Research paper

A multilevel perspective to explain recycling behaviour in communities

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ABSTRACT

Previous research on the motivation for environmentally responsible behaviour has focused mainly on individual variables, rather than organizational or collective variables. Therefore, the results of those studies are hardly applicable to environmental management. This study considers individual, collective, and organizational variables together that contribute to the management of environmental waste. The main aim is to identify, through the development of a multilevel model, those predictive variables of recycling behaviour that help organizations to increase the recycling rates in their communities. Individual (age, gender, educational level, self-efficacy with respect to residential recycling, individual recycling behaviour), organizational (satisfaction with the quality of the service provided by a recycling company), and collective (community recycling rates, number of inhabitants, community efficacy beliefs) motivational factors relevant to recycling behaviour were analysed. A sample of 1501 residents from 55 localities was surveyed. The results of multilevel analyses indicated that there was significant variability within and between localities. Interactions between variables at the level of the individual (e.g. satisfaction with service quality) and variables at the level of the collective (e.g. community efficacy) predicted recycling behaviour in localities with low and high community recycling rates and large and small populations. The interactions showed that the relationship between self-efficacy and recycling is stronger in localities with weak community efficacy beliefs than in communities with strong beliefs. The findings show that the relationship between satisfaction with service quality and recycling behaviour is stronger in localities with strong community efficacy beliefs than in communities with weaker beliefs and a smaller population. The results are discussed accordingly in relation to theory and possible contribution to waste management. Those findings may be incorporated in national and international environmental policies in order to promote environmentally responsible behaviour in citizenship.

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1. The importance of recycling in communities

For many years, public concern over the environment protection has been not only local or national but also international. Environmental protection may ensure sustainable development throughout the world. In this sense, while most national and international environmental policies and politics have been adopted, unsustainable trends persist and nations still need to employ greater effort in order to meet their aspirations (Jordan and Lenschow, 2010). Accordingly, persuading individuals, groups, communities, collectives and companies to adopt environmentally responsible behaviour (ERB) has become one of society's main priorities and this is reflected in support for actions at a micro level (e.g. buying energy efficient appliances) and proposals incorporated into major international political agreements (e.g. the signing of the Kyoto Protocol). This interest is manifested in various ways, although they usually share the aim of promoting pro-environmental sensitivity and awareness in society as a whole. For example, environmental concern has helped to promote environmental education programmes (Oskamp, 2002). Moreover, although many studies have been published about the effectiveness

and efficiency of a variety of policy instruments regarding the collection and treatment of household waste, it is noteworthy that the information is complex, often contradictory and difficult to interpret (Gellynck et al., 2011). Consequently, one of the challenges facing applied social studies today is to explain and predict what motivates individuals, groups and communities to engage in ERB and share their resources for the common environmental good. In turn, at a more practical level, this kind of research may allow more accurate national and international policies and actions that are oriented to promoting pro-environmental behaviour.

As a result of interest in ERB, in recent years an increasing number of researchers have attempted to identify variables that predict ERB (e.g. Gifford, 2013; Juárez-Lugo, 2010; Milfont and Page, 2013; Turaga et al., 2010). Several meta-analyses (e.g. Bamberg and Möser, 2007; Osbaldiston and Schott, 2012) have shown that socio-demographic variables, such as gender, age and education level, have an effect on ERB. The meta-analyses indicate that nearly all psychological states have been put forward at some point as antecedents of, or motives for, ERB. Research has shown that self-efficacy is a motivational variable, i.e. it influences the occurrence of specific behaviours; in this sense self-efficacy also predicts ERB, however, this variable has received little attention in relation to ERB (Tabernero and Hernández, 2011).

Kollmus and Agyeman (2002), identified factors that influence ERB; they considered that both internal and external factors influence ERB and thus external (e.g. institutional, economic, social, and cultural) as well as internal variables must be included in research. External variables have been neglected in much of the psycho-environmental research on ERB, although some studies have shown that there are external factors that influence whether communities act ecologically or not (Blake, 1999). Similarly, Steg and Gifford (2005) reported that structural inadequacies, such as a lack of availability of recycling facilities, constrained ERB, and Kollmus and Agyeman (2002) suggested that many ERBs, such as recycling, can only take place if the necessary infrastructure is provided; the poorer such services, the less likely people are to use them. Corral-Verdugo (2012) found that satisfaction with infrastructural and economic factors was related to recycling behaviour. Chen and Tung (2010) also found evidence that consumers' perceptions of lack of facilities decreased their intention to recycle. We therefore hypothesised that if people perceive a recycling service to be poor and are dissatisfied with it they will be less likely to use it and, in consequence, levels of recycling will be lower, both at an individual level and at community level. This study therefore examined the role in recycling behaviour of an external factor which has not been previously explored, *customer satisfaction with the quality of service provided by the recycling company.*

Schultz et al. (2013) recently argued that it is necessary to use multilevel analysis to study ERB, investigating both personal and contextual determinants. Using a multilevel perspective, Guerin et al. (2001) analysed the social and institutional factors that interacted with a series of individual variables to influence recycling behaviour in different countries. Gelissen (2007) also argued that it is necessary simultaneously to assess the effects of individual and contextual variables on ERB. The importance of a multilevel approach to this field has been recognised, more multilevel studies are required to explore how individual and collective factors combine to influence recycling behaviour. Our study addresses this gap in the published literature on recycling.

Socio-demographic and attitudinal variables associated with ERB have also been investigated [e.g. Scannell and Gifford (2013) found that women reported more strongly pro-environmental attitudes than men]. Pirani and Secondi (2011) studied differences in pro-environmental behaviours between European countries. Using a multilevel design, they investigated pro-environmental attitudes,

including as covariates socio-demographic and socio-economic variables. They found a high level of eco-friendly behaviour in women, middle-aged and elderly people, and individuals with a higher level of education. We therefore chose to examine the role of *socio-demographic variables* (e.g. gender, age and educational level) in recycling behaviour from a multilevel perspective. Pirani and Secondi (2011) also concluded that living in a large town, rather than in a small or medium-sized town, was negatively associated with the probability of reducing energy consumption and, like other pro-environmental acts, was positively associated with the probability of choosing an eco-friendly way of travelling and buying eco-friendly products. Research from a different culture (Chen et al., 2013)found an opposite result, residents of larger cities of China were more likely to engage in pro-environmental behaviours than were residents of smaller cities. We therefore included community size (i.e. number of inhabitants) as a collective level variable in our general multilevel model; we predicted that *number of inhabitants* would be negatively associated with individual recycling.

In addition to service satisfaction and number of inhabitants variables, in this study a multilevel approach was applied to self-efficacy; its role in recycling was examined from two perspectives: self-efficacy at the individual level and community efficacy at the collective level. Incorporating self-efficacy in our model of recycling behaviour helps to establish a link between the two levels of analysis: individual (self-efficacy) and collective (community efficacy), as well as having theoretical relevance and addressing a gap in current research. From an integrative point of view, the construct of self-efficacy explains how people's reactions to different situations including new, complex and challenging tasks such as deciding to establish a new recycling system in the home, changing energy consumption habits, or modifying personal mobility patterns by changing from private to public transport and/or less contaminating modes of transport (Bandura, 2002; Tabernero and Hernández, 2011, 2012). Self-efficacy and community efficacy beliefs are defined as perceptions about the level of personal or community competence required and available to carry out a certain behaviour. Sampson, Raudenbush and Earls (1997, p. 919) described community efficacy within neighbourhoods as "the linkage of mutual trust and the willingness to intervene for the common good".

When behaviour is analysed from a community perspective, the social comparison process is considered a generator of behaviour. This study explores the motivational influence of *self-efficacy* and *community efficacy beliefs with respect to recycling* and *community recycling rates* on individuals' recycling behaviour through social comparison processes or observation of others. Lindsley, Brass, and Thomas (1995) argued that social change is a product of efficacy-performance spirals in individuals, groups, communities and organisations; the advantage of a multilevel perspective is that it recognises that individuals, groups, communities and organisations are not separate conceptual categories but parts of a whole, each part affecting, and being affected by, the others. In this study, efficacy-performance spirals in individuals and communities are conceptualised as the result of interactions between self-efficacy, community efficacy and community recycling rates.

2. A multilevel theoretical model and hypotheses

In the present research, a multilevel study was conducted to analyse collective (e.g. number of inhabitants, community efficacy, community recycling rates) and individual (e.g. age, gender, educational level, satisfaction with service quality, self-efficacy) factors that potentially explain recycling behaviour. The multilevel model and specific hypotheses tested in this study are summarised in Fig. 1. Factors presented in this model could be