



Why doorstepping can increase household waste recycling



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ABSTRACT

In this study we report on a doorstepping intervention which produced a 12.5%, statistically significant, increase in the recycling capture rate. More importantly, we investigate *why* doorstepping caused the increase, through focus groups, structured interviews and questionnaires. By analyzing the findings with respect to a pragmatic set of eleven clusters of determinants of behaviour change, we find that social norms and emotion were important, with prompts as a more minor determinant. We can now plan further doorstepping knowing an emphasis on these is useful. Knowledge, skills, belief of consequences, belief of capability, action planning, role clarification, feedback, and motivation were determinant clusters found not to be important in this case.

Recycling behaviour change interventions often do not generally produce transferable learning because they are usually presented as case studies and not broken down into key elements. Our analytical approach of breaking down a poorly defined activity – doorstepping – into elements which influence different clusters of determinants, and then exploring their separate impacts, allows some predictive planning and optimization for other interventions. The specific context here was residential food waste recycling in apartment blocks of communities in Shanghai, China.

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1. Introduction

Municipal solid waste has become an important issue all over the world. The quantity is expected to reach 2.2 billion tons per year by 2025 (Hoornweg and Bhada-Tata, 2012) as cities expand and grow. In countries like Cambodia, Algeria and Morocco, although more than 70% of urban waste are now collected, more than 95% of the waste is dumped without further treatment (Hoornweg and Bhada-Tata, 2012). However, the trend is slowly changing, with some western countries beginning to reach relatively high levels of recycling. During 2012/13, England achieved a 43.2% recycling rate of household waste (DEFRA, 2013), with sorting categories of dry-recyclables, source separated food waste and residual waste. In Germany, the recycling rate was 62% in 2010 (Fischer, 2013). Globally, organic waste (mostly food waste) is the biggest category at 46% by mass, varying from about 28% in high-income countries to 64% in low-income countries (Hoornweg and Bhada-Tata, 2012).

With increasing urbanization, i.e. millions of people in developing countries moving to cities as a strategy to reduce poverty, waste problems are becoming very significant. In the metropolis of Shanghai there are now over 23 million people, and the 60–70% food waste component of residential waste (Tai et al., 2011) is clearly an urgent target for diversion from landfill and conversion into resources such as biogas, fertilizer and/or compost.

For recycling to become successfully established it is necessary to have processing facilities, demand for products, commercial possibilities, collection infrastructure and appropriate legislation and enforcement. However, even the sum of those will not be sufficient if residents do not cooperate and separate their waste. The question of how to facilitate this behaviour change then becomes crucial, and approaches used by local authorities and waste management companies have included the simple provision of information, incentive or disincentive schemes, provision of related items such as kitchen caddies, feedback, involvement of local volunteers and/or community groups, and doorstepping (Barr and Gilg, 2005; DEFRA, 2007; Harder and Woodard, 2007; Read, 1999; Vogt and Nunes, 2014; Yau, 2010). In Shanghai a food waste pilot scheme has been taking place since 2011. The programs were initially piloted in 1000 eligible “role model” communities to identify best practices

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in preparation for the introduction of the program citywide by 2020. The pilot schemes primarily involved the delivery of information, and sometimes involvement of local volunteers (Dai et al., 2015), but almost all with poor results (Huang et al., 2014). Several different alternative approaches are being explored, including involvement of specialist NGOs (Xu et al., 2015), extra prompting (Lin et al., 2015), incentives, and monitoring and feedback systems. In this work we report on explorations of the use of doorstepping to increase recycling as a potentially scalable activity that could overcome current difficulties.

Doorstepping is already considered an effective method for changing recycling behaviour (DEFRA, 2007; Read, 1999) and it is often referred to as a specific strategy which is considered transferable to different contexts (Bernstad et al., 2013; Cotterill et al., 2009). It basically implies that persons involved in the recycling program knock at the doors of residents to deliver information, having a (usually short) interaction at the doorstep. Although in political campaigns and fundraising this is normally done with no pre-notification to the residents, in recycling programs it is common for residents to be informed in advance, and sometimes, as in our case, for a local person to accompany the doorsteppers to effectively make an introduction and give them credibility. Branded tabards are often worn and photo-identification cards on show. However, doorstepping as an intervention activity is not well defined. Different doorstepping campaigns have their own conceptual approach and methods, and because of these it is difficult to be specific about what lessons can be taken forward from them for use in planning any further recycling programs such as in Shanghai.

For example, looking at the four most significant studies of doorstepping in the recycling literature shows that they each have different target goals, component activities and domains of expected impact. Read (1999) presented doorstepping as an educational instrument which delivered recycling knowledge and asked residents to recycle; Timlett and Williams (2008) used it as a tool for persuasion; Cotterill et al. (2009) indicated its main aim is to improve awareness and attitudes and to remove structural barriers, and Bernstad et al. (2013) focused on its use as a variation on information delivery – oral versus written. Although all of these studies suggested that doorstepping as a named strategy was useful for increasing recycling behaviour, their approaches differed considerably, making it difficult to identify any area of learning that could be used in the planning of new programs. It seems that some way of breaking down doorstepping into a set of constituent activities or fundamental elements is needed, alongside a set of potential determinants on behaviour change, before it can be studied more systematically to inform future planning.

Such difficulties are known more generally, outside waste management. Jackson (2005) has written of the tensions in relation to the different kinds of variables which different behaviour change approaches seek to measure, notwithstanding that those approaches have been derived from related systems of knowledge in psychology, sociology and consumer marketing. Waste management does not have a standard way of describing, categorizing or conceptualizing activities or their impacts, but rather draws from different disciplines or, more commonly, creates local, case-study based descriptions. Thus, Read (1999) speaks of doorstepping in educational terms (e.g. interaction, persuasion, social learning), Cotterill et al. (2009) in terms of structural barriers (facilities, skills, action planning), Bernstad et al. (2013) in terms of delivery methods (written or face-to-face information). In order to learn across different doorstepping programs it would be necessary to find determinants leading to behaviour change that have links across all of them. These might be expected to already exist in the literature of waste management, or of behaviour change, or of both. The next step was thus to search for such determinants, and to use a

set of them to break down doorstepping activities and impacts into operational components.

1.1. Breaking down doorstepping into elements

Our exploratory search for cross-linkable determinants for analysing doorstepping started in the waste management literature, where we found dozens of case-study-defined determinants which we managed to cluster into about 40 broad categories (Gordon, 2014). Besides being so numerous, these generally had the disadvantage of not being linked clearly to determinants of behaviour change established in behaviour change literatures, for example as summarized by Jackson, Darnton or Steg (Darnton, 2008; Jackson, 2005; Steg and Vlek, 2009).

We thus considered the converse approach, to look at those collections of determinants in behaviour change literatures which we could then relate to the waste management activities. However, we found the range large, and containing overlaps and gaps in the coverage of individual determinants that were difficult to understand without specialist training in many different theories. Jackson speaks of the tension between approaches of theories/models which try to cover all possible parameters and become unmanageable, with those which focus on their main theoretical constructs at the risk of missing other key determinants (Jackson, 2005).

We then considered the work of Michie, where a consensus had been developed from theorists, researchers and practitioners in health of eleven domains or clusters of determinants derived from 128 constructs of 17 theories (Michie et al., 2005). We found that these could be contextualized for waste management in general and recycling in particular, in a way that allowed operationalization of the determinants. This approach would in principle allow us to link doorstepping activities to determinant clusters which themselves already had links to behaviour change theoretical constructs. Such links to theory could be developed later: in this work the focus was the contextual operationalization of such determinants for recycling programs. We thus suspended our previous systematisation of determinants from waste management and continued to work on operationalising from Michie's domains.

The contextualization for our purposes was as follows. The two most obvious and necessary clusters were Knowledge (basic information that the scheme existed, and what materials went where) and Facilities (vital equipment and number of employees to make it feasible). Additional clusters included: Skills (the practical ability to sort); Belief of Capabilities (do residents believe they can do it; that their community can do it); Belief of Consequences (actions make a difference); Norms/Social Influences (recycling is considered 'normal' and others may have an opinion about it); and Prompts (reminders which re-motivate action). Then there were the planning areas: Role Clarification (who should do what?) and Action Planning (what actual, exact, actions would be needed to make this happen, and would the planning needed be ensured? This left the topic of Motivation/persuasion for extra pushes towards the making of a decision to recycle, and the overall topic of Emotion to capture positive or negative emotions anywhere which might be significant to the behaviour change observed.

Work to this point suggested that these eleven clusters would be very useful in the context of recycling, and between them would cover a wide range of impacts of interventions. To pre-explore whether they would be useful for doorstepping in particular, the four major published studies were considered in the light of these clusters, and it was found that they did indeed assist in clarifying and categorising sub-elements, as illustrated generally with the following notes. The study of Bernstad et al. (2013) made use of information on how the waste would be treated and made useful, and the related environmental impacts: these would be covered by the determinant clusters for Knowledge and Belief of Consequence.

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