



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 Gedy, 2013). In the meantime, traditional agricultural activities have

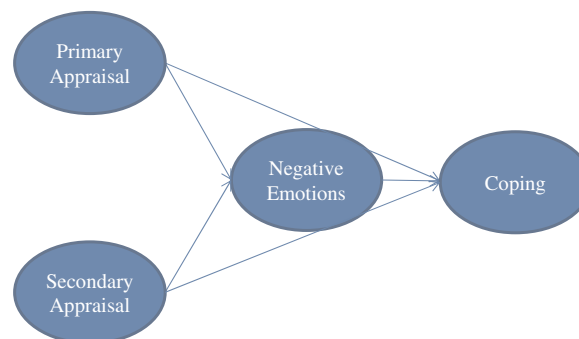


Fig. 1. Conceptual model.

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