"I'm Not in the Habit of Recycling" : The Role of Habitual Behavior in the Disposal of Household Waste

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"I'm Not in the Habit of Recycling"

The Role of Habitual Behavior in the Disposal of Household Waste

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The role of habit was investigated using two potential measures of habitual recycling behavior: past recycling behavior and perceived lack of habit as a reason for previous failure to recycle. Data were collected from 252 participants in Scotland, United Kingdom. Situational constraints, demographic characteristics, and variables associated with the theory of planned behavior were controlled for. Both past behavior and lack of habit made significant independent contributions to the variance of intention to recycle, suggesting that past recycling behavior was not an adequate measure of habit. Lack of habit moderated the attitude–intention relationship, such that the attitudes of those lacking a recycling habit did not predict intention to recycle. This suggests that those who had failed to recycle because of lack of habit may have had the habit of treating recyclables as garbage. Further work is required to develop a range of adequate measures of habit in the recycling domain.

Keywords: *recycling; habit; habitual behavior; theory of planned behavior*

The construct of habit has received attention in the environmental literature because of the potential impact of behaviors that are frequently performed (Fransson & Gärling, 1999; Klöckner & Matthies, 2004; Thøgersen, 1994; Verplanken, Aarts, van Knippenberg, & Moonen, 1998). However, the measurement of habit has proved difficult (Eagly & Chaiken, 1993;

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Verplanken, 2006), and this difficulty is compounded when target behaviors involve more than one step or action, as is the case with recycling. A further aspect of the current debate on habit concerns its role within the theory of planned behavior (TPB; Ajzen, 1985, 1987), a theory that underpins a sizable proportion of research into environmental behaviors. We aim here to contribute to this debate with a secondary analysis of an existing database, using data from participants living in the Glasgow area of Scotland, United Kingdom. Two potential measures of habitual behavior were compared: past recycling behavior and the extent to which "I am not in the habit of doing it" was endorsed as a reason for having failed to recycle in the past (which we call here a lack of recycling habit). In addition, we considered the extent to which lack of recycling habit could be viewed as an indication of an alternative habit, that of disposing of recyclables in the household garbage.

Habits are typically construed as learned, goal-directed acts that become automatic responses in specific situations (Aarts, Verplanken, & van Knippenberg, 1998; Triandis, 1977). This element of automaticity implies that the act is performed without full conscious reasoning at that point in time. However, many behaviors that have an impact on the environment involve more than one action: For example, the recycling of bottles may involve washing them, storing them, and putting them out for collection at a later date. These related sequences of behavior would best be described as habitual behavioral patterns (Verplanken et al., 1998), as semiautomatic response patterns (Ajzen, 2002; Bargh, 1989), or as behavioral scripts (Klöckner & Matthies, 2004), where there are tendencies to perform sequences of actions across different situations but where some control or thought may be required between each phase. However, common to all definitions is the assumption that intentions to repeat habitual behaviors are less likely to be based on conscious reasoning (including attitude) than are intentions to repeat nonhabitual behaviors (Ouellette & Wood, 1998; Verplanken et al., 1998).

As noted above, the theoretical framework of interest here is the TPB. Briefly, according to the TPB, behavior is predicted by intentions to behave or act in a certain way. Intentions, in turn, are predicted by three factors: the attitude toward the behavior, the subjective norm, and perceived behavioral control (PBC). The attitude reflects the evaluation of the behavior and its outcome, the subjective norm reflects the extent to which people important to the individual are perceived to support the behavior (and the extent to which the individual is motivated to comply), and PBC reflects the extent to which the individual feels able to perform the behavior. Although measures of past behavior are typically found to make significant contributions to the variance of measures of future behavior (Conner, Sheeran, Norman,

& Armitage, 2000), past behavior is not generally viewed as a true component of the TPB, and there is argument on the meaning of its contribution (Sheeran, Orbell, & Trafimow, 1999). Ouellette and Wood (1998) suggested that measures of past behavior could be viewed as measures of habitual behavior if the following conditions were met: If the behavior was performed relatively frequently (daily or weekly), and if it was performed under relatively stable conditions (in the same environment or circumstances). The authors conducted a meta-analysis of studies based on the TPB that had also incorporated measures of past behavior. Two findings from this analysis are of relevance to the current investigation. First, the relationship between past behavior and intention (to perform an action or behavior) was found to be significantly stronger when the behavior was classed as habitual ($r = .60$) than it was when it was classed as nonhabitual ($r = .32$). Thus, people who had performed a behavior frequently and under stable conditions in the past were more likely to intend to continue performing the behavior. Second, the relationship between attitude and intention was found to be weaker when the behavior was habitual ($r = .44$) than when the behavior was not habitual ($r = .51$). In other words, although people performing a habitual behavior intended to continue with this behavior, these intentions were less likely to be influenced by attitudes.

In contrast to the findings of other authors (e.g., Terry, Hogg, & White, 1999; Verplanken et al., 1998), the results of the primary analysis of the current database were not consistent with those reported by Ouellette and Wood (1998; Knussen, Yule, MacKenzie, & Wells, 2004). We found some evidence to suggest that the attitude–intention relationship was stronger (not weaker) for those who had recycled most of their recyclable waste in the previous 3 months, compared to those who had recycled little or none of their waste. Thus, the behavior of those who had recycled most of their waste in the past was more consistent with attitude than would be expected if the behavior were to be construed as habitual. If anything, it appeared that those who were not recycling were those displaying habitual behavior. These findings raise at least two issues that are relevant to the current debate, and they are considered in detail below.

The first point relates to the construct of frequency. Our measure of past behavior was derived from that used by Terry et al. (1999) and centered on the quantity or proportion of household waste recycled in the previous 3 months, rather than on the frequency with which this was done. However, this in itself is unlikely to be the cause of the discrepancy between our findings and those of other authors. Verplanken (2006) provided convincing evidence to suggest that frequency of behavior alone does not automatically

confer habit. Furthermore, with a similar measure of past behavior to our own, Terry et al.'s findings were consistent with the interpretation that those who had recycled most of their waste were exhibiting habitual behavior. The difference between our own study and that conducted by Terry et al. (1999) may lie in the way that participants recycled: It appears likely that most of the participants in Terry et al.'s study could put their recyclables out for curbside collection, although most of our participants had to take recyclables to local collection points on their own time. Thus, our participants could recycle all recyclables without performing the final steps on a daily, weekly, or even monthly basis. It may be difficult, therefore, to construe this form of recycling as habitual behavior.

The second point relates to the meaning of absence of behavior. It could be argued that the absence of past recycling behavior actually indicates the presence of a stronger or more prevailing habit—that of disposing of recyclables in the garbage bin. This line of argument is consistent with Ajzen's (2002) position on the role of past behavior in the TPB. All the participants in the current study could put their household garbage out for regular (weekly) collection by the local authorities, and the regularity of this collection supported the establishment of habitual behavior. Garbage bins were provided by local authorities, and there were no penalties for disposing of most household waste in these bins. Recycling, on the other hand, involved a sequence of actions requiring some cognitive or physical effort and some potentially negative experiences for our participants. We reasoned, therefore, that the habit of disposing of recyclables in the garbage bin would be the prevailing habit for many of our participants. However, as argued above, we did not expect the measure of past behavior to provide an adequate index of the strength of this alternative habitual behavior.

Our analysis centered on a comparison between two potential measures of habitual behavior: past recycling behavior, and the endorsement of "I'm not in the habit of doing it" as a self-reported reason for having failed to recycle in the past. However, we also took into account the fact that situational constraints could preclude or interfere with the development of habitual recycling and could support the maintenance of habitual disposal of recyclables in the garbage bin.[1] We judged that all our participants were able to recycle glass, aluminum, and paper (but not plastic) if they so wished, although some would have to make more of an effort than others to do so: For example, those living in more rural areas would have to travel a few miles to recycling points and might therefore need access to private transport. One aspect of situational constraint, PBC, was included in the analysis reported here by virtue of its role within the TPB. Three other measures of situational constraint were also

controlled for in the analysis, all of which could be endorsed by participants as reasons for having failed to recycle in the past: "Recycling facilities are not easily available," "There are no local [curbside] collections," and "I do not have a car (which I would need to do this)."

The first aim of the analysis was to examine the contributions to the variance of intention to recycle of both past behavior and of having failed to recycle in the past because of lack of habit. This was achieved through hierarchical linear regression, with the TPB variables (attitude, subjective norm, and PBC), demographic characteristics, and situational constraints controlled. We expected lack of habit scores to make a significant contribution to the variance of intention over and above that provided by past behavior, the TPB variables, demographics, and situational constraints.

The second aim was to determine whether lack of recycling habit moderated the two relationships highlighted by Ouellette and Wood (1998): the attitude–intention relationship, and the past behavior–intention relationship. Assuming that lack of recycling habit functioned as an index of strength of habit of treating household recyclables as garbage, we expected the attitude–intention relationship to be weaker for those with high scores on the lack of habit variable (i.e., those presumed to have a strong alternative habit) than for those with low lack of habit scores. Similarly, we expected the past behavior–intention relationship to be stronger for those with high lack of habit scores than for those with low lack of habit scores. In other words, we expected the intention of those without a recycling habit to be strongly related to past behavior and weakly related to attitudes (Ouellette & Wood, 1998).

Method

Design and Participants

A cross-sectional survey design was employed. Participants were recruited from Glasgow and the surrounding areas using the following strategies: approaching retail assistants and employees of small businesses; approaching members of the public in shopping areas, railway stations, coffee shops, and other public areas; approaching volunteer workers in charity shops and in volunteer centers; and approaching mature part-time students attending evening classes. The questionnaires were all completed between September and December 2000. The overall response rate was 66% ($N = 252$).

The majority (84%) resided in an area with a Glasgow postcode (covering suburbs of Glasgow in addition to the city itself). Twelve participants failed to indicate postcode, and the remainder (11%) resided

within the central belt of Scotland. The recycling facilities available to the latter group would have been equivalent to those available to the remainder of the sample. Sixty-four percent of participants (n = 160) were female, 36% (n = 90) were male, and two failed to indicate gender. Females were, therefore, overrepresented in the sample. Ages ranged from 16 years to 77 years, with a mean age of 36 years (SD = 14.72). The sample contained fewer participants aged 60 years and above than would be expected within the general population: 7% of the sample fell into this category, compared to the expected 19% (General Register Office for Scotland, 2006).

Occupations were classified according to the Office of Population Censuses and Surveys' standard occupational classification (Her Majesty's Stationery Office [HMSO], 1991). In summary, 34% (n = 82) were in professional or managerial posts; 37% (n = 91) had clerical, retail, or similar nonmanual occupations; and 9% (n = 22) had manual or unskilled occupations. The remainder (20%, n = 52) were students and unemployed or retired persons. The socioeconomic status of the sample was skewed toward the middle of the distribution and contained fewer participants with manual or unskilled occupations than would be expected: Estimates from 2001 suggest that the expected percentage would fall between 16% and 21% (Baffour, 2006). At the professional and managerial end of the distribution, our sample appeared reasonably representative of the population (with an expected percentage of between 22% and 36%; Baffour, 2006). The socioeconomic description of our sample was quite similar to that of Scottish females of working age in 2001: According to these figures, 33% of females were in professional or managerial positions in 2001, 47% were in nonmanual occupations, and 18% were in manual or unskilled occupations (General Register Office for Scotland, 2006).

Measures

Intention to recycle. For each of four types of waste (newspaper, glass, plastic, and aluminum), participants were asked to rate their intention to recycle during the next month ("We want to know what you intend to recycle within the next month"). Ratings were made on 7-point scales from *no intention* to *firm intention*. Responses relating to plastic were omitted from the calculation: Very few participants lived within reasonable distance of a facility to recycle plastic or indeed actually recycled any plastic. A global measure of intention was derived from the mean of the remaining three ratings (M = 4.13, SD = 2.01, α = .83).

Attitude. Six items were used: "I find the idea of recycling distasteful" (reversed), "I find the idea of recycling pleasing," "I am not interested in the idea of recycling" (reversed), "My feelings about recycling are positive," "I find the idea of recycling unpleasant" (reversed), and "My feelings towards recycling are favourable." Each was scored on a 7-point scale from *strongly disagree* to *strongly agree*, and the mean of contributing items was used ($M = 5.86$, $SD = 1.26$, $\alpha = .89$).

Subjective norm. This was measured with three items: "Most of my friends think that household recycling is a good thing to do," "Most people who are important to me want me to engage in household recycling," and "Most of my family think that household recycling is a good thing to do." Each was scored on a 7-point scale from *strongly disagree* to *strongly agree*, and the mean of contributing items was used ($M = 3.65$, $SD = 1.46$, $\alpha = .73$).

PBC. This was measured with two items: "There are plenty of opportunities for me to engage in household recycling" and "It will be easy for me to engage in household recycling during the next month." Each was scored on a 7-point scale from *strongly disagree* to *strongly agree*, and the mean of contributing items was used ($M = 3.12$, $SD = 1.58$, $\alpha = .82$).

Past recycling behavior. Participants were asked to rate the proportions of each of the four types of waste recycled within the 3 months prior to data collection ("We want to know how much of your household waste you have recycled in the last 3 months"). Ratings were made on 7-point scales, from *none of it* to *all of it*. Again, responses relating to plastic were omitted from the calculations. A global measure of past recycling was obtained from the mean of the remaining three ratings ($M = 3.08$, $SD = 2.13$, $\alpha = .80$).

Lack of recycling habit and other reasons for not recycling. Participants were presented with a list of 15 possible reasons for not recycling, all of which had been mentioned by participants in an earlier qualitative study ($n = 69$) and refined during the piloting phase (Yule & Knussen, 2000). The reasons are listed in Table 1. Four columns were provided, headed *paper*, *glass*, *aluminium* [aluminum], and *plastic*. For consistency with the measures of intention and past behavior, responses in the *plastic* column were omitted from the calculations. Participants were asked to record, for each type of waste, the extent to which the reason applied. A 5-point scale was provided for each type of waste, from *not at all important or relevant* (0) to *extremely important or relevant* (4). Global scores for each reason were

Table 1
Descriptive Statistics for Reasons for Not Recycling, Including Lack of Habit ($N = 252$)

Reasons for Not Recycling	% Endorsing Reason	*M*	*SD*	α	Relationship With Lack of Habit
I'm not in the habit of doing it	60	1.44	1.53	.90	
Recycling facilities are not easily available	70	2.01	1.65	.93	.49***
There are no local [curbside] collections	60	1.85	1.72	.94	.47***
It doesn't occur to me to do this, or I forget[a]	49	1.19	1.48	.96	.59***
I do not generate sufficient waste[a]	43	0.82	1.16	.87	.29***
I do not have a car (which I would need to do this)[a]	42	1.21	1.63	.97	.36***
I can't be bothered[a]	38	0.89	1.33	.96	.53***
I don't have time to do this[a]	38	0.85	1.30	.97	.45***
I reuse most of it in other ways[b]	29	0.48	0.96	.88	.08
I do not believe it is worth doing this[b]	29	0.63	1.15	.97	.27***
I don't know what to do for the best[b]	29	0.61	1.11	.97	.25***
I don't like being told what to do[b]	21	0.48	1.10	.98	.25***
Someone else in the household does this instead[b]	19	0.41	0.98	.95	.16*
I feel that it is other people's responsibility[b]	16	0.33	0.86	.99	.23***
I'm physically not able to do this[b]	13	0.26	0.81	.97	.08

Note: *M* = mean, *SD* = standard deviation, α = Cronbach alpha coefficient of internal consistency, relationship = correlation coefficient (Pearson or point-biserial).
a. Subjected to square root transformation for further analysis.
b. Dichotomized for further analysis.
*$p < .05$; ***$p < .001$.

obtained by taking a mean of contributing scores (e.g., the score for lack of recycling habit was obtained by calculating the mean score of three responses—relating to paper, glass, and aluminum).

Results

Descriptive statistics of reasons for failing to recycle are shown in Table 1.[2] The first reason in the list is lack of recycling habit, and the remaining

reasons are displayed according to endorsement rates or the percentages indicating that the reason was at least partly relevant to their failure to recycle at least one form of recyclable waste. Lack of habit gained the second highest endorsement rate, with 60%, indicating that this was, to a greater or lesser extent, a reason for their failure to recycle most or all their recyclables.

The other reasons gaining high endorsements were related to situational constraints: failing to recycle because facilities were not easily available (70%), and because there were no local curbside collections (60%). As can be seen from Table 1, the responses to many items were positively skewed, and this was addressed by applying square root transformations (Tabachnick & Fidell, 1996). The most highly skewed items were dichotomized (0, or > 0). These transformed and dichotomized variables were used in further analysis. Scores on the measure of lack of recycling habit were significantly correlated with most of the other reasons given for having failed to recycle in the past, particularly those related to lack of motivation ("It doesn't occur to me to do this, or I forget," $r = .59$, $p < .001$; and "I can't be bothered," $r = .53$, $p < .001$) and those related to situational constraints ("Recycling facilities are not easily available," $r = .49$, $p < .001$; and "There are no local [curbside] collections," $r = .47$, $p < .001$).

The relationships between reasons and the TPB variables (and age) are shown in Table 2. Lack of recycling habit was, as expected, significantly correlated with past recycling behavior ($r = –.46$, $p < .001$). Lack of recycling habit was also significantly related to intention ($r = –.40$, $p < .001$), the subjective norm ($r = –.17$, $p < .01$), and age ($r = –.35$, $p < .001$) but not to attitude or PBC. Thus, those who indicated that an important reason for their failure to recycle in the past was lack of habit were less likely to have recycled in the past, were less likely to intend to recycle, perceived a weaker norm for recycling, and were younger. However, they did not have a less positive attitude toward recycling, and they did not perceive less control over their behavior. Lack of habit scores did not vary significantly according to gender or occupational category. Most other reasons were related to intention to recycle and past recycling behavior in the expected directions. The reasons most strongly related to attitude ($r \geq .30$) reflected beliefs, values, or motivation, and these reasons also tended to be significantly related to the subjective norm. A number of significant relationships were noted between reasons and PBC, particularly, as expected, those relating to situational constraints.

The first aim was to compare the measure of lack of recycling habit with the measure of past behavior, within the context of the TPB. We expected lack of habit scores to remain significantly related to intention when past behavior,

Table 2
Correlations (Pearson or Point-Biserial) Between Reasons for Failing to Recycle and TPB Variables, and Age

Reasons	Intention	Attitude	Norm	PBC	Past Behavior	Age
I'm not in the habit of doing it	–.40***	–.09	–.17**	–.12	–.46***	–.35***
Recycling facilities are not easily available	–.29***	.04	–.04	–.29***	–.33***	–.25***
There are no local collections	–.24***	.13*	.02	–.26***	–.32***	–.28***
It doesn't occur to me to do this, or I forget	–.27***	–.21***	–.26***	–.16**	–.39***	–.33***
I do not generate sufficient waste	–.13*	–.19**	–.10	–.05	–.11	–.21***
I do not have a car	–.18**	–.02	.04	–.10	–.23***	–.30***
I can't be bothered	–.33***	–.33***	–.25***	–.09	–.38***	–.37***
I don't have time to do this	–.27***	–.30***	–.22***	–.11	–.31***	–.37***
I reuse most of it in other ways	–.02	.01	.03	.06	.04	–.10
I do not believe it is worth doing this	–.32***	–.37***	–.25***	–.14*	–.26***	–.16*
I don't know what to do for the best	–.20**	–.21***	–.15*	–.14*	–.24***	–.24***
I don't like being told what to do	–.21***	–.33***	–.15*	–.05	–.17*	–.19**
Someone else in the household does this instead	–.17**	–.12	.01	.07	–.07	–.21***
I feel that it is other people's responsibility	–.19**	–.35***	–.08	–.04	–.10	–.07
I'm physically not able to do this	–.16*	–.13*	–.10	.03	–.10	–.12*

Note: PBC = perceived behavioral control.
*$p < .05$; **$p < .01$; ***$p < .001$.

the TPB variables, demographic characteristics, and situational constraints were controlled for. A hierarchical regression was conducted, with intention to recycle as the dependent variable (see Table 3). The reasons reflecting situational constraints were entered first (Step 1) as control variables: "Recycling facilities are not easily available," "There are no local [curbside] collections," and "I do not have a car." These variables were significant on entry but lost significance at Step 3 ($R^2 = .08$). Demographic variables—gender, age, and occupation—were entered at Step 2. Occupation had four categories (professional, nonmanual, manual, and "other"); the variable was therefore subjected to dummy coding, with the nonmanual group as the reference category ($R^2 = .11$, $R^2_{change} = .03$). At Step 3, the TPB variables were included: attitude, subjective norm, and PBC ($R^2 = .37$, $R^2_{change} = .26$).

Lack of habit was then entered either on its own (at Step 4) or following past behavior (at Step 5). When lack of habit was entered at Step 4, it made a significant contribution to the explanation of variance ($R^2 = .42$, $R^2_{change} = .05$): $\beta = -.29$, $F_{change}(12, 204) = 20.09$, $p < .001$. When past behavior was entered instead at Step 4, it made a bigger contribution to the variance of intention than did lack of habit ($R^2 = .54$, $R^2_{change} = .17$), but lack of habit at Step 5 still made a small but significant contribution ($R^2 = .55$, $R^2_{change} = .01$): $\beta = -.13$, $F_{change}(13, 203) = 4.26$, $p < .05$. As expected, the relationship between lack of habit and intention was not wholly mediated by past behavior and was relatively unaffected by the inclusion of situational constraints. The power of this analysis ($\alpha = .05$, $f^2 = .15$), calculated post hoc, was .98 (Erdfelder, Faul, & Buchner, 1996).

The second aim was to determine whether lack of recycling habit moderated two relationships: between attitude and intention, and between past behavior and intention. Based on the assumption that those with higher lack of habit scores were more likely to have an alternative habit of waste disposal, we expected the attitude–intention relationship to be weaker for those with high lack of habit scores and the past behavior–intention relationship to be stronger (see Ouellette & Wood, 1998). The interaction terms were calculated using centered scores reflecting deviation from the mean (Jaccard, Turrisi, & Wan, 1990), and these new variables were added one at a time to the regression analysis used to examine the first aim, following past behavior and lack of habit. One interaction variable, Attitude × Lack of Habit, made a modest but significant contribution to the variance of intention: $\beta = -.11$, $F_{change}(14, 202) = 4.58$, $p < .05$. The other, Past Behavior × Lack of Habit, did not: $\beta = -.07$, $F_{change}(14, 202) = 1.68$, ns.

To gain an understanding of the Attitude × Lack of Habit interaction, a simple slope analysis was conducted (Aiken & West, 1991; Preacher,

Table 3
Summary of Two Hierarchical Multiple Regression Analyses of Intention to Recycle Household Waste, With and Without the Inclusion of Past Behavior

Step	Variable	R^2	ΔR^2	F_{change}	*B*	*SE B*	Final β
Analysis 1: without past behavior							
1.	Recycling facilities are not easily available	.08	.08	6.49***	–0.11	.10	–.08
	There are no local collections				–0.02	.10	–.01
	I do not have a car				–0.01	.15	–.01
2.	Sex	11	.03	1.10	0.12	.23	.03
	Age				–0.07	.12	–.04
	Occupation: professional[a]				–0.12	.28	–.03
	Occupation: manual				–0.09	.41	–.01
	Occupation: other				–0.04	.32	–.01
3.	Attitude	.37	.26	27.75***	1.71	.35	.33***
	Norm				0.31	.39	.06
	PBC				1.29	.29	.27***
4.	Lack of recycling habit	.42	.05	20.09***	–0.38	.09	–.29***
Analysis 2: with past behavior							
1.	Recycling facilities are not easily available	.08	.08	6.49***	–0.06	.09	–.05
	There are no local collections				–0.01	.08	–.01
	I do not have a car				0.09	.14	.04
2.	Sex	11	.03	1.10	–0.09	.21	–.02
	Age				–0.09	.10	–.05
	Occupation: professional[a]				–0.04	.24	–.01
	Occupation: manual				–0.04	.36	–.01
	Occupation: other				–0.14	.28	–.03
3.	Attitude	.37	.26	27.75***	1.44	.31	.28***
	Norm				0.02	.35	.01
	PBC				0.50	.28	.10
4.	Past behavior	.54	.17	79.73***	0.47	.06	.49***
5.	Lack of recycling habit	.55	.01	4.26*	–0.17	.08	–.13*

Note: Analysis 1: $F(12, 204) = 12.42$, $p < .001$. Analysis 2: $F(13, 203) = 19.32$, $p < .001$.
a. Reference category for occupational groups: nonmanual.
*$p < .05$; ***$p < .001$.

2003). The relationship between attitude and intention was examined at three levels of lack of habit: When lack of habit scores were equal to 0 (i.e., when lack of habit was not given as a reason for past recycling failure); when lack of habit scores were equal to 2; and when lack of habit scores were equal to 4, the maximum possible score. We expected the attitude–intention relationship to be stronger when lack of habit scores were lower, and this proved to be the case. When lack of habit scores were equal to 0, attitude was strongly related to intention ($B = 2.64$, $SE\ B = .36$, $p < .001$). When lack of habit scores were equal to 2, the attitude–intention relationship was weaker, but still significant ($B = 1.67$, $SE\ B = .28$, $p < .001$). However, when lack of habit scores were equal to 4, the attitude–intention relationship was no longer significant ($B = 0.70$, $SE\ B = .50$, ns). Thus, for those with high lack of recycling habit scores (those presumed to be in the habit of treating recyclables as garbage), attitude was not related to intention to recycle.

Discussion

As predicted, lack of recycling habit, as a reason for having failed to recycle in the past, made a significant contribution to the variance of intention to recycle with and without the inclusion of past recycling behavior. These findings were independent of any effects of situational constraint, demographic variables, and also attitude, norm and PBC, all of which were controlled for in the analysis. Although the relationship between lack of habit and intention was reduced when past behavior was included in the equation, past behavior did not fully mediate this relationship. On the other hand, lack of habit did not mediate the relationship between past behavior and intention: Both variables made independent and significant contributions to the variance of intention.

Our findings regarding the contribution of past behavior are consistent with those reported by a number of other authors (e.g., Bentler & Speckart, 1979; Conner et al., 2000; Ouellette & Wood, 1998; Terry et al., 1999; Thøgersen & Ölander, 2006; Tonglet, Phillips, & Read, 2004). However, the finding that both past behavior and lack of recycling habit made independent contributions suggests that, in this context at least, past behavior does not fully capture the construct of habit. Our results are to some extent consistent with those reported by Verplanken (2006): In the first of Verplanken's three studies (related to eating unhealthy snacks), habit was found to fully mediate the relationship between past behavior and future behavior, whereas in the second (related to negative self-thinking), both

past behavior (frequency of negative thinking) and habit made significant independent contributions to outcome measures (self-esteem and symptoms of depression/anxiety). Verplanken's measures of habit were derived from the Self-Report Habit Index (Verplanken & Orbell, 2003), and it is interesting to note the consistency between our own results and those reported by Verplanken, when both the measures of habit and the target behaviors are so very different.

Given that past behavior could not be construed as equivalent to habitual behavior in the current context, it remains necessary to consider the meaning of the significant past behavior–intention relationship. Although it is possible that this relationship reflects the similarity in the way in which the variables were measured (Ajzen, 2002; Bamberg, Ajzen, & Schmidt, 2003; Trafimow, 2004), the most parsimonious explanation is that the past behavior–intention relationship reflects temporal stability (Ajzen, 1991, 2002; Conner et al., 2000)—in other words, the factors that contributed to past behavior also contributed to intention, factors that were either not measured or poorly measured by the TPB variables included in the study.

With regard to the second aim of the study, there was some evidence to support the assumption that high scores on the measure of lack of recycling habit were in fact indicative of a strong alternative habit of waste disposal (i.e., disposing of recyclables in the garbage bin), in that the attitude of those with high lack of habit scores was not related to intention to recycle in the future. In other words, the intention to recycle of those who strongly endorsed lack of habit as a reason for having failed to recycle in the past was not significantly related to attitude. This interpretation of the results is consistent with those of other authors, including Ouellette and Wood (1998), and Verplanken et al. (1998), where measures of habit strength were found to moderate the attitude–intention relationship in comparable ways. However, contrary to expectations, lack of habit scores did not significantly moderate the past behavior–intention relationship: The consistency between past behavior and intention to recycle was not more marked for those presumed to have a strong habit of treating recyclables as garbage. It was perhaps the case, therefore, that those who indicated that lack of habit was a very important reason for having failed to recycle also felt that they should be recycling more, in line with their beliefs and values (see Festinger, 1957; Thøgersen, 2004). This explanation suggests that the endorsement of lack of habit as a reason for failure to recycle was to some extent a reflection of the salience of the construct of habit. Some support for this line of argument has emerged from the results of a much larger study ($N = 4{,}119$) conducted by the Scottish Executive (2005). Twenty-nine

percent of their sample said that "habit" was the greatest obstacle they faced to reducing the amount of energy they used, but this figure rose to 35% of those identified in the report as "responsibility takers"—participants who believed that not only should people in general change their way of life for environmental reasons but also that they personally should change their way of life. When asked what changes to their lives they felt they should make, 33% of these "responsibility takers" said they should be recycling more than they did. These participants, therefore, appeared to feel a sense of obligation to change their behavior (particularly to recycle more), but feel that existing habits posed a barrier to change.

There are, of course, a number of limitations to the present study. The first relates to the way in which the lack of recycling habit was measured. We assumed that participants would have some insight into their habitual behaviors and that when they endorsed "I'm not in the habit of doing it" as a reason for having failed to recycle, they were doing so with some accuracy. There were two possible sources of error. First, some participants who did not, in fact, have any habit of recycling may have failed to endorse "lack of habit" because they felt that it did not actually explain their behavior. Second, some participants may have endorsed "lack of habit" without thinking of the implications or to obviate the need to provide any other reason for their behavior. Thus, for some participants, the endorsement of "lack of habit" may have been partly determined by factors unrelated to habit per se.

The second important limitation is that it was not possible to obtain an independent measure of ease or difficulty of recycling for each participant (see Armitage & Conner, 1999, 2001). This limitation was addressed in the analysis by controlling for PBC and the endorsement of three reasons for having failed to recycle that reflected situational constraint. Furthermore, responses relating to one class of recyclable—plastic—were omitted from calculations, because it was clear that many participants would not have been able to recycle plastic with any ease. Although situational constraints can presumably both interfere with the formation of habitual recycling behavior and support the maintenance of habitual disposal of recyclables in the garbage, the measures of constraint included in the analysis did not mediate the relationship between lack of habit and intention to recycle. This suggested that the formation of habitual behavior was not solely dependent on the availability of recycling facilities.

The study used a convenience sample, and participants were not fully representative of the local population in terms of age, gender, and occupational status. Although these three factors were controlled for in the analysis, this remains a limitation, and the results may not be applicable to the

wider population. Our participants were likely to be more sympathetic toward the idea of recycling than the "average" member of the local population, and it may be that the relationships noted in the analysis hold true only for those with a particular set of underlying values. This is certainly worthy of further investigation.

Certain additional limitations should also be taken into account. The analysis was limited in that no measure was taken of future behavior. The study was cross-sectional in nature; it was therefore not possible to determine whether the relationships noted in the analysis were causal in any way. Finally, although the analysis suggested that the TPB variables alone did not provide a full explanation of intentions, it is possible that the TPB variables and the measure of intentions were not measured at the same level of specificity (see Kaiser, Wölfing, & Fuhrer, 1999; Knussen et al., 2004; Trafimow, 2004).

Conclusions

There is, rightly, an increasing interest in the role of habit in the environmental literature, and some useful models have emerged (e.g., Dahlstrand & Biel, 1997; Klöckner & Matthies, 2004). A number of authors have developed ways of assessing or measuring environmentally relevant habitual behavior and habit strength (e.g., Bamberg et al., 2003; Bamberg & Schmidt, 2003; Klöckner & Matthies, 2004; Verplanken et al., 1998), but the emphasis has tended to be on discrete behaviors such as mode of transport. However, with regard to waste disposal, there is a need to further explore both the definition and measurement of habitual behavior: Although disposing of items in the household bin can be envisaged as habitual behavior, it is more difficult to apply the construct of habit to recycling, particularly when the steps involved can be separated by days, weeks, or months. It probably makes more sense to consider the potential involvement of habit at each step of recycling (e.g., sorting, washing, storing, disposal) than it does to consider a single habit of recycling, and it may be that we require more than one model or conceptualization of habit to cover these various steps: For example, one step may be triggered by stimulus cues, whereas another may be triggered by automatic activation of cognitive factors (see Ajzen, 2002; Verplanken, 2006). The success or utility of any assessment of "habitual" recycling will depend on the integrity of the underlying theoretical framework, and there remains a substantial amount of work to be done in this area.

On a practical note, it is worth bearing in mind that habitual behaviors relating to the environment can be changed (see Thøgersen & Ölander,

2006) but probably only if certain conditions are met, and if interventions are appropriately targeted (Klöckner & Matthies, 2004). Some strategies, such as the provision of curbside collection bins for recycling, may influence large numbers of people by removing common barriers to recycling. However, such strategies alone are unlikely to influence those with strong antirecycling habits (see Klöckner & Matthies, 2004), and it is worth noting that not all of those with access to curbside collection in the United Kingdom make use of this service (McDonald & Oates, 2003; Scottish Executive, 2005). Having said this, there is evidence to support the efficacy of this fundamental intervention strategy (Mee, Clewes, Phillips, & Read, 2004; Thøgersen, 1994). Without the opportunity to recycle with minimal costs, there is a danger that many people will downplay or deny any proenvironmental values to avoid the experience of dissonance between values and behavior (Costarelli & Colloca, 2004; Festinger, 1957; Thøgersen, 2004; Thøgersen & Ölander, 2002).

Notes

1. We are grateful for the comments of an anonymous reviewer on this point.

2. Large numbers of missing values were recorded, mostly because reasons for not recycling were not endorsed by those who had recycled most or all their waste. To circumvent problems associated with missing values, all missing values in the list of reasons were recoded to indicate that the reason was not relevant to the participant (i.e., 0).

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