

Train Ticket Vending and the Principle of Least Effort

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### Abstract

In a brief observational study, individuals were directly observed as they purchased train tickets in an urban train station, choosing between Ticket Vending Machines (TVMs) and Terminal Ticket Counters (TTCs). Of the 117 observed customers, 67% purchased tickets at TTCs and 33% purchased tickets at TVMs. Based on the Principle of Least Effort, customers perceived TTCs to require the least effort. However, there was an inverse relationship between age and use of TVMs. Those in their twenties used TVMs most often (52%) while those in their sixties or older used them least (0%). The data indicate there may be a generational difference in ticket vending and perceived least effort which warrants further study.

## Train Ticket Vending and the Principle of Least Effort

Most people can agree that human beings tend to follow the path of least resistance; this concept can be extended to include the way in which individuals gather information. Zipf defined this idea as “a single unifying principle... defined as meaning that each individual will adopt a course of action that will involve the expenditure of the probably least average of his work” (1949). Bierbaum outlined the paradigm of the Principle of Least Effort and encouraged librarians to utilize this enveloping paradigm as a unifying underpinning of research efforts (1990).

In an attempt to witness this phenomenon in a brief observational study, individuals were directly observed as they purchased train tickets in an urban train station, choosing between Ticket Vending Machines (TVMs) and Terminal Ticket Counters (TTCs). Level of effort required for each vending method was based on the average number of micro interactions required to complete the ticket purchase. This study sought to gain insight into which method of ticket vending was used the most, thereby indicating which method was perceived by customers to require the least effort.

Direct observation of public behavior was the chosen method of study as it offers direct contact between the researcher and the phenomenon being studied as well as high potential for reliability (Wallace & Van Fleet, 2012, ch. 9).

This study sought to answer the following questions: 1) Which method of ticket vending is used most often? 2) Which method of ticket vending requires least effort? 3) Are the purchasing patterns of customers accompanied by young children different from those who are not?

## **Method**

### **Subjects**

Research subjects were individuals in the New Haven Metro-North train station who were purchasing train tickets on a weekend morning. If a group, family, or couple purchased tickets, only the individual who actively purchased the tickets was counted.

### **Instruments**

Data were collected by counting each individual who actively purchased tickets during the research time period. Details were collected on which method of ticket vending was used, perceived age and gender, and presence of young children. Microsoft Excel was used to create a spreadsheet for data collection (Appendix A). The observer was able to check the corresponding boxes for each research subject with one line counting as one observed person. This allowed for rapid and accurate data entry by the observer in the field.

### **Procedures**

The observer sat on a bench in the waiting area of the train station with a clear view of the ticket vending area which included both the TTCs and the TVMs. Individuals purchasing tickets were observed for 30 minutes between 10:40am and 11:10am on Saturday, April 5, 2014. There were five TTCs and four TVMs available to customers during this time period. The observer noted the average number of micro interactions required at TTCs and TVMs by counting the sets of back-and-forth exchanges required to obtain a ticket (e.g. a customer asking for a ticket and the teller asking to which station they're traveling would be counted as one micro interaction).

**Results**

After the data were collected, they were entered into an Excel spreadsheet to allow for descriptive data analysis. Over the course of the study, 117 individuals were observed purchasing tickets (see Table 1). Of those 117 individuals, there were 10 individuals who appeared to be in their teens, 42 in their twenties, 33 in their thirties, 10 in their forties, 17 in their fifties, and five in their sixties or older. Sixty-three (63) individuals appeared to be men while 54 appeared to be women. Only two individuals were traveling with young children. Sixty-seven percent (67%) of tickets were purchased at TTCs and 33% were purchased at TVMs.

<b>Variable</b>	<b>% (n)</b>
<u>Perceived Age</u>	
Teens	9% (10)
Twenties	36% (42)
Thirties	28% (33)
Forties	9% (10)
Fifties	15% (17)
Sixties+	4% (5)
<u>Perceived Gender</u>	
Woman	46% (54)
Man	54% (63)
<u>Traveling w/child 6 &amp; under</u>	
Yes	2% (2)
No	98% (115)
<u>Where ticket purchased</u>	
TTC	67% (78)
TVM to TTC	2% (2)
TVM	33% (39)
TTC to TVM	3% (1)

Table 1

A total of three individuals started in line at one method and switched to the other; while this was noted, they were counted based on where they finally purchased their ticket (see Table 1). Of the women, 70% bought their tickets at a TTC while men bought 64% of their tickets at a TTC (see Figure 1).

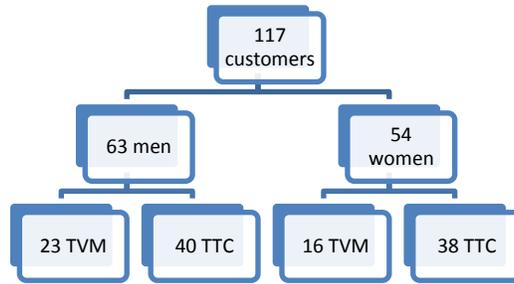


Figure 1

Of those who appeared to be in their teens and twenties, 44% chose TVMs while 33% of those in their thirties and forties chose TVMs and those in their fifties and sixties and older, 14% (see Figure 2). Of all groups, those in their twenties used TVMs the most (52%) while those in their sixties or older used them the least (0%).

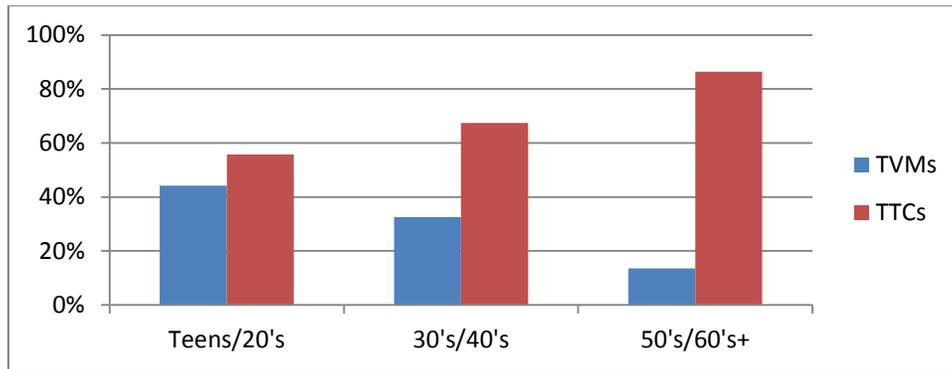


Figure 2

### Discussion

With TTCs accounting for 66% of all ticket purchases, the TTCs were greatly favored over TVMs by all observed customers.

Based on observation, individuals using TVMs completed approximately seven micro interactions while individuals using TTCs completed approximately three micro interactions. Based on the Principle of Least Effort, it follows that more individuals would use the TTCs since it requires less effort. The data demonstrates this interaction very well. However, the data also indicates there is a large difference in purchasing method between customers in their twenties and those in their sixties and older. Based on Figure 2, there appears to be an inverse relationship

between age and use of TVMs. This difference could occur for many different reasons. It could be younger customers find navigating digitally easier while older customers find it more difficult (Siebenhandl, Schreder, Smuc, Mayr, & Nagl, 2013). It could also be that younger customers perceive TVMs to require less effort while older customers perceive the TTCs to require less effort and therefore, older customers have better alignment between perceived and actual effort.

While this study did collect data about those traveling with young children to see if there was a difference of behavior in those who traveled with young children and those who did not, there was not sufficient data to compare these two groups. Further study would be necessary to answer this research question.

### **Study Limitations**

The observation was of an urban commuter train station serving the greater NYC area; behavior may be different in other metropolitan areas or for different forms of transportation (e.g. bus, subway). The study results may not be comparable to weekday travelers and took place for only 30 minutes so it may not be representative of weekend travelers during different times of day. There was only one observer so some customers may have been missed. Age and gender were estimated by the observer and may not have been accurate. The length of the line to access either the TVMs or TTCs was not taken into account.

### **Conclusions**

While this study had many limitations, it produced interesting results. The data clearly showed customers utilize TTCs more often than TVMs, though customer age appears to be an important factor. There was insufficient data to assess differences between those traveling with young children and those without young children. Further study into ticket vending behavior and the influence of generational differences and traveling with young children is warranted.

### References

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