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Differentiation of determinants of low-cost and high-cost recycling

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ABSTRACT

The bulk of research on recycling has been devoted to disentangling factors that affect it. Based on the low-cost hypothesis, we suggest that psychological factors differentially influence behaviors that are relatively less costly to perform compared to behaviors that are more costly to perform. Recycling has often been viewed as low-cost behavior, neglecting that recycling in different waste categories may vary in cost. The aim of the present study was to apply and extend the low-cost hypothesis by investigating whether beliefs about environmental consequences, knowledge, and norms differentially affect low-cost and high-cost recycling. A survey of 418 participants showed that knowledge, social norms, and personal norms were related to both low-cost and high-cost recycling, but the relation was significantly stronger for high-cost recycling. Personal norms partially mediated procedural knowledge and social norms in both low-cost and high-cost recycling. The findings emphasize the need to regard recycling as a multi-form behavior and to analyse its determinants separately for different waste categories.

Excessive solid waste production is becoming both an environmental and economic burden in society. Re-use of materials for production consumes less energy and produces less emissions than use of raw materials (Björklund & Finnveden, 2007). It is therefore of great importance that households engage in recycling.

It is commonly believed explicitly (e.g. Diekmann & Preisendörfer, 2003) and implicitly (e.g. Harland, Staats, & Wilke, 2007) that environmental concern and attitudes are stronger predictors of behaviors that are relatively easy or inexpensive to perform (low-cost) than of behaviors that are more demanding or costly to perform (high-cost). This article challenges that view and suggests instead that this may depend on how low-cost and high-cost behaviors are defined. Recycling is often seen as an example of a low-cost behavior in studies (e.g. Iyer & Kashyap, 2007) that have disentangled factors influencing recycling. However, an important fact neglected in previous research is that recycling entails several diverse behaviors. Starting from the observation that some waste categories are more easily recycled (here labelled low-cost recycling) than others (high-cost recycling), we report a study aimed to explore whether psychological factors have different impact on low-cost and high-cost recycling. More specifically we investigate whether beliefs about environmental consequences, knowledge, and norms differentially affect low-cost and high-cost recycling.

Environmentally significant behaviors differ both in perceived economic and behavioral costs, involving time use, self-sacrifices, and inconveniences. The low-cost hypothesis (Diekmann & Preisendörfer, 2003) posits that environmental concern primarily has an impact on environmental behaviors associated with low costs and has less impact on behaviors associated with high-costs. As an example, for a majority of people the cost difference between public transport and private car is large, thus the private car is their (environmentally unfriendly) choice, whereas a majority would perceive the cost difference between buying washing powder with or without eco-label as small, thus the eco-labeled product is their (environmentally friendly) choice. In this paper we explore the possibility of making a similar distinction between recycling of different waste fractions. Such a distinction would imply that the perceived cost of recycling metal cans or plastics is larger than the perceived cost of recycling paper and glass, which was supported by the findings reported below.

According to the low-cost hypothesis cost is continuous and broadly defined, thus is not confined to objective economic costs. A difficulty is therefore to assess whether certain behaviors are low-cost or high-cost for individuals. In Diekmann and Preisendörfer (2003) the distinction between high-cost and low-cost behaviors relied on external measures. For instance, in the case of recycling of paper cost was assessed as the distance to the waste disposal site. In the present study we do not use such direct cost measures. Instead we measure the frequency of recycling for different waste categories, arguing that the definition of low-cost and high-cost recycling relies on individuals' perceptions of the situation. We suggest

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that these perceptions are determined by both internal factors such as moral components and external factors such as distance. In this explorative work we focus on the internal factors. In the following, we derive hypotheses about different determinants of low-cost and high-cost recycling.

1. Environmental beliefs

Environmental concern is generally defined as a positive attitude towards environmental issues (Dunlap, Van Liere, Mertig, & Jones, 2000; Fransson & Gärling, 1999). According to the low-cost hypothesis, environmental concern decreases the perceived threshold to act in favor of the collective interest to a larger extent in low-cost behaviors. Consequently, positive environmental attitudes would influence low-cost behaviors more than high-cost behaviors, whereas for high-cost behaviors economic incentives in general dominate the effect of attitudes (as exemplified by the reasoning: "I know I ought do it, but it is still too costly or time-consuming for me"). Thus, a higher correlation is expected between environmental concern or environmental attitudes and environmental behavior under conditions characterized by low costs. A similar line of argument is found in Schwartz' Norm Activation Theory (NAT, 1977), in which awareness of consequences (the "tendency to become aware of the consequences of one's own behavior for others", Schwartz, 1977, p. 229) is expected to mediate the relation between norms and behavior. In studies on recycling, this hypothesis has both been confirmed (Derksen & Gartell, 1993; Hopper & Nielsen, 1991) and disconfirmed (Bratt, 1999).

Environmental beliefs are assessed in different ways. Bratt (1999) measured environmental consequences by asking participants about their beliefs of general environmental effects of recycling, and found no evidence that these beliefs affected recycling. In contrast, Hopper and Nielsen (1991) found an impact on recycling using a measure addressing specific environmental consequences of recycling. However, neither of these studies differentiated between high-cost and low-cost recycling. Thus, the results regarding the relation between beliefs about environmental consequences and recycling point in different directions, but beliefs about specific consequences of recycling behavior do not seem to affect low-cost and high-cost recycling differently.

2. Knowledge

The role of knowledge has been recognized as a determinant of recycling (Diamantopoulos, Schlegelmilch, Sinkovics, & Bohlen, 2003; Lindsay & Strathman, 1997; Schultz, 2002). In general, the more knowledge an individual has about which materials are recyclable and when and where the materials are collected, the more likely he or she is to recycle (De Young, 1986; Gamba & Oskamp, 1994; Hopper & Nielsen, 1991). Knowledge about recycling has two components; declarative knowledge which refers to what is involved in recycling, and procedural knowledge which refers to when, where and how to recycle. In the present study the focus is on procedural knowledge. In a meta-analysis Hornik, Cherian, Madansky, and Narayana (1995) found that across 17 studies the average relationship between procedural knowledge and recycling behavior was $r = .54$. Overall, many people have substantial knowledge and awareness of recycling programs (Tasady, 1991). Since the majority knows where to dispose of low-cost waste but still do not recycle all low-cost waste items, other motives may explain low-cost recycling behavior. Furthermore, it may be less common among people to possess knowledge about high-cost recycling, and lack of knowledge may therefore constitute a barrier (McKenzie-Mohr & Smith, 1999; Schultz, 2002). However, when people have been motivated to process the information about where to dispose high-cost waste items, we hypothesize that they may also be more motivated to adopt high-cost recycling. Hence, we expect procedural knowledge to be more strongly related to high-cost than to low-cost recycling.

3. Norms

Previous studies have concluded that norms constitute a strong motive for environmental behavior (Biel, von Borgstede, & Dahlstrand, 1999; Biel & Thøgersen, 2007). Diekmann and Preisendörfer (2003) failed to include norms when developing the low-cost hypothesis. One purpose of this study is to investigate whether social norms have a potential influence on low-cost and high-cost recycling, either direct or via personal norms.

Social norms can be divided in two sub-categories (Cialdini, Reno, & Kallgren, 1990), descriptive norms (expressing what most people actually do) or prescriptive norms (expressing what significant others think about what one ought to do). A descriptive norm offers a decisional shortcut when people choose how to behave (Cialdini et al., 1990). A prescriptive norm, on the other hand, specifies how people in the same culture or society ought to act. Prescriptive social norms refer to rules or beliefs as to what constitutes morally approved or disapproved conduct. Social moral norms limit egoistic behavior in favour of collective behavior (Biel, Eek, & Gärling, 1999). If social norms are violated, they will be met by sanctions. When social moral norms are internalized, they are referred to as personal norms (Schwartz, 1977). Sanctions, like feelings of guilt, are then managed internally by the individual. Norms are strongly linked to pro-environmental behavior, but according to Stern and Aronson (1984) they are less strongly linked to behaviors that are costly and time-consuming. However, the empirical results are mixed. Some studies show a weaker impact of norms (strategic investment decisions, see Black, Stern, & Elworth, 1985; and car use, for a meta-analysis, see Gardner & Abraham, 2008), whereas others show a stronger impact of norms (e.g. on travel mode choice, see Nordlund & Garvill, 2003).

In a recent meta-analysis (Bamberg & Möser, 2007) based on 46 studies of pro-environmental behavior, it was established that social norms is an indirect determinant of intention to act in an environmental benign manner. Furthermore, other studies show that social norms are completely mediated by personal norms (Bratt, 1999; Do Valle, Reis, Menezes, & Rebelo, 2004; Hopper & Nielsen, 1991; Stern, Dietz, Guagnano, & Kalof, 1999). The possible impact of norms on recycling has also been recognized (Bratt, 1999; Davies, Foxall, & Pallister, 2002; Do Valle et al., 2004; Guagnano, Stern, & Dietz, 1995; Schultz, 2002). However, the results regarding the unique influence of social norms on recycling is mixed and indirect (see Biel & Thøgersen, 2007, for a review), whereas personal norms are directly related to recycling behavior (Bratt, 1999; Davies et al., 2002; Do Valle et al., 2004). The effect of personal norms also appears to be stronger than the effect of social norms on recycling (Thøgersen, 1996, 2003). In some studies, social norms have been found to influence behavior only via personal norms (Bratt, 1999; Do Valle et al., 2004; Hopper & Nielsen, 1991; Stern et al., 1999). If the behavior implies self-sacrifices, personal norms serve as reminder of values important to the individual (Biel & Thøgersen, 2007; Harland et al., 2007), which may help overcoming the barrier to adopt high-cost recycling. Therefore, we assume that personal norms will explain more of the variance in high-cost than low-cost recycling, but that social norms will guide behavior to the same extent in high-cost and low-cost recycling.