Design Influences on Composting Behavior in Three Cornell Eateries

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ABSTRACT

Cornell University is a leading institution in promoting environmental awareness and practices that reduce the university’s impact on the surrounding area. One such practice is composting, which has become an integral part of waste disposal at every eatery across campus. However, composting rates are variable and the reasons behind these differences have not been fully examined. This study investigates the influence of environmental aesthetics, crowding, and the location of composting bins on the decision made by consumers to compost their waste purchased from the Cornell eateries Manndibles Cafe, Trillium, and The Terrace. Observations of the composting habits of people during crowded versus uncrowded times revealed that composting rates increased with crowding at Trillium. When the survey responses and observations were compiled, Manndibles Café appeared to be the most compost-friendly eatery. The convenience of composting bin locations was reported by survey participants as one of the most important factors influencing composting behavior. Future studies should further examine the effects of signage on composting participation and seek to identify specific ways to improve all three eateries.
INTRODUCTION

Landfill waste creates numerous environmental problems including the leaching of pollutants and the production of methane, a potent greenhouse gas (Valerio 2010). Composting is a waste diversion technique for organic material widely used throughout Cornell’s dining locations that not only keeps the waste out of landfills, but also can later be used to nourish the soil. While eateries at Cornell provide opportunities for composting they are not always taken advantage of. Different campus clubs or eateries themselves try to encourage composting however the effects of social pressure, design, and timing on composting are unknown. This study aims to investigate these variables in order to identify beneficial design elements in eateries that encourage composting which will help maximize participation around campus.

Literature Review:

The food waste produced by college campus dining facilities presents a unique situation for composting. While there have been previous investigations into promoting community composting for family households (Block 1998), there are few studies of the factors that influence student composting rates. Managing the compost pile is the most common deterrent for household composters (Block 1998). It is therefore interesting that composting rates are still low in some dining facilities even though the student consumer only needs to sort their waste. Dining halls on Cornell’s campus have taken the effort to make “post-plate separation at dining halls easy” however other disincentives on composting have appeared (Schwarz 2009).

Cornell University began composting food scraps from the campus’ dining facilities in December 1997. It was estimated that this initiative diverted about 700 tons or about 17% of Cornell’s total annual waste that had been going to a landfill (Schwarz 2009). Only pre-consumer organic material was being composted until 2006 when during the academic year of
05-06, students set up post-consumer composting through Cornell Dining (Schwarz 2009). Since then, Cornell and student clubs have been trying to encourage students to compost by posting signage that explains the sorting procedure. An eatery that simply sets out composting bins and assumes people will compost out of environmental concern will most likely have a low rate of composting (Ying 2010).

A major factor of high composting rates that has emerged from the observations and input of college students over the past decade is the importance of biodegradable and compostable alternatives to conventional plastic packaging of food in dining halls (Song 2009). At Texas State University in San Marcos, students feel it is difficult to separate their waste products because none of the containers are recyclable or compostable (Sullivan 2010). They want to incorporate “product stewardship” into their dining halls, meaning selling food packaging that can be thrown in a composting bin without the need for separation. At the University of North Carolina-Charlotte, composting rates improved and there was less compost contamination when no food was sold in plastic containers (Stats on University Composting 2006). Cornell eateries around campus have begun to sell food in compostable containers; however students can still be confused since not all of the packaging is compostable.

Another factor examined in this study is the influence of environmental aesthetics, meaning an aesthetic that increases environmental awareness through promoting an environmental-friendly atmosphere. The effect of this aesthetic in an eatery is echoed by the words of a student at Vanderbilt University who said that it would be “ridiculous to throw away food scraps in a green-centered dining hall” (Sullivan 2010). Inspiring a positive attitude in a consumer towards composting has been shown to significantly influence their decision to
compost (Taylor 1997). This can be done through positive signage or imagery surrounding composting bins.

Crowding, like such that might happen during a busy lunch time at an eatery, affects people’s behaviors and attitudes. Since positive attitudes towards waste management programs have been shown to improve composting rates (Ying 2010), the negative influence of crowding on most people could change composting behavior. In addition, the composting habits of other individuals have been shown to have a strong impact on others (Edgerton 2009; Park 1998). Student eateries around Cornell’s campus often become very crowded during the lunch hours and composting rates could possibly be influenced.

In summary, much effort has been put into the initial set up of composting in dining facilities across the nation, yet there are still limited studies of the best ways to encourage people to compost. There are no previous published studies that examine the effects of crowding on student composting rates or comparisons of composting rates in relation to the location of composting bins. There have been limited studies on the influence of positive environmental attitudes on composting (c.f. Edgerton 2009; Park 1998; Taylor 1997); however this study examines a correlation between those attitudes and an environmental-friendly aesthetic.

This study investigates the physical design elements and social pressures that influence the decision made by students and faculty consumers to compost their waste purchased from the Cornell eateries Manndibles, Trillium, and The Terrace. Variables such as an environmental aesthetic within the eatery, crowding, and the location of the composting bins were evaluated through observations of composting behavior between and during class periods around the lunch hours and survey responses. Environmental aesthetics that promote “green” behavior were predicted to have the strongest positive correlation with higher composting rates in Manndibles.
Crowding was expected to have a negative impact on composting rates in all three eateries.

Finally, a convenient and visible location of composting bins was predicted to improve composting rates in each eatery and was expected to be important in the survey responses.

**METHODS**

**Design**: The observation portion of this study was conducted at three independent dining locations that had similarities and differences between three independent variables of timing of day, convenience, and environmental aesthetics, meaning the ambience of the eatery promoted environmental awareness. The dependent variable was the number of people composting when different combinations of these variables were examined. Observations were made at different times of the day to observe changes in composting behavior when an area was crowded. These comparisons were made at Manndibles Café and Trillium where facilities are especially crowded during the lunch hours. The effect of the convenience of composting was compared by observing composting behavior at the different locations which have different bin placement that may not be optimal. The effects of the variation in environmental aesthetics of each dining location were compared through observed composting behavior.

The survey portion of this study was sent out to students across campus on various list-serves who were told that the purpose of the study was to gather data on student opinions of composting at the three separate campus eateries for a class. The independent variable was the student participant, while the dependent variable was the self-reported behaviors on composting. The survey was meant to evaluate student’s perception of the three variables at each dining location. Participants were asked on a scale of 1 (never) to 10 (always) how often they would compost at each location when they had compostable items to dispose of. In addition, they were
asked to identify the most important factor influencing their decision to compost. Participants also stated their opinion on statements about crowding and the dining aesthetics on a scale of strongly disagree to strongly agree. The survey is attached in the appendix.

Participants:

**Number of survey participants:** 59

**Number of composting individuals observed:** 475

All participants were part of the Cornell community, but the majority observed was undergraduates, both male and female, within the average college student age of 18 to 22 years old. Previous composting experience was assumed to be equal for all participants and limited to a basic understanding of what composting is and the information on signage within each location. The sample was random within the consumers of each location who were throwing away waste that could be composted.

Possible sources of error for the survey include a bias of the people surveyed because the survey was sent out on specific list serves instead of being open to the entire Cornell community. Another source of error when comparing the survey responses to composting observations is that the people surveyed were different than those we observed so there might be differences in composting behavior.

**Apparatus/Setting:**

These three eateries on campus were chosen because of their specifically strong characteristics in relation to our variables. Manndibles Café has a unique aesthetic that promotes environmental
awareness, Trillium is one of the most crowded eateries on campus around lunch time, and the Terrace has inconvenient composting bin locations.

*Manndibles Café:* Located in Mann Library, Manndibles Café is independent of the Cornell Dining system and therefore has the freedom to promote itself as a unique, environmentally-conscious eatery. The food selection is almost entirely organic and local, and the walls are covered in local art. Mann Library is in the College of Agriculture and Life Sciences (CALS) where the majority of environmental studies undergraduates and faculty are concentrated. The café is smaller than the two other dining locations and has a smaller menu. The majority of items sold have compostable containers and there are only compostable utensils within the café. There are more compost bins than trashcans.

*Trillium Dining Location:* Also located within CALS, this dining location is the largest of the three observed in this study. There are two floors where students can sit and dine and Cornell Dining food is sold on the first floor. There is one major composting and trash area on the first floor with clear signage, and one trashcan, recycling bin, and composting bin on the second floor. This dining location attracts some of the same people who frequent Manndibles Café due to its location. The aesthetic of the eatery is relaxed and has brightly colored walls.
The Terrace Dining Location: Located within Statler Hall and part of the Hotel School, the Terrace has a business-like atmosphere and mostly attracts students from the hotel administration and business majors. The seating area is broken up into three rooms with limited composting locations. There is one composting bin by the main exit area and a small separate alcove in the back with some composting bins. However, there are mostly trashcans spread throughout the dining area. The food sold here is similar to that sold at Trillium.

![The Terrace Layout](image)

X ~ trash cans  
- the green box represents the garbage disposal site that has composting, recycling and trash

Procedures: The composting survey was sent out on email list-serves with a basic explanation of the study. During observations, the observer discreetly watched only people with compostable items as they approached a disposal area and tallied whether they composted over a period of twenty minutes. These people were not informed of being observed and weren’t influenced by the actions of the observer. Composting behavior was observed at each location within a twenty minute time window. Only people with compostable items were counted and were each given only one tally mark on a checklist whether they composted an item or not.
RESULTS

Observations:

The number of consumers with compostable waste under what was considered favorable composting conditions at each location (uncrowded or nearby composting bins) was tallied during each observation period and averaged (Figure 2). When standard deviation error bars were included, the Terrace and Manndibles had significantly higher composting than non-composting rates. Trillium had a higher rate of not composting when possible; however the difference was not significant (Figure 2).

![Figure 2. Average composting behavior across each eatery](image)

Composting rate percentages in Trillium and Manndibles were compared during crowded versus uncrowded times (Figure 3). Manndibles had very similar percentages despite crowding while a greater percentage of people composted in Trillium when it was crowded (Figure 3).
Additional Observations that were noted during observations of eateries were:

1) **Terrace**

   People spent longer looking at the signs and deciding what could and couldn’t be composted compared to Manndibles where people appeared to have prior knowledge of compostable items.

2) **Manndibles Café**

   People would almost throw something away but then compost because all they had to do was barely take a step over. People who didn't compost seemed either crowded out or weren't really thinking about it. There are more opportunities to compost in Manndibles than actually throw something in the trash.

3) **Trillium Observations**

   The staff members were the worst culprits. When a group of people come up to the garbage station, if the first person did not compost, the rest did not compost either. The people that did compost were mostly disposing of their garbage alone.
Survey:
There were a total of 59 participants in the survey. 80% reported that they composted >50% of the last ten times they ate lunch on campus. For Manndibles café, on a scale of 1 to 10 where 1=never and 10=always, 74% of participants responded with an 8 or higher and the convenient/inconvenient location of the composting bins was cited as the most important factor influencing their decision. For Trillium, 68% of participants responded with an 8 or higher and the convenient/inconvenient location of the composting bins was cited as the most important factor influencing their decision. For The Terrace, 44% of participants responded with an 8 or higher and the convenient/inconvenient location of the composting bins was cited as the most important factor influencing their decision (Figure 4).

DISCUSSION
This study sought to identify the physical design elements and social pressure variability between the three Cornell campus eateries Manndibles, Trillium, and The Terrace that influence
the decision made by students and faculty consumers to compost their waste when possible. Observations and survey responses examined variables such as an environmental aesthetic within the eatery, crowding, and the location of the composting bins.

Manndibles Café appeared to be the most composting-friendly location of the three eateries in this study. 34 out of 59 survey participants “strongly agreed” that Manndibles Cafe has an environmentally friendly aesthetic and the majority agreed that it was convenient to compost there as well. Observations also revealed that whether the eatery was crowded or not did not seem to reduce the high rate of composting (Figure 3). This correlation suggests that the Café has an aesthetic that promotes awareness of composting. Figure 1 shows the aesthetic and extremely convenient composting layout that Manndibles has put in place to promote composting rates.

A confounding result that was observed but not expected was that composting rates were higher when Trillium was not crowded versus crowded (Figure 3 and Figure 4). However, notes taken during observations revealed the social influence of individuals on group composting. This social factor of the influence of one individual has been previously shown to have a strong affect (Edgerton 2009; Park 1998). Therefore, it can be speculated that when people approach a waste station in groups, composting rates were biased because the decision to compost relied less upon the individual, and more on the group’s decision to compost based off the first person.

The results of this study reveal that the Cornell community is willing to compost, but needs encouragement. The survey results and observations suggest that the convenient location of bins is the most important factor (Figure 4). The inconvenient location of composting bins as shown by the Terrace layout, reveals that the eatery had lower composting rates (Figure 2). Also
there was a lower reported rate of composting from the survey results suggesting that people do not find it easy to compost at the Terrace.

Mandibles Café had the highest composting rates however it is an independent dining location, so they are able to choose all of their packaging and utensils to be compostable. The importance of biodegradable and compostable alternatives to conventional plastic packaging of food in eateries to composting rates has been shown before (Song 2009). Trillium and Terrace are Cornell Dining eateries that have less control on which products they can sell. Therefore, a possible explanation to why they had less composting participation reported in the survey responses might have been because their products were not as clearly compostable.

Student groups have previously tried to increase composting rates by having a person available to inform students of what can and cannot be composted thereby improving attitudes towards composting which has been shown to improve rates (Ying 2010). However, there have not been any studies specifically comparing the physical design elements of the different eateries around the Cornell campus. This study brings a new perspective focusing on the eatery instead of packaging, however it seems this is a limitation of the study and a combined analysis should be done next.

Limitations of this study include a limited sample size meaning it could have been biased towards people with particular attitudes or prior knowledge of composting. The influence of signage was not investigated in this study, however it is clear from observations of people deciding whether to compost and survey responses that this is a strong factor in the decision of whether people compost. Most people have a general concept of the fact that only organic and paper products should be composted. Therefore, with some packaging that appears plastic they become hesitant without a clear explanation of whether or not it can be composted. Thus, for
dining locations to really improve their composting rates, they should make the transition to compostable packaging. Future research should include more eateries around campus and incorporate the influence of signage on composting participation.
REFERENCES


APPENDIX

A. SURVEY

Cornell Student Composting Survey

College: 
Year: 

1. Of the past ten times you ate lunch on campus, estimate the percentage of the times you composted:

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<tr>
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<th>0%</th>
<th>0-25%</th>
<th>25-50%</th>
<th>50-75%</th>
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2. On a scale of 1 to 10 where 1=never and 10=always, how often do you compost when you eat lunch at the following eateries (mark with an x in the appropriate box):

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<td>Manndibles</td>
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What is the most important factor influencing your decision (choose one)?

A. Convenient/inconvenient location of composting bins
B. Aesthetic of the eatery
C. Social influence
D. Extra time to sort waste
E. Other: _____________________________

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<th>2</th>
<th>3</th>
<th>4</th>
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<td>Trillium</td>
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C. Social influence
D. Extra time to sort waste
E. Other: _____________________________

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<td>The Terrace</td>
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A. Convenient/inconvenient location of composting bins
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C. Social influence
D. Extra time to sort waste
E. Other: _____________________________

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<tr>
<th>Questions</th>
<th>RATING</th>
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<tr>
<td></td>
<td>Strongly Agree</td>
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<tr>
<td>COMPOSTING ON CAMPUS</td>
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<tr>
<td>Composting at Manndibles Café is convenient.</td>
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<tr>
<td>There is an environmentally friendly aesthetic in Manndibles.</td>
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<tr>
<td>I am less likely to compost when in a hurry.</td>
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<tr>
<td>Composting at Trillium is convenient.</td>
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<tr>
<td>Composting at The Terrace is convenient.</td>
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<tr>
<td>I will go out of my way to compost, even if it isn’t convenient.</td>
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<tr>
<td>Knowing what can and can’t be composted is easy.</td>
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Other Comments:

Thank you!