



MOTIVATIONS AND BEHAVIORS THAT SUPPORT RECYCLING

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Abstract

This paper proposes that recycling researchers should pay attention to both attitudes towards recycling and the processes involved in recycling (recyclers' phenomenal experiences and organizing strategies). As predicted by Sansone and colleagues' model of how people induce themselves to engage in necessary but boring tasks, people who had reasons to persist at recycling (that is, who held strong prorecycling attitudes or had a social orientation towards recycling) were more likely to redefine recycling so as to emphasize its pleasures or the sense of satisfaction they gained from contributing to the environment. These people were also more likely to have developed a way of organizing recycling in their homes, to report few interferences with recycling, and—most important—to recycle on both short- and long-term bases. In accord with the model, people who became better recyclers by Time 2 had had stronger prorecycling attitudes at Time 1 than people who remained poor recyclers. Our results are consistent with the view that people who make a valued but uninteresting task more phenomenally interesting and more manageable are more likely to continue at the task. Sansone and colleagues' model provides a useful way to look at recycling and also suggests a new way that attitudes may be linked to behavior—via cognitive transformation of behavior. © 1999 Academic Press

Introduction

Although questionnaire and survey research suggest that people in the United States strongly support recycling programs, for many recycling itself is a drudgery, especially when compared to simply discarding an item as trash. Indeed, numerous studies have found that people cite inconvenience and lack of time as reasons for not recycling (see, for example, Vining & Ebreo, 1990; Gamba & Oskamp, 1994; McCarty & Shrum, 1994). Thus, it is not surprising that in U.S. settings where recycling is voluntary, participation can be low and can fall off over time (Grogan & Bell, 1989; Werner *et al.*, 1995, p. 197). Even where recycling is mandatory, people do not always prepare and separate recyclables properly, resulting in recyclables of lower quality and lower market value. An obvious question, then, is what maintains a person's everyday recycling behaviors? To answer this question, the present research draws on work by Sansone and colleagues on how people induce themselves to perform boring but necessary tasks (Sansone &

Morgan, 1992; Sansone *et al.*, 1992; Sansone & Harackiewicz, 1996).

Sansone and colleagues' central thesis is that when a task is not inherently pleasurable or rewarding, people will not do it unless they have some reason to persist. If they have a reason to persist, they will devise a way to make the task more interesting—that is, they will actively transform their experience of the task to make it more positive. People can focus on previously unnoticed aspects of the task, add variety to how the task is performed, or even change their definition of the task (Sansone *et al.*, 1992, p. 380). Although each of these strategies is distinctive and can be achieved in multiple ways, they all serve the same general purpose of making the task more interesting. For example, with respect to recycling, people seeking ways of making it more interesting might: change their focus from how time-consuming it is to how quickly the recycling barrels fill; add variety by listening to music or news stories while sorting recyclables; or change their definition by emphasizing they are working with a reusable resource

rather than with garbage. Sansone and colleagues assume that people can use multiple strategies and these strategies can change over time as individuals continue to reframe a behavior in order to maintain it.

The key ideas are that there must be a perceived reason to persist, there must be a strategy for making the task more interesting, and the strategy must work in the person's current context. The model provides an important complement to research on attitude-behavior consistency, at least for particular kinds of activities, by showing how attitudes (which provide reasons to persist) can be translated into behavior via changing perceptions of the behavior's inherent interest value.

In an empirical test of her model, Sansone *et al.* (1992) had students engage in a boring letter copying task. They convinced some of the students the task was actually good for their health, thereby satisfying the criterion that participants perceive a reason to persist in the activity. Sansone *et al.* then varied the extent to which interest-enhancing strategies were available. As expected, compared to others, people led to believe that the task was good for them took advantage of the available strategies. For example, they read accompanying text about font styles; if that material was absent, they varied the script they used in writing out the copies. Furthermore, the more they engaged in these strategies, the greater their eventual interest in the task (the more likely they were to request additional pages to work on later). This research supports the view that when people are committed to engaging in a behavior, they can change their construal of the behavior or their way of doing it and turn it into a more inherently interesting activity.

We see clear parallels between this model and recycling. It suggests that for people to recycle on a regular basis, they must hold positive recycling attitudes (reasons to persist) *and* they must have positive phenomenal experiences associated with recycling, whether these occur during recycling or as they reflect on their recycling behaviors. Thus, the model directs our attention towards the traditional research focus of recycling attitudes as well as in a new direction, towards the *processes involved in and affective experiences* of recycling.

In the present research, we use the model as a framework for understanding recycling; it suggests the kinds of variables to examine and what interrelationships should exist. Using a correlational design, we examine the following propositions: to the extent that people have reasons to persist at recy-

cling, they should define recycling as more interesting and fun or should emphasize subjective feelings of satisfaction, and they should be most likely to recycle during a short time frame as well as over the long term.

In addition, by posing a challenge not addressed by Sansone and her colleagues' research, recycling provides an opportunity to extend the model. That challenge is how people take a task that is not only boring but also complex and time-consuming and make it manageable. Hormuth *et al.*'s (1993) analysis of apartment dwellers' recycling suggested two inter-related strategies for facilitating day to day recycling. One was to use conveniently located containers and the other was to embed recycling in the ongoing behavior stream of food preparation and clean-up. A similar idea, although from a different theoretical perspective, was proposed by Zimmerman (1989), drawing on Bandura (1986). In his examination of effective self-regulation, Zimmerman said that people need to figure out how to organize their environment so that it supports desired behaviors. In the present project, we used an open-ended question to ascertain how our participants organized their recycling to see whether manageability contributes to behavioral maintenance.

In summary, the present research is guided by the central idea that people need to have positive phenomenal experiences or they will not persist in a task. If these positive experiences are not inherent in the task, people who have reasons to persist will psychologically transform the task. First, we asked peoples' attitudes towards recycling to gauge their reasons for persisting. We also asked them open-ended questions to allow them to describe how they made recycling interesting or what satisfactions it provided (i.e. how they redefined the task), what interfered with recycling (whether they emphasized or de-emphasized problems), and how they made it easier (i.e. whether they had made the task manageable). Finally, we used self-report and observations to determine whether they actually recycled.

In the present analysis, we examined two reasons to persist in recycling (two kinds of attitudes). One of these is simply holding favorable attitudes towards recycling. Research results have been mixed, but several studies attest that people who hold positive attitudes towards recycling are more likely to recycle (De Young, 1986; Oskamp *et al.*, 1991; Gamba & Oskamp, 1994; Smith *et al.*, 1994). The more specifically recycling attitudes are measured, the better their predictive ability (Vining &

Ebreo, 1992; Shrum *et al.*, 1994).

The second reason to persist in recycling is social orientation. This refers to the extent to which people are proud that they recycle, promote recycling among others, and have friends, neighbors or relatives who encourage them to recycle. This general idea was discussed 15 years ago in Cook and Berrenberg's (1981) seminal paper on social psychological aspects of conservation behaviors. They reviewed the literature on the social embeddedness of behavior, including social norms, conformity pressures, and social modeling, and suggested that conservation programs that took advantage of people's tendencies to respond to group pressure and group recognition would be highly successful. To support their hypothesis, they cited an array of studies in which public scrutiny and recognition increased the effectiveness of energy conservation programs.

Cook and Berrenberg's analysis led to recycling programs that emphasized the importance of 'block leaders'—people assigned to meeting with neighbors, promoting the idea of recycling, and giving instructions on the recycling program (Nielsen & Ellington, 1983; Hopper & Nielsen, 1991). Subsequent research also attests to the value of the 'block leader' approach, further supporting Cook and Berrenberg's emphasis on social aspects of recycling (Burn & Oskamp, 1986; Burn, 1991; Everett & Peirce, 1991–92). Related research suggests that people whose friends and neighbors recycle are themselves likely to recycle (Oskamp *et al.*, 1991) or to begin recycling if they are part of a block organization (Spaccarelli *et al.*, 1989–90)—in theory because of the interaction, education, and social pressures that occur among friends. For these reasons, we included a variety of indices of the social embeddedness of recycling. In the present research, we measured attitudes expressing a social orientation towards recycling, asked which household members recycled to gauge the level of immediate social support for recycling, asked whether they were in a neighborhood of recyclers, and assessed whether they were aware of their neighbors' recycling.

Data on which the present analyses are based were collected as part of a larger study (Werner *et al.*, 1995). That study included a treatment intervention (which influenced recycling but had no direct impact on attitudes or motivational processes), observation of curbside recycling for almost 5 months, and a lengthy questionnaire containing the closed- and open-ended questions described above. The questionnaire also provided demographic information to allow examination

of such factors as age, education, and household configuration.

Method

Neighborhood and recycling history

The research setting was a four by ten block area approximately one-half mile square containing over 300 homes. The area is in an older, established neighborhood, close to the city's downtown. Many of the homes have been refurbished, and it has a reputation for being one of the more desirable neighborhoods in the city. It was selected for research because a recycling firm decided to use it as the setting for its trial, no-cost, curbside recycling program. Before free curbside pick-up was available, residents had recycled at numerous recycling centers sponsored by churches, grocery stores, and schools.

Timeline of study

The purpose of the original project was to evaluate methods for increasing recycling among these residents.¹ Four different interventions were undertaken in November 1990, and curbside recycling was observed from November into the following March when the firm went out of business, ending the curbside pick-up. Time 1 questionnaire data were collected in February 1991. Long-term recycling was measured via questionnaire approximately 2 years later.

Recycling behaviors, Time 1

The original study provided two indices of how regularly people recycled, a self-report index and observations of their curbside recycling. As described next, these two indices were combined into a single index for the present analyses.

The self-report index was included in the Time 1 questionnaire described below (see that section for sampling and administration procedures). Respondents used four-point scales to indicate how frequently they recycled each of six different commodities that were being collected by the pick-up firm: aluminium cans, tin cans, newspapers, glass, plastic milk containers, and cardboard (0 = never, 3 = always). An average 'recycling frequency score' was computed across these items. If respondents indicated they did not use a commodity, it was omitted from their recycling frequency score. A

median split on these scores was used to create two groups of low- and high-frequency self-reported recyclers.

Observations of curbside recycling were made during the recycling project (November to March). Residents provided their own containers and placed the recyclables at the edge of the curb for convenient pick-up, making it fairly easy to observe who participated. Observational data were gathered early in the morning, typically by two people in an automobile, each of whom was responsible for one side of the street. Reliability checks indicated high reliability (Cohen's kappas for the team of raters ranged from 0.93 to 1.00 and for a separate observer from 0.73 to 0.84; Werner *et al.*, 1995). From this information, we created two groups roughly parallel to the groups based on self-reports. Nonrecyclers were those who did not put any recyclables at curbside during the 4-month study, and recyclers were those who put out recyclables one or more times.

A comparison of these two indices indicated discrepancies, i.e. people whose self-reports differed from our observations of their behavior. Although it is common to discount self-reports in favor of observations (e.g. Hines *et al.*, 1986-87; Gamba & Oskamp, 1994), these residents had been using community groups (e.g. boy scouts and schools) or community-based recycling centers for quite some time. With the money earned from recyclables, the groups and centers sponsored local projects valued by contributors. Many residents continued to support the local organizations and their activities instead of using the curbside service, lending credence to their self-reports (that is, the recycling bins in the neighborhood were used even while curbside pick-up was available; furthermore, even after the curbside pick-up program ended, recycling continued at neighborhood centers). Therefore, we weighted the indices equally and created three groups, with 'low' recyclers composed of the 30 per cent who scored low in both self-reported and observed recycling, 'high' recyclers composed of the 29 per cent who scored high in both self-reported and observed recycling, and 'moderate' recyclers, which included the 41 per cent who had mixed scores in self-reported and observed recycling.

Questionnaire, Time 1

The questionnaire contains 34 closed-format items tapping recycling attitudes, self-concept, social orientation and behaviors towards recycling. It also

contains questions about which commodities were used and recycled (the 'self-reported recycling' described above), as well as three open-ended items measuring recycling processes: phenomenal experience/interest value of, strategies for, and interferences with recycling.

Closed questions. Three scales were created from the 34 closed-format items; an overall attitude scale, and two subscales derived from this. One subscale included all of the social aspects of recycling, and the other, all the value-related (economic, political/philosophical) aspects.

The overall recycling attitude scale contained 27 items, all measuring participants' attitudes towards recycling. It was based on a factor analysis of the original 34 items. A single 31-item factor emerged with an eigenvalue of 9.9, accounting for approximately 28 per cent of the variance (see Werner *et al.*, 1995 for factor loadings). For present purposes, we added one item because of its relevance to social support for recycling (how many neighbors recycled) and deleted five items tapping motivational processes (such as: 'I try to make recycling interesting or fun' and 'recycling gives me a sense of personal satisfaction'). These five items had been used in Werner *et al.* (1995) but were excluded here in order to keep a clear distinction between recycling attitudes and the three open-ended questions they were expected to predict. Cronbach's reliability coefficient for the 27 items was 0.91. Although the total scale had high coherence, in order to distinguish social and personal reasons for recycling, the scale was divided *a priori* into the two subscales.

The 17 items in the personal aspects of recycling subscale measured the respondent's self-concept as a recycler, and values about and reasons for recycling (such as: to earn money; to preserve landfill space; to help future generations). Cronbach's reliability coefficient for this subscale was 0.86.

The 10 items in the social subscale measured different aspects of social concerns or social pressure to recycle (such as: people should encourage each other to recycle; respondent discusses recycling strategies with others; respondent would 'show off' recycling by displaying a recycling decal or wearing a T-shirt with a recycling message; respondent would feel embarrassed to be seen throwing away a recyclable commodity). Cronbach's reliability coefficient for this subscale was 0.83.

Open-ended questions. To establish recycling his-

tory, respondents were asked how long they had been recycling; the average length of time was 58 months (almost five years)(median and mode are both 24 months, with a range of 0 to 780 months, or 65 years). These data were highly skewed, and several data transformations failed to make adequate corrections to normalize the data (Kirk, 1968). For purposes of analyses, we clustered the scores into four groups: never recycled = 0; had been recycling for 12 months or less = 1; recycling 1-5 years (59 months) = 2; recycling 5 years or more = 3. These scores represent a rough continuum of no, short-term, moderate-term and long-term recycling history.

Regarding neighbors' recycling, one question asked how many of their neighbors participated in curbside recycling. From this information and the number of households on the block ('block' was defined as both sides of the street between the closest cross streets), we computed the percentage of their neighbors who recycled as an index of the 'recycling milieu' among close-by neighbors. Because more than half the sample responded that they 'didn't know' or 'hadn't noticed' which of their neighbors recycled, we created an additional index—'neighbor awareness'—of whether they were aware of their neighbors' recycling activities as one more check on their social concern. Those who provided an estimate of how many neighbors recycled received a score of 1 and the remainder received a score of 0.

Three questions probed respondents' phenomenal experiences around recycling and their strategies

for managing recycling. They were open-ended to allow respondents complete freedom to respond.

The first open-ended question, probing task definition/intrinsic interest, asked 'Is there any part of recycling that you think is interesting or fun to do? If so, what is it?' Answers to these questions were typed as lists to obscure respondents' identities and other answers. They were read by an individual unfamiliar with our theoretical interests who clustered the answers into eight different categories. Category assignment was redone by a second individual (the second author), and there were no disagreements between their ratings. The eight categories were reduced to the seven shown in Table 1 (two had been variations on the 'personal satisfaction' theme). From those answers we were able to create two groups of respondents: those who did not find anything interesting, worthwhile, or fun in recycling; and those who gave at least one reason (few respondents gave more than one answer so a dichotomous score was used). If no answer was given, the item was treated as missing data and the case was omitted from analysis.

The next question, establishing organizing strategies, asked 'What do you do to make recycling easier? (Please be specific...)'. Answers to these questions were processed in the same way as the first, yielding 10 categories. The two raters disagreed on only two of the ratings, both in the same category, yielding a kappa coefficient of 0.98 for that category (the others, of course, were 1.0). These 10 categories were reduced to the eight ways of organizing shown in Table 2 (different ways of

TABLE 1
Is there any part of recycling that you think is interesting or fun?

Value	f	%
No	88	59.1
Yes	61	40.9
Positive comments/cognitions*	16	10.7
Personal satisfaction/good for environment†	14	9.4
Recycling is necessary	10	6.7
Thoughts of reusing resources	9	6.0
A good teaching tool	5	3.4
Like to get money back	4	2.7
Organizing and separating items	3	2.0
Total	149	100

Note. People could give more than one response.

* Enjoy seeing garbage reduced; enjoy can crushing with children; enjoy the colors and shapes of bottles or crushed cans; enjoy opportunities to meet people at recycling centers; enjoy reusing materials, etc.

† Two people said 'necessary' without adding affective comments.

TABLE 2
What do you do to make recycling easier?

Value	f	%
Positive answers		
Separate into containers	69	39.9
Store in another area	42	24.3
Do it immediately/do it weekly or monthly*	18	10.4
Lump items together, sort later	9	5.2
Use/will use curbside recycling	7	4.0
Combine recycling with other activity	6	3.5
Negative answers		
Need to start recycling/organizing	12	6.9
Do not recycle	10	5.8
Total	173	100

Note. People could give more than one response.

* We intended to distinguish people who delay from those who embed recycling in the ongoing behavior flow (immediate recyclers), but there were too few of each type to make this worthwhile.

scheduling recycling were combined—immediately, weekly, monthly). For analyses, these scores were summed, allowing identification of three groups of respondents: those who did not recycle or stated that they were not well organized; those who indicated one way of making recycling easier; and those who used two or more ways of making recycling easier. If no answer was given, the item was treated as missing data and the case was omitted from analysis.

The final open-ended question asked whether people expressed or de-emphasized negative aspects of recycling: 'Whether you do or do not recycle: What—if anything—interferes with recycling in your household?' These answers were also processed as described above. The first rater arrived at eight categories which were redone by

the second rater; there were no disagreements between the two raters. The eight categories are shown in Table 3. We summed the scores to create three groups corresponding to their reported level of interference with recycling. The three groups are: those to whom recycling is not a problem; those who indicated one thing which interferes with their recycling; and those who indicated two or more things that interfered. If no answer was given, the item was treated as missing data and the case was omitted from analysis.

Questionnaire distribution, Time 1. The questionnaire was distributed, in person, to every home in the sample area (total $n = 309$). Verbal instructions and a cover letter on University letterhead described this as a class project being conducted for

TABLE 3
What, if anything, interferes with recycling in your household?

Value	f	%
Mess, lack of storage place	48	26.1
No convenient pick-up/drop-off	30	16.0
Forget, lazy, difficult	26	13.9
Not enough time	22	11.8
Need more information on how to recycle	20	10.7
Not enough articles to recycle	12	6.4
Suggestions or political statement*	6	3.2
Nothing interferes	23	12.3
Total	187	100

Note. People could give more than one response.

* Various responses including a need for a complete curbside program provided by city and county, a need for the firm to take more kinds of recyclables, and so on.

the Mayor's office. To assure a high response rate, we stressed that we needed participation from everyone, both recyclers and nonrecyclers, and indicated that participants' responses were completely anonymous and would only be presented as group data. If a resident could not be contacted in person after three visits, the questionnaire was left somewhere visible with a hand-written invitation to participate and a stamped return envelope. Seven different researchers were responsible for contacting approximately equal numbers of people on each street. The overall questionnaire response rate at Time 1 was 67 per cent.

Follow-up questionnaire, Time 2

Questionnaire distribution. In the spring of 1993, approximately 27 months after the first questionnaire study was completed, a group of 12 undergraduate students interviewed residents in the same four by ten block area in order to ascertain whether residents were still recycling. The neighborhood was canvassed on three separate occasions in a 1-week period, yielding 220 complete questionnaires (71% response rate) of which 117 could be used in the present analyses (other respondents had moved in since the previous survey, $n = 53$, or had not participated in the previous survey). The final question asked their permission to combine this questionnaire with the earlier one; one respondent refused permission.

In order to be certain that this small group of respondents was similar to the total sample, we examined a correlation matrix of their Time 1 attitudes, processes, and behaviors. The pattern of results was similar to the one described below, suggesting that this subgroup is sufficiently similar to the total group to comprise a representative sample, allowing us to ask which variables from Time 1 predicted recycling at Time 2.

Recycling. As an index of recycling, we asked which commodities they recycled. Responses were summed and a median split used to divide the participants into two groups of low and high recyclers. The median was two, so this procedure grouped together people who did not recycle at all with those who recycled somewhat. For a more sensitive analysis that avoided a skewed distribution, we created a five-point scale corresponding roughly to the numbers of items recycled in the household (scores of 0, 1, and 2 corresponded to that number of items; a score of 3 corresponded to 3 or 4 items; and a score of 4 corresponded to 5 or 6 items).

Although there was a curbside recycling program available at Time 2, mixed citizen support made participation in it an unsuitable dependent variable for our study. (People complained that they had to pay a private contractor. They preferred a system in which recycling was an integral part of garbage collection, thereby distributing the cost and rewarding people for reducing their garbage by recycling. The present survey was conducted for the city, and its primary purpose was to ascertain why residents were or were not participating in the paid curbside recycling program and how that program could be improved.)

Results

Household demographics

Respondents came from households in which the average age of the adult male was 47 (range = 19–90), and the adult female 46 (range = 19–87). The most common household type was a male–female couple (32% of the sample) and the second most common was a couple with children under 18-years-old (27.5%; average age of the children was 9). The group was well educated, with many of the males (28%) and females (29%) reporting at least some college, and many reporting a college degree (20.5% and 24% for males and females, respectively). More significantly, 43 per cent of the males had post-college education compared to 31 per cent of the females.

Association between demographic variables and recycling

None of the demographic variables yielded significant associations with any of the attitudinal, process, or behavioral recycling measures (all χ^2 's were small and nonsignificant).²

Recycling interest value and recycling strategies

Was anything interesting or fun in recycling? Table 1 shows that more than half of the respondents did not find anything interesting or fun in recycling, supporting our expectation that for many, recycling is a rather routine and even boring or unpleasant task. Those who provided a reason had positive comments or cognitions related to recycling, such as enjoying the variously colored or shaped bottles, the satisfaction of seeing garbage reduced, and fun moments with children when crushing the cans. In

TABLE 4
Correlation matrix

	Recycling history	Overall recycling attitude	Personal attitude subscale	Social Attitude subscale	Neighbor awareness	Neighbors recycle	% of household members recycling	Organization in recycling	Interest/Satisfaction	Interfering factors	Recycling Time 1	Recycling Time 2(Mdn)
Overall recycling attitude	0.33*** (181)											
Personal attitude subscale	0.37*** (181)	0.93*** (203)										
Social attitude subscale	0.22** (181)	0.89*** (203)	0.66*** (203)									
Neighbor awareness	0.28*** (181)	0.21** (203)	0.19** (203)	0.21*** (203)								
Neighbors recycle	-0.03 (80)	0.28** (84)	0.21* (84)	0.33*** (84)	*							
% of household members recycling	0.46*** (174)	0.33*** (189)	0.34*** (189)	0.25*** (189)	0.07 (190)							
Organization in recycling	0.30*** (124)	0.46*** (135)	0.53*** (135)	0.30*** (135)	0.35*** (135)	0.16 + (64)	0.12 + (139)					
Interest/Satisfaction	0.05 (140)	0.29*** (149)	0.32*** (149)	0.22*** (149)	0.20*** (149)	-0.01 (67)	0.06 (143)	0.27** (119)				
Interfering factors	-0.16* (135)	-0.24** (149)	-0.27** (149)	-0.15* (149)	-0.01 (150)	-0.03 (72)	-0.16* (149)	-0.06 (111)	-0.18* (119)			
Recycling Time 1	0.27*** (172)	0.53*** (190)	0.52*** (190)	0.42*** (190)	0.16* (191)	0.25** (81)	0.27*** (181)	0.34*** (128)	0.25** (143)	-0.18* (141)		
Recycling Time 2 (Mdn)	0.15 + (100)	0.35*** (116)	0.38*** (116)	0.22** (116)	0.10 (116)	0.11 (54)	0.06 (106)	0.17 + (78)	-0.06 (84)	-0.15 + (87)	0.38*** (108)	
Recycling Time 2, 5-point scale	0.22* (100)	0.37*** (116)	0.40*** (116)	0.24** (116)	0.05 (116)	0.17 (54)	0.17* (106)	0.21* (78)	-0.11 (84)	-0.15 + (87)	0.42*** (108)	0.86*** (116)

Note. + = $p < 0.10$; * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$. Number of respondents is in parentheses.

Note. Except for the recycling data, all measures were collected via a single questionnaire during February 1991. Recycling at Time 1 represents a combination of actual curbside recycling (observed between November 1990 and March 1991) and recycling reported in the questionnaire. Recycling at Time 2 is based on a follow-up survey 27 months later. See text for specific details.

* r cannot be computed between these two variables because all with a 'Neighbors Recycle' score have the same 'Neighbor Awareness' score.

contrast to these comments about recycling activities *per se*, many people spoke of more abstract principles. They said that although recycling was not fun, it was important, necessary, and worthwhile. Indeed, more than 20 per cent of those who answered this question referred to recycling's importance, the personal satisfaction which people can experience when recycling, or the feeling of doing something good for the environment. For these people, task transformation appears to have taken the form of emphasizing the affective accompaniments of recycling rather than changing perceptions of particular task activities.

How did they make recycling easier? Table 2 shows the eight kinds of things participants did to make recycling easier. Most typical was separating recyclables into individual containers in the kitchen, and second most typical was separating the items and putting them into a separate storage area, away from the kitchen. The general themes—consistent with Hormuth *et al.*'s and Zimmerman's reasoning—were that (i) people had developed a system that fits their home's design and space availability, and (ii) they tried to make recycling a part of their daily or weekly routine.

Did anything interfere with their recycling? Table 3 shows the problems which interfered with participants' recycling. People complained that recycling is messy and time-consuming and they did not have enough space to organize it well. Another common complaint was the lack of convenient pick-up or drop-off for recyclables, reflecting to some extent problems that had occurred with the original curbside pick-up firm.

Attitudes, recycling processes, and recycling

Table 4 shows the inter-correlations among the variables. Several coherent patterns emerged, all generally supportive of our theme that positive recycling experiences are central to recycling. First, the personal prorecycling attitude subscale yielded strong associations with the other variables, including whether the task was interesting or worthwhile, their level of organization, and the absence of anything that interfered with recycling. Furthermore, this subscale predicted recycling at both Time 1 and Time 2 (note also that the total attitude scale yields a similar pattern, although the total scale is not our current focus). Thus, consistent with Sansone and colleagues' thesis, people with favourable personal recycling attitudes

appeared to have reasons to persist in recycling, reported ways of making recycling interesting or stressed feeling good about recycling, had organized their recycling to make it easier, reported little that interfered with recycling and, not surprisingly, were the strong recyclers at Time 1 and continued to recycle 2 years later.

The second pattern involves the measures of social bases of recycling which yielded a pattern similar to that just described. We measured four aspects of social orientation: the social concern subscale containing 10 questionnaire items (labeled 'social attitudes' in Table 4); the percentage of household members aged 5 or above who participated in recycling (for households with more than one person, on average 86% of the residents aged 5 and older participated in recycling); the index of whether people noticed neighbors using the curbside service (labeled 'neighbor awareness'; 44% had noticed neighbors recycling); and recycling milieu, or the percentage of neighbors estimated to recycle at the curbside (labeled 'neighbors recycle'). The first three are generally under the respondent's control, whereas the fourth is simply their description of the neighborhood recycling milieu.

As can be seen in Table 4, three of these factors (the three under the individual's control) are inter-related. In addition, all of them predict recycling at Time 1, and two of them (social attitudes and percentage in household who recycle) also predict recycling at Time 2. Consistent with Sansone and her colleagues' model—assuming that all serve as reasons to persist in recycling—these three factors were also related to recycling processes; they were associated with whether people described recycling as interesting or worthwhile, developed ways of organizing it, and reported no or few problems with recycling. Thus, social attitudes and behaviors contribute to effective recycling.

So far we have asked whether attitudes predict the other variables, especially recycling. A key question is whether the process variables of phenomenal interest/satisfaction, organization, and reduced interference can also predict recycling: do we have evidence that positive experiences with recycling are related to short- and long-term recycling? As indicated in Table 4, all three process variables predicted recycling at Time 1 (r ranges from 0.18 to 0.34). With respect to the follow-up 2 years later, both having a way of organizing (significant) and lack of interference (marginally significant) continued to predict recycling, $r(76) = 0.21$, $p < 0.03$, and $r(85) = -0.15$, $p < 0.08$, respectively, but interest did not, $r(82) = -0.11$, n.s.

There are two ways in which the association between the process variables and recycling could have weakened over time (that is, the lower marginally or nonsignificant correlations for Time 2). There could have been backsliding (people with positive recycling experiences at Time 1 stopped recycling by Time 2) or nonrecyclers could have begun to recycle. Examination of the data indicated that a change to recycling was very common and backsliding was extremely rare. Indeed, consistent with the model, only two households who recycled during Time 1 had stopped recycling by Time 2. Thus, all of the change (and reduced correlation) was due to people who had begun recycling by Time 2.

Because this was a correlational study, we could not really document that attitudes led people to transform their phenomenal experiences of recycling. However, we could focus on the Time 1 low and moderate recyclers and ask whether they had changed to recyclers by Time 2. The model would propose that those who began recycling would have had stronger attitudes at Time 1—that is they had a stronger reason to improve or begin recycling. Results for both attitude subscales are consistent with this hypothesis. The Time 1 low and moderate recyclers who became high level recyclers by Time 2 ($n = 29$) had higher personal attitude scores than did those who remained at their original level ($n = 25$) or improved from low to moderate ($n = 18$) [means = 3.88, 3.46, and 3.44, respectively, $F(2, 69) = 6.69$, $p < 0.002$]. A similar but nonsignificant pattern of means occurred for the social concern subscale [means = 2.56, 2.30, and 2.30, respectively, $F(2, 69) = 1.5$, $p < 0.20$]. So even though these people had similar recycling behaviors at Time 1, they held different attitudes, and these attitudes may have led to their improved recycling by Time 2.

Unfortunately, we don't know what changes occurred in the mediating processes of interest and organization by Time 2. At a broader level, these analyses suggest dynamic changes over time, and provide intriguing support for the model's proposal that Time 1 attitudes provided the impetus for transformed meanings and Time 2 behaviors.

Discussion

The project represents an initial study of recycling using Sansone and colleagues' (Sansone & Morgan, 1992; Sansone *et al.*, 1992; Sansone & Harackiewicz, 1996) model of how people induce

themselves to do valued but boring or uninteresting tasks. This theory posits that people who have reasons to persist in a boring task will cognitively or behaviorally transform the task in ways that make it inherently more interesting to do. Consistent with this view, people who had strong personal attitudes favoring recycling or a strong social orientation towards recycling were most likely to describe ways in which they made it more interesting. They involved their children, looked forward to smashing aluminium cans, or treated recycling as a learning experience, among other things. A substantial number said that recycling was not interesting or fun, but instead emphasized the satisfaction they experienced knowing they were helping the environment. In essence, this latter group may have redefined the task by focusing on the positive feelings it engendered rather than on specific actions of recycling. This emphasis on abstract qualities is similar to research by De Young (1985–86) whose environmentally-concerned participants endorsed items that recycling 'feels right' and gives them 'good feelings'.

The study added to the model by asking about mechanisms that made recycling easier or reduced interference. As expected, respondents with strong personal and social attitudes and positive phenomenal experiences were most likely to describe multiple ways of organizing recycling and to report fewer interferences to recycling. Furthermore, all of these variables (attitudes, interest, organizing, low interference) predicted short-term recycling and all but interest value predicted long-term recycling (people with high interest continued to recycle, but the presence of new recyclers reduced the correlation at Time 2).

Future research needs to establish that changes in phenomenal experience actually occur among recyclers. Sansone *et al.* (1992) were able to create a novel task which enabled them to study changes in phenomenal experience. We studied people who were already recycling and who, according to the theory, had already redefined the task. It will be important to determine whether successful recyclers actually changed their views or if they had at the outset actually experienced recycling as interesting and fun.

It is important to note that the model describes complex processes, making it difficult to identify a clear separation between the initial 'attitude' and subsequent cognitions about the phenomenal experience. Sansone and colleagues (Sansone & Morgan, 1992; Sansone *et al.*, 1992; Sansone & Harackiewicz, 1996) stress these dynamic qualities,

suggesting that reasons to persist (our 'attitudes') and task definitions are inter-dependent and can change over time. So, for example, saying 'people with strong attitudes *devise* ways of making recycling interesting' (a linear causal direction from attitudes to transformed interests) can be accurate, as can saying 'people who find recycling interesting *develop* strong prorecycling attitudes' (linear cause from acts to attitudes, *cf.* McCarty & Shrum, 1994, whose path analysis indicated that perceived inconvenience led to *less* favorable recycling attitudes). It may also be true that 'the association between attitudes and interest value *grows slowly and reciprocally*, with attitudes leading to transformed interests and positive phenomenal experiences, and phenomenal experience and actions strengthening attitudes over time'. Acknowledging causal complexity does not mean that one should abandon attempts to study causal processes, it simply means that in natural settings, this may be difficult.

One strategy for accessing these processes is to study critical events when part of the total attitude/interest/organization/action system changes. People whose interests emphasized working with their children would need alternatives when the children move away. Indeed, people who only recycle to support their children's projects and who do not develop strong independent reasons for recycling would be expected to stop when the children leave. Only parents with prorecycling attitudes (whether they preceded or followed action) should find new ways of transforming the task once the children move away.

Another example of the potential to study these processes in dynamic ways is suggested by the seemingly superficial interest values reported by some respondents. Several respondents reported short-term attractions such as the challenge of effectively crushing cans, or the enjoyment of seeing different kinds of bottles. It is possible that these pleasures wane over time, such that people who initially responded to a more superficial aspect of recycling would become bored and would need to find alternative ways of maintaining a commitment to the task. It is also possible that the short-term pleasures serve a purpose by maintaining the behavior until a system is in place to make it easier to do; at such a time, strong levels of attitudes, interest, and satisfaction may no longer be as necessary. The issue of superficial pleasures may be of particular importance to people tempted to use 'fun' as a way of attracting people to recycling. Our perspective suggests that unless the 'fun' is genuine and enduring, or unless it is bolstered by strong reasons

to persist, the strategy should have short-term but no long-term impact. These questions can be addressed in future research.

And finally, it is important to ask whether the kinds of strategies that emerged in this study would be sufficient to maintain a broader variety of more difficult behaviors. De Young (1996) discussed the role of intrinsic motivation in maintaining the entire array of behaviors that compose the 'reduced consumption lifestyle'. In a series of nine studies spanning 10 years, his research participants reported gaining satisfaction from many conserving behaviors (scores of approximately four on five-point scales). Consistent with our view that there is a dynamic process involved, he suggested that 'intrinsic motives could be nurtured and developed' (p. 365). For example, he cited work on energy conservation suggesting that people got caught up in the challenge of lowering their energy use (p. 365). It would be interesting to know whether Sansone and colleague's model can account for energy conservation as well as recycling.

In comparing their model with other work on intrinsic motivation, Sansone and Harackiewicz (1996) distinguished between their emphasis on positive phenomenal experiences and others' emphasis on self-directedness and the need for strong reasons for engaging in the behavior, saying:

[Other authors] recently suggested that ... emphasizing the rationale behind and value of continued performance [can lead to] internalization in which the individual feels more self-directed than other-directed. In this instance, performance of an activity continues to be boring or unpleasant, but motivation is maintained through positive feelings of self-determination ... (Sansone & Harackiewicz, 1996, p. 218.)

While we (and Sansone & Harackiewicz) agree with authors who say that behavior is more likely to continue if a person has a strong reason to persist and feels self-directed (Deci & Ryan, 1987; Ryan & Stiller, 1991; Ryan *et al.*, 1991; Deci, 1992), we believe that Sansone and Harackiewicz are also correct: it is a lot easier to maintain behavior if one can identify and focus on its positive phenomenal features.

One aspect of motivation not considered in the present project is perceived competence or efficacy (White, 1959; Sansone, 1986). Although we did not tap competency with our measures, we did sense that some respondents took pride in how effectively they managed their household recycling. Such a sense of competency can be related to increases in

positive phenomenal experience, but only if the individual is oriented towards competency. For example, in one study (Sansone, *et al.*, 1989), students playing a computer game were either fantasy or competency oriented. Providing instructions to enhance competency actually undermined interest among those with the fantasy goal, although it increased interest for those given the competency goal. This does not mean that competency and fun cannot exist in the same individual; people are complex and can have multiple construals of and ways to achieve a goal. The research does suggest that if people have a singular definition of a task, it is important to work with that definition rather than introducing rewards or feedback about a different definition. For example, if one is trying to increase recycling in a neighborhood, children might respond better to an appeal stressing socializing (fun to get together with friends and recycle) and their parents might respond better to competency feedback (amount of recycling accomplished).

In addition to providing support for Sansone and colleagues' model of motivation for boring tasks, the present research fits with a larger body of research on recycling and other proenvironmental behaviors. It fits with work showing that a specifically measured attitude is a good predictor of a particular behavior. It complements work suggesting that attitude-behavior links are complex and are mediated or moderated by factors such as attitude strength and salience (Fazio, 1986), behavioral convenience (Derksen & Gartrell, 1993; attitudes only predicted recycling when recycling was difficult), perceived efficacy (Gerlach, 1991; people get involved if they believe they can make a difference), and norm activation (Stern *et al.*, 1993; Guagano *et al.*, 1995).

It is also consistent with a growing sense that demographic factors are no longer good predictors of proenvironmental attitudes or behaviors because environmental concerns have become widespread and transcend traditional demographic groupings (Van Liere & Dunlap, 1980; Oskamp *et al.*, 1991; Baldassare & Katz, 1992). In this particular case it is important to note that we studied a single neighborhood, and although there was variability in ages, education, and household configurations, it was still a fairly uniform, well-educated, upper-middle class neighborhood, making it difficult to obtain associations between demographics and other variables. On the other hand, even when demographic characteristics and recycling are associated, it is important to go beyond such a descriptive level and

understand what psychological processes underlie the association.

Several authors have called for research on effecting long-term, internalized behavior change around environmental issues (Katzev & Johnson, 1987; De Young, 1993, 1996; Werner *et al.*, 1995). By suggesting mechanisms that help to sustain recycling, this project joins the others. But the model's emphasis on self-generated satisfactions might leave one wondering how to use it to effect change; how do you convince someone this is fun or interesting to do? Rather than take on that challenge, the present study proposes a different route. The model allows for interventions that spark interest without being coercive—that persuade about, teach reasons for the behavior, or that use social modeling and suggestion. The resulting changed attitudes—reasons to persist—become the impetus for the cognitive transformations that sustain behavior. Years of research on self-persuasion tell us that people are most persuaded by arguments they themselves generate (see Petty & Cacioppo, 1981, Ch. 8). It does not surprise us that people will also be their own best source for ways of making boring tasks phenomenally interesting.

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Notes

(1) Much of the Method section is paraphrased from Werner *et al.* (1995). The treatment was designed to increase participation in the curbside recycling program. In the present manuscript, we consider both curbside and noncurbside recycling as equivalent, so treatment effects are not the focus of analysis and are ignored.

(2) Recycling had been the subject of in-school recycling education programs, and we wondered whether families

with school-aged children would be more likely to recycle than other types of households. A comparison of families with and without children yielded unanticipated findings. Although the two groups did not differ in their recycling scores, overall attitudes, or interest values (F approximately 1), they did differ in their day-to-day recycling strategies. Compared to families with school-aged children, couples without children reported being somewhat more organized (1.29 vs 1.06), $F(1, 72) = 3.17$, $p < 0.08$, and experiencing fewer interferences to recycling (1.00 vs 1.27), $F(1, 79) = 4.59$, $p < 0.035$. These are provocative findings, worthy of future research (Did children bring home their new recycling knowledge? Without the education programs, would child-free couples be more likely to recycle than families? How can recycling become part of families' everyday behaviors?).

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