community valued by most Gloucester residents (GSC, 2012). This is further confirmed by the low mean values of the two items measuring Support Seeking (Table 2). Our findings suggest that the small portion of respondents who turned to their social network for support was represented by those who wanted to do something about the stressor and believed that they could do something about it.

Engaging in support-based coping strategies may enable individuals to adapt better to new conditions induced by a stressor (Carver et al., 1989). However, if it is used primarily as an outlet where individuals express negative feelings to their social networks, then it is less conducive to adaptation in the changing environment (Tolor and Fehon, 1987). The primary appraisal of threat and subsequent negative emotions bring our respondents' attention to the significance of the stressor. It also motivated their pursuit of social support as a manifestation of their adaptive capacity that was reinforced by a sense of control.

6.3. Emotion-focused coping

According to SAC, threat appraisal signals the significance of a stressor that requires individuals' attention and the use of emotion-focused coping that is likely strengthened when a secondary appraisal suggests a lack of coping option (Collins et al., 1983; Folkman and Lazarus, 1980). Our findings indicate that when CSG is appraised to damage resources (Primary Appraisal), individuals are more likely to use denial to cope (Denial) but less likely to reinterpret its meaning positively (Positive Reframing) and accept it (Acceptance) possibly because the stake involved in such changes is high due to the significance of the impacted resources. The finding that Secondary Appraisal exerts a direct and negative effect on Acceptance is in line with existing research showing that the more a stressful situation is appraised to be beyond one's control, the more likely he/she is to accept the situation (Folkman and Lazarus, 1985; Bachrach et al., 1985). Since Primary Appraisal only minimally explains Positive Reframing, our discussion here focuses on Acceptance and Denial.

Emotion-focused coping can be viewed as beneficial to individuals' psychological well-being when it helps reduce psychological stress and directs their attention towards the problem caused by the stressor (Carver et al., 1989; Folkman and Lazarus, 1988b). However, when the effect rests on temporarily relieving the psychological stress by ignoring the problem, an unhealthy effect on psychological well-being is likely to occur (Folkman and Lazarus, 1988b). This may arise when the stressor is prevalent and enduring as the one examined in our study. During the time of our data collection, CSG related issues were widely debated at community meetings and became highly salient through different forms of local, state and national media. Consequently, either to accept or deny the problems caused by CSG would only temporarily relieve the psychological stress experienced by our respondents. As such, these two emotion-based coping strategies were less likely to have a positive effect on residents' psychological well-being.

6.4. Maladaptive coping

Maladaptive coping such as Self-Distraction, Venting and Avoidance divert individuals' attention and effort from tackling the source of their stress and has been shown to be associated with depression, anxiety, and post-traumatic stress disorder (Arata et al., 2000; Schroder and

Ollis, 2013). Following SAC, our study illustrated that the perception of loss (Primary Appraisal) contributes directly to the use of Self-Distraction, Venting, and Avoidance, and indirectly via Negative Emotions. Additionally, the finding that Self-Distraction is influenced by a lack of control (Secondary Appraisal) is also consistent with the findings reported elsewhere (Folkman and Lazarus, 1985; Bachrach et al., 1985). These results suggest that perceived loss and lack of control facilitate the adoption of coping strategies that are unhelpful to solving the problem caused by the stressor. The negative affect resulting from perceived loss is associated with outcomes tied to psychological stress, such as depression (Folkman and Lazarus, 1986) and post-traumatic stress disorder (Freedy et al., 1992). The mediating role of Negative Emotions suggests that its prevalence among our respondents could reinforce the use of maladaptive coping leading to a negative effect on psychological well-being.

7. Policy implications

Land use policy that guides regional development in Australia and many other countries has been driven predominantly by the neoliberal paradigm that often places emphasis on the value of rural landscapes to produce marketable goods and services (Beer, 2012; Mercer et al., 2014). The values of personal and communal resources (e.g., health, family/friends self-efficacy, ecosystem service, social cohesion) that are incommensurable to marketable goods and services are often less stressed and sometimes ignored. However, these non-marketable resources are essential to maintaining the psychological well-being of rural residents as evidenced in their commitment to protecting the resources from being compromised due to unfamiliar or unwanted land use such as CSG developments (Colvin et al., 2015; Lai et al., 2017a,b). Moreover, decisions about the use of rural land for energy development often fail to incorporate procedural fairness that permit rural residents to reasonably voice their concerns and interests in related processes, and establish the legitimacy for the proposed project to operate (Moffat and Zhang, 2014; Lyytimäki, and Peltonen, 2016). This, in turn, can further forge distrust of rural communities in government and industry entities leading to negative emotions and continuing resistance to the proposed land use via various coping mechanisms.

Our study reinforces the first point that land use planning and related policies need to take a holistic perspective on the multi-dimensional resources and associated values supported by rural landscapes. In addition to marketable and material resources, rural residents also invest in non-marketable resources that support a preferred way of life, self-identity ingrained in rural landscapes, and sense of belonging (Manzo and Perkins, 2006; Ribeiro et al., 2016). When a land use decision fails to consider its impact on the multi-dimensional nature of resources in rural areas, such a decision is likely to contribute to emotional and coping responses that are likely to produce undesirable outcomes for psychological well-being as shown in our study. Responses to such a decision often gradually unfold before the decision is implemented contributing to a prolonged stress process experienced by the affected community. In our study context, the persistent opposition to the CSG project from the majority of Gloucester residents eventually led to the withdrawal of the project six years after it was proposed. This further supports the need for this holistic consideration.

A sense of powerless prevalent within our respondents could have arisen from concerns about procedural fairness. However, it did not stop our respondents from resisting the projects by engaging in Active Coping and Planning, and Support Seeking since the stakes were high and the resources to be adversely impacted were invaluable. While the CSG project in Gloucester was withdrawn, residents' resistance to energy and resource development may carry over and influence their attitude toward future land use projects. One area that has received attention in other studies that focus on the role of trust between residents, industry and government in maintaining and obtaining a social license to operate (Moffat and Zhang, 2014). Future research is needed that

considers the extent to which trust from previous interaction between stakeholders affects future relations.

A social-ecological systems approach to rural landscape policy and planning that acknowledges the interdependence of ecosystem health is increasingly gaining significance in facilitating a holistic perspective for land use planning. Integrated Landscape Management presents one such framework that encourages coordination across rural sectors (e.g., energy, mineral, tourism, agriculture, natural resource conservation) and involvement of multiple stakeholders (e.g., communities, governmental and non-governmental organisations, industry representatives) (Estrada-Carmona et al., 2014; García-Martín et al., 2016). Through cross-sectorial coordination and multi-stakeholder processes, different values of rural landscapes, both marketable and non-marketable, and associated interests can be articulated, negotiated, and considered in land use planning. This helps ensure that important cultural ecosystem services that support sense of place ingrained in a preferred representation of rural landscapes and opportunities for recreation, tourism and spiritual inspirations (Ribeiro et al., 2016) are not comprised in the process of regional development through collaborative planning and actions across sectors and stakeholders.

Developing legitimacy and a social license to operate to obtain informal acceptance of energy development by the affected community can be viewed as an essential component to the process of integrated landscape management. This can be achieved by implementing genuine participatory planning processes designed to facilitate community engagement (Lacey et al., 2017). Such an approach provides opportunities for open communications between the affected communities, state governments responsible for managing related impacts, and private entities that propose changes to land use (Measham et al., 2016). During the process, community members are encouraged to identify important personal and communal resources that are salient to the meanings they ascribe to their community and become an integral part of their identification with the local landscape. Key stakeholders are brought together to learn about the norms and cultures of each group,

and discuss mechanisms to minimise impacts on resources to afford residents a sense of control. Such opportunities can serve as an open forum where public criticism can be articulated, community expectations expressed, legitimacy of the proposed change discussed, that in turn may help establish a trustful relationship between involved parties and support a sense of control among concerned residents (Lyytimäki and Peltonen, 2016).

8. Conclusion

CSG developments in rural areas represent a relatively new form of land use that is imbued with controversies and uncertainties. Our study presents a context where the effects of a CSG project extended for a long period of time during which concerns and uncertainties about associated consequences were pervasive. Within this context, local residents continuously appraised the impacts of the project on their resources and their coping options, responded to the appraisal with emotions and coping, and reappraised the outcomes of coping and associated implication for resources and well-being. While research on stress processes is contextually dependent, exploration of these processes helps better understand the possible directions along which these processes may evolve. This understanding can be used to inform land use planning and policy to minimise the psychological impact of rural residents during the process of proposing, negotiating, and implementing land use changes.

Psychological stress driven by land use change involves complex processes and is influenced by a wide array of contextual factors that are beyond the scope of our study. This investigation, however, offers some insight into these processes and associated implications for short-term psychological well-being that needs to be considered in land use planning. A longitudinal research design that incorporates key contextual factors is needed to further improve our understanding of the related processes and stress outcomes.

Appendix A

See Table A1.

Table A1
Measurement items of Primary Appraisal.

Items	Mean (SD)	Factor loading (α score)
Dimension 1:Material resources		
1. Property value (e.g., residential, commercial, agricultural, recreational)	1.78 (.87)	.72 (32.24)
2. Housing that suits you and your family's needs	2.07 (.85)	.66 (21.45)
3. Land, property, built improvements, infrastructure	2.16 (.94)	.69 (25.98)
4. Financial stability	2.20 (.88)	.75 (26.67)
5. Retirement security	1.92 (.86)	.79 (35.83)
<i>Composite reliability</i>	<i>0.85</i>	
Dimension 2:Health		
1. Personal health	1.64 (.74)	.57 (23.29)
2. Time for adequate sleep	2.48 (.75)	.75 (27.22)
3. Time for leisure	2.67 (.64)	.75 (23.40)
4. Time for work	2.77 (.58)	.70 (17.57)
5. Time for loved ones	2.73 (.59)	.68 (17.75)
<i>Composite reliability</i>	<i>0.83</i>	
Dimension 3:Family/friends		
1. Health of family and friends	1.68 (.76)	.61 (20.25)
2. Support from family and friends	2.79 (.72)	.50 (11.09)
3. Feeling valuable to others	2.70 (.66)	.60 (14.25)
<i>Composite reliability</i>	<i>0.60</i>	

(continued on next page)

Table A1 (continued)

Items	Mean (SD)	Factor loading (α score)
Dimension 4:Self-efficacy		
1. Ability to manage your daily life in the area	2.34 (.74)	.86 (25.13)
2. Ability to exercise control over local issues	1.62 (.76)	.54 (15.85)
<i>Composite reliability</i>	<i>0.67</i>	
Dimension 5:Natural environment		
1. Scenic quality	1.24 (.46)	.66 (.16.19)
2. Health ecosystem	1.14 (.37)	.66 (15.88)
3. Productive agricultural land	1.27 (.47)	.69 (18.26)
4. Nature-based tourism and recreation	1.39 (.58)	.78 (23.36)
<i>Composite reliability</i>	<i>0.79</i>	
Dimension 6:Social environment		
1. Friendly local people	2.00 (.80)	.78 (.30.90)
2. Community cohesiveness	1.83 (.83)	.73 (27.46)
3. Accessibility to services	2.50 (.82)	.68 (23.19)
<i>Composite reliability</i>	<i>0.78</i>	
Dimension 7:Economic environment		
1. Infrastructure of the area	2.40 (.95)	.65 (19.26)
2. Availability of local labour	2.38 (1.00)	.66 (22.32)
3. Employment opportunities	2.91 (1.01)	.81 (39.35)
4. Overall economic prosperity	2.55 (1.08)	.85 (50.70)
<i>Composite reliability</i>	<i>0.75</i>	

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