PRIVATE TIME ON PUBLIC TRANSIT:
DIMENSIONS OF INFORMATION AND TELECOMMUNICATION USE OF CHICAGO TRANSIT RIDERS

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ABSTRACT

The variety of activities one can engage in while traveling is thought to give some utility to the trip, and this has implications for mode choice and transit customer satisfaction. In particular, use of information and telecommunication devices allows riders to stay connected and may thus improve their perception and rating of their transit experience. An econometric analysis of responses to a survey of Chicago Transit Authority (CTA) train riders suggests that activity participation (particularly information and communication technology [ICT] use), environmental attitudes, and proximity to destination are all significant predictors of whether an individual would consider riding transit in Chicago as “a better use of time and/or money than driving”. Further models relate information and communication activity engagement on board transit vehicles to the riders’ attributes and trip characteristics. The strong preference of individuals under 30 for audio/visual and cell phone use, compared to the preference among older individuals for reading, suggests evolving factors to consider in designing and marketing a total transit experience. The work presented in this paper provides insight into an emerging phenomenon in the realm of communication-transportation interaction.

INTRODUCTION

As traffic congestion and vehicle miles travelled grow each year in Chicago as in most large cities around the world, transit attributes that might entice potential users to get off the roads will play an important role in travel demand management. A recent study in Wellington, New Zealand concluded that transit vehicles satisfy neither the need for social interaction nor the need for privacy (*1*). The Illinois Department of Transportation has investigated broadband access for passenger rail in order to attract commuters and business travelers (*2*). Riders on trains operated by Metra, the passenger rail company serving Northeast Illinois, have expressed concern about "lost productivity" due to lack of wireless internet on the trains (*3*).

Smart phones and personal digital assistants (PDAs) allow transit users to answer e-mail, play games, and get directions or other information on the way to their destination. One can read or listen to books or music on the train without having to compromise the content with travel companions, as one might do in an automobile. In addition to being entertaining and possibly useful, these activities also serve to assist humans in their avoidance of one another in crowded public spaces. Individuals, at least in western cultures, generally desire to remain inconspicuous when surrounded by strangers, yet need to maintain high situational awareness in order to protect themselves (*4,5*); the ability to engage in a variety of activities on board may make transit less stressful in this regard. Those individuals who wish to be conspicuous can use electronics for this as well.

Individuals satisfying their needs while maximizing the utility derived from activities undertaken represents the dominant paradigm for transportation planning. Travel itself is usually treated as a cost to be minimized and merely a means to accessing those activities. It is assumed that people will trade a slow, inexpensive trip for a fast, expensive one subject to personal constraints and preferences. Travel time is one of the largest categories of transport costs, and time savings are often claimed to be the greatest benefit of transport projects such as roadway and public transit improvements. Factors such as traveler comfort and travel reliability are quantified by adjusting travel time cost values. The growing desire for productivity and stimulation that drives the use of electronic devices could be facilitating a shift in the time spent in transit and how individuals perceive that time use, and eventually in transit use and satisfaction. An understanding of these motivations can advise policymakers on the best return for their investment in telecommunications for transportation infrastructure, particularly where younger, impressionable riders, among whom information and communication technology (ICT) use is widespread, are concerned. Travel behavior and telecommunications use are becoming more intertwined *(6)*, and as such understanding and characterizing this interaction is necessary for travel demand models.

As we shift to an activity-based perspective on travel demand, it is reasonable to recognize travel as a primary activity which may afford time for secondary activities. The ability to multitask during travel is not a new concept, as people have always been able to read or socialize on trains, but ICT use has so expanded one's activity options that its effects should be examined. Golob and Regan *(6)* suggest that in the information age, activity patterns are a function of IT availability, and demand for IT is likely a function of demand for certain activity patterns. The work presented in this paper provides new insight into an emerging phenomenon in the still evolving realm of communication-transportation interaction.

This work seeks to answer the following questions: (1) how do attitudes and activity engagement affect customer satisfaction on public transit, and (2) can activity engagement (specifically, ICT activities) on board the train be explained via simple models using readily available demographic data? We hypothesize that the ability to engage in a variety of activities and use travel time productively has a positive influence on riders' rating of the system, and perhaps increases the perceived value of time. Accordingly, econometric models are employed to relate the belief that "transit is a better use of time and/or money than driving" to respondents' socio-demographic characteristics and activity engagement patterns, with particular emphasis on ICT use. The latter is examined in some detail through models intended to estimate effects of socio-demographic and trip characteristics on activity engagement. The goal of the model estimation was to understand influences on riders' activity engagement as well as how these variables affect satisfaction with the transit service and their reasons for choosing transit for a given trip. To lend credibility to web-based survey results, personal observations of riders were recorded at different times of day.

The remainder of this paper is divided into four sections. Some existing work concerning ICT use and travel motives is presented, followed by a description of the survey of activity engagement of Chicago Transit Authority (CTA) train riders. We present the results of the logit models and close with some brief conclusions and recommendations for future work.

BACKGROUND AND EXISTING WORK

The typical urban transit ride consists primarily of trying to occupy one's time and, usually, remain inconspicuous *(4)*. Riders tend to avoid awkward eye contact by looking out windows, reading books, or tapping on their cell phones. This desire to "privatize" the public space, or tendency towards "cocooning", is compounded by the occasional possibility that one will be forced to share the space with individuals emitting unpleasant odors, sounds, gestures or other visual cues. In the past, riders may have had to settle for a book; a slew of electronic devices allow today's riders a high tech escape from the annoyances of other passengers. MP3 players are particularly handy for ignoring strangers, whether the conversation is friendly or threatening. Lyons and Urry *(7)* note that "carcooning" allows a passenger to create an entire "soundscape" based on mood and destination, and transit passengers can now do the same. The mobilization of information and entertainment affords transit travelers a variety of activities.

Travel models tend to take a utility maximizing approach, and utility has many forms and motives. Davis and Levine *(8)* suggest that the lack of things to do on board transit means riders treat trips as "instrumental" (a means to achieving something). They hypothesize that as the world continues to move faster, however, trips may become more "affective" (emotional, relating to feelings), as a nostalgia for the past emerges out of riders' disdain for the harried present. Changing society may well increase both the instrumental and affective motives for transit use.

Symbolic motives—what travel and how it is conducted represent for an individual—are a third motive that plays a part in travel decisions. Steg *(10)* found that for commuters in the Netherlands, car use was more strongly related to symbolic and affective motives than instrumental ones. Choo and Mokhtarian *(11)* find that luxury car owners are often higher educated, have higher incomes, and are more “status seeking” than other drivers, for example. Some people use their cars as an expression of themselves or their personal attitudes or beliefs, a finding further confirmed by surveys of Prius drivers *(12)*. These symbolic motives encourage airline passengers to pay premium prices for visible separation and a higher level of service in first or business class *(5)*. Transit users, on the other hand, do not have these options for special seating or treatment. The exposure to complete strangers whom one does not select means social status, though widely transferable across other activities in life, does not transfer to transit *(13)*. Wealthy Chicago residents in the 1920s considered it “unfortunate to go to functions via the street car or the Yellow cab” *(14)*, and these perceptions may persist. Today, expensive electronics and carefully selected book titles may serve some of the same symbolic purposes.

To the extent that many of these symbolic motives are often correlated with education and income, one could speculate that the individuals who care more about symbolic motives may also care about their productivity. People who are able to use travel time productively have a smaller disutility for travel *(15)*. A desire for productivity may influence travel decisions, as pointed out by Mokhtarian et al. *(16)*, since multitasking can be achieved by altering activity mode, location or timing. Characteristics of transit’s choice users could inform this issue. Put another way, can love of the internet replace the so-called “love affair with the automobile”?

There is evidence that value of time varies depending on attributes of the time or how the time is spent. Horowitz *(17)* used psychological scaling techniques to show how the value of time spent in travel varied with trip length, time period, trip purpose, travel mode, and environmental conditions. All variables except the time period when the trip was undertaken were found to affect an individual’s subjective value of time. More recently, Hensher *(18)* found the value of travel time savings to decline as the number of passengers increased. One could speculate that spending time with others, an affective motive for traveling in groups, has some value of its own. It has been suggested that when travel time is spent doing other activities, it may not be considered travel time at all, challenging the notions that travel is wasted time with a fixed budget *(7)*.

Choo and Mokhtarian *(18)* explored the relationships among economic activity, land use, and transportation and telecommunications supply, demand, and cost using time series data from 1950- 2000. They conclude that travel demand has a positive effect on the number of mobile phone subscribers, and suspect the relationship has a positive impact in the reverse direction that is counteracted by the efficiency and flexibility that mobile phone use affords for travel. They recommend that telecommunications questions be added to national travel and activity diary surveys (a recommendation that appears to have been more or less ignored up to now) due to the non-negligible effect of telecommunications on travel demand. Even if ICT use doesn't reduce travel, it does make it more efficient in terms of routing and scheduling *(19)*. Since the variables in their study are based on time series data, and these efficiencies may not apply to an individual's regular routes, which remain relatively stable overtime. More information about how individuals are *using* ICT would add value to the discussion.

DATA

A two-pronged survey approach was followed to collect the data for this study. First, transit users were observed while riding the CTA, and gender, approximate age, group size, activities and, sometimes, behavior were recorded. This yields a rough approximation for the demographics of users on the lines by time of day. In a second step, a quantitative web-based survey was constructed to ask the public transit users in particular about their choice and time use. Both survey methods are described in Table 1.

TABLE 1. Survey Methods

Survey Approach		Obs.
Observing train riders	Red line north and purple line, inbound and outbound, during different times of weekdays and weekends	400
Quantitative data through web-based survey	Online distribution and intercepting passengers at stations	336

Anecdotal data was collected onboard from the "Loop" (Chicago's central business district) northward to the suburb of Evanston in order to determine which traits and activities were of most interest for the quantitative survey. In this distance of approximately 12 miles (20 kilometers), the tracks cross neighborhoods of varying affluence[1] and many colleges and universities, constituting a fairly diverse ridership. Other transit lines, particularly those serving communities on the south and west sides, remain to be investigated.

Entering and exiting passengers were given the link to the online survey at CTA stations during April 2010. After an initially low response, the link was distributed through Northwestern University Transportation Center e-mail lists. The CTA Tattler, an online blog where readers can voice complaints and praise about the service, later posted the link for its readership. These outlets constitute the majority of the responses. The responses are thus highly self-selected in the sense that all respondents have an interest in transportation issues in addition to already choosing transit for their trip.

Summary statistics for the binary responses are given in Table 2 and compared alongside values obtained from a CTA Rider/Non-Rider survey *(20)*. More than half the respondents owned

[1] From the suburb of Evanston, this route crosses through Rogers Park, Edgewater, Uptown, Lakeview, Lincoln Park, and Near North Side neighborhoods en route to the Loop.

vehicles and could be considered choice riders, confirming the supposed bias of the sample. The age of the respondents, however, was fairly well distributed[2]. Printed materials included books, magazines, and newspapers. Audio/visual electronics were any devices used to play music, watch movies, play games, or read any digital media. Captive users are those who said they "rarely" or "never" have access to a vehicle. The online survey did not ask respondents for their entry and exit points, and these were not actively observed.

TABLE 2. Summary Statistics

Variable	NUTC Survey (2010)	All CTA Customers (2009)
Male	68%	53%
Frequent rider	47%	35%
Under 25 years old	17%	19%
Employed Full Time	60%	39%
Used Cell phone/PDA	67%	70%
For work calls, e-mails, texts	23%	
For personal calls, e-mails, texts	53%	
Used Printed Materials	60%	
Used Audio/Visual Device	44%	
Access mode was walk	74%	
Access mode was bus	14%	
Own a bicycle	69%	
Household has 1+ vehicles	63%	80%
Trip purpose was "Work"	54%	58%
Travelling Alone	85%	
Choice Rider	52%	61%
N_{obs}	336	1,721

Table 3 lists the reasons cited for choosing transit over driving. The reasons were not rigidly defined, so the definitions should be taken at face value. For example, if a person chooses not to drive to work because parking near their place of employment is too expensive, but there is cheaper parking at a greater distance, their reason could be either "Riding the CTA gets me closer to my destination" if he considers all the parking available in his price range and/or "Parking is not always available or is too expensive" if he considers only the parking he would

[2] Responses were as follows: 18-24, 58; 25-30, 96; 31-35, 57; 36-40, 25; 40-55, 53; Older than 55, 44.

be willing to walk to and from. These reasons in and of themselves are intended to characterize the users and help explain their behavior on transit rather than to predict mode choice. The category "other" was any answer that did not fit with the others; these were respondents who stated they were "too drunk to drive" or enjoyed the experience, space and flexibility of transit.

TABLE 3. Reasons cited for choosing the CTA over driving/carpooling

Riding the CTA is a better use of time and/or money than driving	58.93%
I can read on board CTA trains and buses.	47.62%
Parking is not always available or is too expensive.	42.26%
By riding the CTA, I feel I am helping the environment.	40.48%
Driving or carpooling is not available to me.	27.68%
I do not like driving.	26.79%
Riding the CTA is faster than driving.	23.51%
I can call/text others while on board CTA trains and buses	17.86%
Riding the CTA gets me closer to my destination	15.77%
I can work on board CTA trains and buses.	13.39%
Riding the CTA seems safer.	5.06%
Other	5.06%

Note: the question was asked "If driving/carpooling were/are available alternative FOR THIS TRIP, why did you choose to ride the CTA?"

Since people can usually listen to music in a personal vehicle, this was not given as a reason to select transit over driving. More than 17% of the respondents cited the ability to call and text others while riding the train as an incentive to ride, suggesting that the desire to stay connected while travelling may be widespread. That parking availability appears to be a major deterrent for driving suggests Chicago's parking policies are achieving some of their goals. In terms of motives, most of these are instrumental, but environmental reasons for avoiding driving could be symbolic and affective. A dislike of driving is certainly affective.

RESULTS

The most common reason for choosing transit over driving in this survey was that transit is a "better use of time and/or money than driving". Many respondents also commented that free wi-fi would improve their time on the CTA and complained about poor cell phone reception where the trains run below the surface. Thus, the goal of the models presented is to understand how ICT activities affect the satisfaction with the service and what kinds of individuals are using ICT.

The results presented below employ binary logit models, which assume the binary variable being estimated follow a logistic distribution. This distribution is similar to the normal but with larger tails, representing larger variation, which is useful when an attribute varies widely across a population. In gathering data, we observe an estimate $\hat{y}$, not the true value y. We assume that the true value y = x**β** + ε, where **β** is a vector of coefficients and ε is an error term. The logistic cumulative distribution function is defined as follows:

$$Pr(Y = 1|X_1, X_2, \dots, X_k) = F(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k)$$
$$= \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k)}}$$

That is, the probability that a person's response to a question is "yes" (yes=1) is a function of the value of the X variables, and this probability follows the logistic distribution. The β values for each model are reported in the tables below. The coefficients of the binary logit model can be evaluated using maximum likelihood estimation.

The ordered logistic regression, or ordered logit, is an extension of the binary logit which allows for more than two response categories of the dependent variable. In this case, the variable is customer rating of the CTA on a five point scale, and the survey gave no monetary or other relative basis for this scale. Threshold values are determined for each ranking in addition to the vector of coefficients **β**.

$$\hat{y} = \begin{cases} 1 \; if \; y \le \mu_2 \\ 2 \; if \; \mu_2 < y \le \mu_3 \\ 3 \; if \; \mu_3 < y \le \mu_4 \\ 4 \; if \; \mu_4 < y \le \mu_5 \\ 5 \; if \; \mu_5 < y \end{cases}$$

CTA Rating and Time on Transit

Considering that many respondents found the survey via a CTA "watchdog" site, the respondents rated their satisfaction with the service surprisingly high—the average rating was 3.92 out of a discrete 5, and the median was 4. To explore the relative importance of factors that affect how respondents rate the service offered by the CTA, an ordered logit model with the ratings as the dependent variable was estimated. A likelihood ratio test confirms that this model presented in Table 4, with 12 degrees of freedom, is better at describing the data than a null model. Higher test values (t-values) indicate less uncertainty in the estimator, and a t-value greater than 1.96 indicates 95% certainty that the value, for this sample, is different from zero.

The results suggest that the most significant factor increasing one's rating of the CTA is whether he considers it a better use of his time/money than driving (1.07); the most significant variable reducing one's rating is the availability and willingness to pay for parking (-0.90). This result suggests that the people who rate the CTA below average would rather be driving, but are not willing to pay—this has implications for road and parking pricing policies, as well as subjective value of time and perceived time use. Also significant at the 5% level was whether the wait time for first bus or train was less than 15 minutes, which positively impacted rating, but this is due to the way the model was estimated. The coefficient for wait time greater or equal to 15 minutes on one's rating of the service would be -1.36, and this is the more reasonable direction to consider.

Since these were all train trips, wait time depends on accessibility, vehicle scheduling and time of day.

TABLE 4. Ordered Logit for Discrete Ranking of Service

Coefficients on Variables	Value	SE	t value
Better use of time/money than driving	1.07	0.24	4.49
"Parking unavailable or too expensive" as reason for not driving	-0.90	0.22	-4.11
Wait time less than 15 minutes	1.36	0.61	2.23
"CTA gets me closer to my destination than driving"	0.59	0.31	1.95
Safer	0.85	0.54	1.56
Travelling alone	0.42	0.30	1.38
Used phone or PDA for personal communication	-0.30	0.23	-1.31
Trip over 30 minutes	-0.27	0.22	-1.22
Getting directions to destination	-0.27	0.37	-0.73
Reading news/magazines	0.12	0.27	0.44
Used phone or PDA for business communication	0.09	0.27	0.34
Age- under 30	-0.05	0.22	-0.25
Intercepts between discrete rankings	Value	SE	t value
1|2, μ_2	-2.87	0.79	-3.59
2|3, μ_3	-1.44	0.71	-2.01
3|4, μ_4	0.73	0.71	1.03
4|5, μ_5	2.74	0.72	3.80
N_{obs}	336		
Likelihood-Ratio test against null model	62.41		

The results in Table 4 suggest that while personal and business communication may be important, they are no substitute for parking policies and service reliability that encourage transit use. The small and even negative effects of cell phone and PDA use are consistent with findings in other countries, and suggest that activities mask boredom (*7*). As the models presented in the rest of the paper will demonstrate, a more complex model structure is needed to understand why "Better use of time and/or money" has a significant positive effect on rating while some activities themselves have a negative coefficient.

A more interesting model is presented in Table 5. As the most significant variable leading to a positive rating was whether one considered the CTA to be a better use of time/money than driving, this model focuses on estimating this response. A binary logit model was estimated for this purpose.

That parking is significant in this model suggests these people may have a more positive attitude about their transportation in general. As stated before, proximity to one's destination (0.25) and the availability of parking (0.10) could be considered two sides of the same coin. Choice riders (0.06) are slightly more likely to say the CTA is a better use of their time/money than driving. These attitudes are perhaps strongly correlated with the environmental motivation (0.37) for using the CTA.

The activities on board suggest there may be mixed feelings about ICT and their usefulness during transportation. Use of a laptop (0.21), though limited to only 16 out of 336 cases, was remarkably significant at the 5% level. The negative coefficient and low t-value on cell phone/PDA use (-0.11, interacted with age less than 30 years) suggests there are mixed feelings about what constitutes enjoyable or productive travel time, e.g. individuals leaving work would prefer to relax by looking out the window than to continue conducting business during their commute. Use of printed materials (0.10) is significant at the 5% level and positive. The negative sign on audio/visual devices (-0.09) suggests that people are not listening to music or other recordings for their own pleasure, but perhaps in order to shield themselves from other passengers. Generally audio and visual devices were used by individuals travelling alone, so "traveling alone" (0.08) may be counteracting audio/visual device use, though such interactions were not found to be statistically significant in these simple models.

TABLE 5. Logit for response "CTA is a better use of time/money than driving"

Variable	Estimate	Std. Error	t value
(Intercept)	-0.06	0.14	-0.39
"Riding the CTA gets me closer to my destination"	0.25	0.07	3.77
"By riding the CTA, I feel I am helping the environment"	0.37	0.05	7.49
"Parking is not always available"	0.10	0.05	2.12
Choice rider	0.06	0.05	1.18
Traveling alone	0.08	0.07	1.24
Wait time less than 15 minutes	0.34	0.13	2.69
Used laptop	0.21	0.11	2.01
Used printed materials	0.10	0.05	1.98
Used audio/visual electronics	-0.09	0.05	-1.94
Used a cell phone * age 30 or younger	-0.11	0.05	-2.18
N_{obs}	336.00		
R^2	0.45		

What to Do: Activities in Transit

Three separate binary logit models, presented in Table 6, were estimated to evaluate the effects of demographic and attitudinal responses on activity engagement. Because there were so few observations of laptop use, it was not possible to establish a strong model explaining this activity. Laptops are more commonly used on commuter rail, however, so their use and subsequent impact on customer satisfaction should not be overlooked for longer distance trips. Similarly, nearly everyone on the trains used a cell phone or PDA, so without much variation in the responses, there is not sufficient basis for a good explanatory model. The columns labeled "Cell/PDA" list the results of a logit model predicting cell phone and PDA use. Two clear predictors are gender and age. Females (-0.65) and riders over age 55 (-1.00) are much less likely to use cell phones. Anecdotal evidence reveals that females, especially younger ones, tend to use cell phones at some point whether traveling alone or with a group, so the highly negative coefficient is surprising. This could reflect a bias in the data. The negative coefficients suggest the cell phone users are much younger on average, though a significant portion of riders aged 31-55 are also using cell phones and PDAs. The ability to work on board did not influence cell phone use, nor did employment status. Citing the ability to call and text on board (2.949) influenced cell phone use, but citing the ability to work did not. More exploration of what riders were using their phones for could reveal whether cell phones are used more commonly for working or keeping in touch with friends.

The results of "Printed Materials" use are in striking contrast to "Cell/PDA" and suggest there is a very clear division of activities between the different age groups. Riders over age 30 are significantly more likely that those under 30 (-0.75) to use printed materials on board. Traveling alone (1.27) is also very significant—it is much easier to focus on reading when alone, so this is expected as compared to the impact of traveling alone on cell phone use. Some respondents noted in the comments that they like to read *if* they can find a seat, but this survey did not include a question on whether or how long a rider was seated during the trip. The positive impact on reading from considering the CTA a better use of their time/money (0.82) suggests that a more sophisticated joint model structure could be used to determine to what degree these attitudes and behaviors influence one another. One could speculate that these are riders who have a more positive outlook on transit, enjoy using it, and bring things to do on the train. Such model structure would require a larger sample with better statistical properties than the one available for this exploration.

TABLE 6. Binary Logit Estimation Results for Activities

	Printed Materials			Cell/PDA			Audio/Visual Device		
Variable	β	SE	|z|	β	SE	|z|	β	SE	|z|
(Intercept)	-1.19	0.52	2.32	0.73	0.28	2.61	-2.79	0.54	5.14
Traveling alone	1.27	0.35	3.61				1.25	0.38	3.32
Better use of time/money	0.82	0.25	3.29	-0.35	0.26	1.34	-0.41	0.24	2.68
Age: 30 or younger	-0.75	0.26	2.90				0.75	0.61	1.23
Female	0.69	0.27	2.53	-0.65	0.28	2.33			
Trip length more than 30 minutes	0.52	0.27	1.97						
Used cell phone/PDA	-0.47	0.27	1.75				1.08	0.26	4.13
Employed full time	0.33	0.32	1.03				0.79	0.45	1.75
Choice Rider	-0.25	0.26	0.99						
Used audio/visual electronics				0.80	0.27	2.91			
Can call and text on board				2.95	1.04	2.83			
Age: 55 and older				-1.00	0.39	2.55			
Female * can call and text				-1.57	1.20	1.30			
Age: 31-55				-0.03	0.28	0.12			
Age 30 or young * Employed full time							-0.19	0.66	-0.28
N_{obs}	336			336			336		
R^2	0.206			0.222			0.179		

The final columns of Table 5 list coefficients estimating “Audio/Visual Device” use. The distinction in activity participation for individuals under 30 (0.75) is less clear here, and the likelihood of using these devices is more dependent upon whether one is employed full time (though many respondents over 55 suggested that music played on the train would improve their experience). The same contradiction as in the first model can be seen here in the negative impact of “better use of time/money” (-0.41) on use of audio and visual devices; this further suggests that it is a younger generation listening to music, as they may not have much awareness for the actual time and cost involved in transportation or car ownership. Individuals who were employed full time (0.79) were more likely to listen to music; perhaps they are not anxious to answer e-mails or read after just leaving the office. The results in Table 5 suggest the relationships among age and employment, as well as value of time and activity engagement are highly variable among individuals. There is certainly a strong correlation between cell phone/PDA use (1.08) and audio/visual device use, but the motives for their use seem to vary.

CONCLUSION

This paper presents some observations and simple models of the engagement of travelers in information and communication activities while on board public transit vehicles. As such, it adds to a growing body of work on the interaction between telecommunication information use and travel behavior. One of the most salient, albeit not especially surprising, results is that younger, employed travelers (under 30) tend to use audio/visual devices whereas travelers over 30 are more likely to read. People who read rate the CTA as a better use of their time than those who do not, whereas people who use audio/visual devices tend not to state this as a reason for riding the CTA. This could be because these younger riders do not have a choice whether or not to ride transit, but the underlying reasons should be explored in greater depth. Urbanization and ICT use continue to increase, and there is concern that adolescents have too much difficulty pulling themselves away from their computers and phones: This could have implications for distracted driving on a young generation of licensed drivers. In an already congested metropolitan area, attracting young people to transit in their formative years could help ease congestion trends.

These results may not be directly applicable to other cities, though several of the key insights are likely transferable. Road and transit networks, local culture, and train car design influence transit rider behavior, satisfaction and activity engagement. The average trip on the CTA is approximately 35 minutes *(20)*, so its status is somewhere in between a rail rapid transit system and a commuter rail system. Interestingly, trip length and transit captivity seemed to have no significant impact on ICT activity engagement on the train, though trip length did influence whether one read printed materials. Future research in this area should consider a more open-ended survey in order to gather a greater variety of activities and motivations. In the comments section, a number of respondents noted that their activity engagement was influenced by their ability to find a seat. As the CTA replaces its vehicles to provide more overall capacity but fewer seats, the potential impacts on activity engagement and subsequent rider satisfaction should be considered.

Further work using this survey will examine how mobility and telecommunications affect ones decision to use transit in addition to examining the actual uses of cell phones and PDAs and the type of material read, watched or listened. Cell phone use was wide spread (224 of 336 respondents), so an exploration of how specific cell phone activities affect rating and motivations for riding would be valuable. Laptop use, though limited, was highly significant and positively affected whether one considered transit a better use of their time. Many respondents commented that the ability to work on the trains would be a great benefit, so transit agencies may increase ridership by encouraging laptop use via free wi-fi on trains.

An understanding of why people desire to stay connected while in transit and how much pleasure it affords them is key to determining what measures need to be taken to keep both public and private transportation safe and pleasant. Future work should focus on how mobility and telecommunications affect satisfaction with transit service so that it can remain a viable alternative to driving. These results suggest that more sophisticated models could be developed to help understand user satisfaction and how it relates to ICT use. Since cell phones are so commonly used, and there is such a clear distinction of activity participation among age groups, such models would provide greater insight into the transportation-telecommunications interaction.

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