Today's consumers are exposed to a vast spectrum of products, ever increasing in range and scope, which are presented to them en masse using the widest array of media ever employed (Palmer 2000). To cope, it seems consumers have learned to view, assess, and purchase items they feel are compatible with their personalities and ideas using complex reasoning and discrimination skills. Purchasing power has become a tool with which to assert personal freedoms, display opinions, and influence economic and/or political change. Similarly, ownership of an object can function comfortably as reassurance of an individual's rights within modern society (Garner 1998).

All of this puts an enormous amount of focus on products for sale in a commodity sense, while things whose “product” nature is less obvious fall off the consumer's radar. Because it is more of an experience than a physical commodity, use of a mass transit system is not thought of as a purchasable “product.” Nor does mass transit fit into the “mobility product” paradigm where a tangible object, such as an automobile or motorcycle, is a personal possession and reflects a lifestyle choice. For many people choosing whether to use mass transit or an automobile, the decision is an economic solution to a transportation dilemma, shaped more by economics than by consumer desire or demand (Transportation Research Board 1999). Inflexible variables like service availability, routes, and schedules leave customers with a rigidly unattractive choice that meets their practical needs, but will never exceed them.

Too often the economically disadvantaged are forced to accept poor design deficient in quality, appearance, and accessibility as a living standard. Persons without the economic means to purchase a vehicle for personal transportation have only one choice: to accept public transportation whatever the state or condition of the system. Because they are tax dollar or government funded, public transportation systems often lack the financial resources that would enable hiring qualified designers. I believe that design is capable of affecting positive, progressive change within a society. If designers are to be thought of as those who envision such innovation, then they must contribute their skills, talents, and time toward work on less monetarily attractive projects that could benefit the lives of ordinary people. Public transportation is one such worthy venture not inherently “cool” in nature, which should not be allowed to fall by the wayside.

This thesis seeks to clarify design opportunities for the WMATA Metrorail and its ridership by applying user research techniques from the design field to better understand the relationship between product and user. By focusing on the point of purchase, the entrance area of a Metrorail station, the design research becomes a study of the purchasing act of a specific product, a farecard. The “retail setting” in which that transaction takes place consists of the interior environment, traffic patterns, lighting conditions, temperature, etc., and the information systems and physical equipment located within it. Treating the entrance system in this way casts the experience of entering the Metrorail system as a sellable item, which in turn becomes something to purchase in the eyes of the consumer.
It is my sincere hope that public transportation systems will continue to improve, effectively serving their riders and communities, with ridership numbers eventually equaling, perhaps even surpassing, those of other transportation modes. To understand why some transportation companies and/or modes are more successful at recruiting consumers than others, I investigated several outstanding examples of brand and design development within the transportation industry. Viewing relationships between these topics and my own work gave depth to my ideas.

Personal automobiles, privately owned and operated, are the most widely used transportation mode in the United States, and the predominant mode of living in this country supports continued reliance on them. However, as people age they typically become less able to independently use automobile transportation and would especially benefit if public transportation were to become more accessible. Working specifically toward improving life for the elderly is MIT’s AgeLab, a collaborative research and development project started by Joseph Coughlin in 1999. Researchers at AgeLab hope to invent products and programs for today’s aging adults, who are more active than previous generations, and projected to live longer as well. Transportation research is one of the lab’s most challenging undertakings. A December 2001 article in Metropolis quotes Coughlin’s thoughts on the subject:

“These ideas highlight the importance of creating transportation systems that are easy to use not just for the elderly and other challenged users, but for anyone who ever wants to have a job, visit friends and family, shop, or do almost anything else. They also highlight the lack of attention designers are giving public transportation. Case in point: instead of working on public transportation innovations, AgeLab researchers are working on creating safer automobiles for seniors that will be intelligently sensitive to their needs. To this end AgeLab’s transportation research encompasses the “Miss Daisy” project: a donated VW Beetle adapted to be a driving simulator, that will later serve as a test vehicle for technologies developed by AgeLab (Krasner 2001).

With American lifestyles largely dependent on automobile use, people express a general desire to spend less time in their cars than they currently do. Yet consumers are simultaneously asking manufacturers to create “roomier” vehicles with more amenities capable of providing refuge from the world outside (Roberts 2001). Despite the recent, encouraging media attention toward alternative fuel sources, like electric battery assist and hydrogen fuel cells, sports utility vehicles (SUVs) and light trucks continue to surge in popularity, meaning that for the time being, the average vehicle’s mpg rating will continue to drop lower. I researched these roomy vehicles and their cousin, transportation is not traveling from point A to point B. It’s everything. Before you can do anything, you’ve got to get there. In most cases transportation for seniors is being able to drive. Our public transportation system is not particularly comfortable for the elderly, and in most places it’s nonexistent. For seniors, being able to drive is independence and freedom. Once you rip those wheels out, they begin to deteriorate both mentally and physically.”

connections
Designers from Ford and Maytag took a new angle on the automotive experience by focusing on “today’s frustrations” (60). The design team ultimately integrates existing “questioning the role of transportation in our lives” (60) in an effort to merge automotive and appliance technologies like trash compactors, refrigeration units, central vacuuming, navigation systems. This emphasis on creature comforts has caught on in the automotive industry, where heated cup-holders are considered a necessity by prospective buyers, and not get hung up on vehicular category trendiness.

Industrial designer Joseph Ungari had this in mind when he brought together the design teams at Ford and Maytag to create a remarkable driving experience using its sensory-pleasing extras, and not get hung up on vehicular category trendiness.

The resultant Windstar Solutions concept vehicle has the ironic twist of providing super-sized vehicles boast big easy-chair seats, living-room-inspired materials palettes, advanced digital video and audio options, even small appliances and computerized navigation systems. This emphasis on creature comforts has caught on in the automotive industry. Vehicles in other categories, such as the minivan, are emulating the features offered in SUV’s to sell as well.

In 1998 (Redhead 2000). Designed by Swatch, modular ideas are seen at work in the Mini Cooper, as well as gas-electric hybrids (selling well in the US) and the high-mpg vehicle. Currently America’s most popular small-scale car, BMW’s Mini Cooper gets 37 mpg. The car had a poor electric assist system and about as much stowage as a ponytail holder. The Prada, a three-wheeler with regenerative braking, an actual truck, and a highly praised electric, arrived stateside in 2003 (Evarts 2000). Also hitting the market are small, extra-high-mpg vehicles that take up less space on roadways, easing air pollution and traffic congestion in urban areas. Available almost exclusively in Europe, many of these vehicles in this category, like Volkwagen’s 90 mpg Lupo, utilize recent diesel technology advances. Cleaner burning HHO-direct injection diesel engines are also being featured in some Citroën models, and gasoline direct-injection (Gdi) technology yields about 30 mpg in the mini Audi A2 (Liimett 2003).

Of the seventeen million new cars purchased in America during 2000, a third were SUVS and trucks, a percentage that has increased each year since. In 2003 it is estimated that 60% of all new cars sold are SUV’s (Roberts 2001). The outdoorsy SUV’s and trucks, a percentage that has increased each year since. In 2003 there were an estimated 60% of all new vehicles sold will be SUV’s (Roberts 2001). The outdoorsy SUV’s and trucks, a percentage that has increased each year since.

According to Daimler Chrysler’s Chief Transportation Analyst, John B. BMW’s Mini Cooper was introduced in 1997 (Chambers 2001). Top of the list is the Smart, a two-wheel microcar. Reduced bulk also made possible more creative approaches to vehicle appearance, as demonstrated by Daimler Chrysler’s Smart Car introduced in 1998 (Redhead 2000). Designed by Swatch, modular ideas are seen at work in the Smart’s interchangeable, thermoplastic granules body panels. Not only is it an appearance customizable by its owner (a process which takes 90 minutes to complete), but it manages to achieve an astounding 57.6 mpg (Plowman 2002).

Given that transportation systems like Metrorail are more concerned with a cost-per-mile operating figure than with extraordinary gas mileage possibilities, innovations like Swatch, modular ideas are seen at work in the Smart’s interchangeable, thermoplastic granules body panels. Not only is it an appearance customizable by its owner, a process which takes 90 minutes to complete, but it manages to achieve an astounding 57.6 mpg (Plowman 2002).

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Jane Priestman knew to do this in Trains & Planes: British Rail, Acela, and JetBlue. pic 5 – BR's Hull Station, ticket office and travel center. Further incorporating rider input, ideas, and while simultaneously helping employees to feel more valuable in their positions and mentor ideas could benefit the WMATA system by organizing these disparate elements, consistent AFCS configuration, and congruent signage. The success of Metrorail's product positioning transit service as a product rather than letting it be seen as a governmental tax sink, Priestman inextricably linked the system's users to British Rail's operational roots of the transit system, rather than just tending to the most visible parts. Priestman's holistic work ethos also recognized the interdependence of the diverse sensibilities was key to perpetuating good design management in the long run. By her belief that educating British Rail's employees about the importance of keen design thinking experience holistically when designing transit systems, giving as much focus to the transit vehicles they will ride in as the transit vehicles themselves; boarding the correct train means that you will arrive at a station with a street map that will be able to show you how to navigate towards your destination.

I was elated when I came across design firm IDEO's work for the Amtrak rail system. The product of IDEO's work was the "Acela"; a passenger system servicing major cities along the East coast of the United States. Though my focus was on a heavy-rail system for commuters serving only one metropolis, I found IDEO's work to be significantly relevant to my own. IDEO had placed an emphasis on researching the Amtrak rider's experiences with the existing train system. A detail in the success of the Acela project validated my observational and interactive research approach and techniques. Faced with a January 2003 congressional deadline, Amtrak had to either pull itself out of the red or be forced to restructure and possibly liquidate. In 2001, Amtrak had never connected the pre-ride process with the post-ride experience. 8. riding, 9. arriving, and 10. continuing on their way (Corporate Design Foundation 2001). Seeking a redesign of their passenger rail cars Amtrak turned to the talents of IDEO, who quickly realized that Amtrak presented a more holistic problem solving task than just a brand update but an overall of customer experience and expectation as well. After enlisting the help of New York based brand strategy firm CH/MC, the design team began an investigation into all aspects of the Amtrak customer's experience, from trip planning to arrival at a destination. They began to look at the entire system, viewing Amtrak's customers and employees, gathering and storyboarding their experiences, riding trains, and analyzing Amtrak's computer and information systems. The firm also created a full-scale mock-up of a passenger rail car, which they brought into its studio spaces and worked inside for the duration of the project (Kelley 2001).

Pulling the collected research findings together, designers at IDEO developed a 10-step picture of the process a typical Amtrak rider goes through: 1. learning, 2. planning, 3. starting, 4. entering, 5. ticketing, 6. waiting, 7. boarding, 8. riding, 9. arriving, and 10. continuing on their way (Corporate Design Foundation 2001). Prior to happening upon IDEO's list I had developed a similar but shorter list from my ethnographic and observational research for Metrorail's entering and exiting processes (see p.34). The Amtrak rider's process has more steps mainly because a trip on a train is typically longer than one would take on a public transportation system, requiring not just a brand update but an overhaul of customer experience and expectation as well. After enlisting the help of New York based brand strategy firm CH/MC, the design team began an investigation into all aspects of the Amtrak customer's experience, from trip planning to arrival at a destination. They began to look at the entire system, viewing Amtrak's customers and employees, gathering and storyboarding their experiences, riding trains, and analyzing Amtrak's computer and information systems. The firm also created a full-scale mock-up of a passenger rail car, which they brought into its studio spaces and worked inside for the duration of the project (Kelley 2001).

Seeking for design opportunities with such a large net of research methodologies had yielded great insight. It was found that the presence of Amtrak was suffering from over design ranging than the company had originally thought. IDEO’s response was a design strati-
etyl that goes beyond the complete experience of riding a train into account. Instead of simply giving Amtrak vehicles a facelift, IDEO developed a new product, the Azula. Information and tailored services, station environments and signage, were all redefined. The resulting Azula project is comprehensive, innovative, and exemplifies good design research value.

Air travel's high ticket price may make it more financially exclusive than rail transportation in general, but in principal both aim to serve the same population: the public. JetBlue, a discount passenger airline, took the faltering airline industry by stylish surprise when it entered the air travel market in 1999. Specializing in flights within New York State, as well as to and from New York City, JetBlue is an outstanding example of a transportation business restructuring travel industry models.

Unlike Amtrak's Azula project, whose strength was industrial design-based, JetBlue's success is attributable to a tightly coordinated brand image that looks slick and functions well. Brand development utilized focus groups and market testing, but direct user research could not be done since JetBlue was starting from scratch. Instead, the collective business expertise of JetBlue’s executives and the leadership of CEO David N. Neeleman, already with four successful airline startups under his belt, guided the development of the brand (Dowdy 2006). User experience may not have been discussed in classic design terms, but passengers' potential needs and satisfaction, singularly guided the development of the brand. All this culminated in JetBlue landing the number two spot among airlines in the Zagat 2001 customer satisfaction survey.

A hip and comprehensive website sets the tone for JetBlue's customer service, providing convenient on-line ticket sales, route information, schedules, and company anecdotes. JetBlue offers passengers stylish amenities consistent with their brand image, like blue in-flight snack foods (most often blue corn or potato chips), blue leather seats, and free individual screen satellite TV. And last year JetBlue partnered with Crunch Fitness to create “In-flight Yoga”, a creative response to rising public concern about “economy class syndrome”, the condition in which blood clots form in-flight due to the sedentary nature of air travel (JetBlue 2003). A series of four yoga poses, all able to be executed in a seated position, is illustrated and make available to passengers on-seatback cards, a format traditionally used to present safety information. To convey all of this to a target audience, JetBlue used slick and humorous advertisements that reflect their smartly hip brand image.

Within the usually drab concept of discount airlines very little consideration is given to design or style beyond minimal safety requirements. These carriers seem to survive on bargain pricing alone, and to cut costs they often fly well-used planes bought from bankrupt airlines and simply retitled with new logos. JetBlue, however, flies only new A320 Airbus planes. Even though the planes are new, flying only one kind of aircraft actually saves money since less employee training is needed, which in turn benefit customers by keeping fares low and creating a safer fleet of planes.

In order to create a product that works well for its users, a designer must consider more than the physical object during the design process. In the traditional design approach, user-centered methodologies take into account how the user interacts with and is affected by the object itself. More recently “experience design” methodologies have been elaborated by the design community, focused on creating a deeper, more meaningful relationship between user and object, the experience design model attempts to explore the experience of and with objects, in particular environments. Real-world application of these ideas have brought the advent of an “experience economy” with businesses offering their customers a product composed of some traditional objects, but also environments, services, and temporal factors. The relationship between user and product is enriched by these aspects, and the product is often remembered as an event by the user (Kaylee 2003). Experience design acknowledges the importance of the psycho-social dimensions of the product-user-experience, known as the “experience needs” of the user (Hudspith 1997). It took the occurrence of two changes within the design community to bring about the idea of “experience design”.

Firstly, an influx of other disciplines into design brought about the emergence of the multidisciplinary studio, making it possible for companies to offer their clients a more extensive range of services beyond traditional ID studios. Professionals from marketing, engineering, human factors, anthropology, sociology, psychology and other fields began to work together under one roof, providing hybrid services like design strategy, branding, and website development. Clients in turn, came to expect design firms to be capable of problem solving on different levels, thus solidifying the value of a multidisciplinary studio (Robinson 2001). Then as the Internet blossomed and e-business came into its own, the need for a strong web presence with reliable support became almost as important as the product itself. A firm that could build a consistent brand (image/experience) across all of the different aspects of a client's business, and market it too, had an advantage over the rest of the pack (Montague 1999).

The second change was a shift in focus within the design community in how designers think about their jobs. Instead of creating objects for people to use, designers began to work on a broader scale, creating and shaping the circumstances through which
and a “continuous process of discovering possibilities and opportunities with people, rather than an artifact, this thesis designs the setting in which the user will have a directed experience.

Some designers feel, however, that the predominant idea of experience design is misguided. Elizabeth Sanders of Sonic Rim, Ltd. is one such member of the design community who argues that it is impossible to design an experience given that only one half of any experience comes from the particular situation, while the other half is created by the person having the experience. In a designed situation, she points out, each new person brings a unique set of variables into that experience that were not there before, rendering that experience different from any previously had. Sanders is instead an advocate of “Postdesign,” defined as “design for experiencing,” and “a distinct mental state in which the user is aware of their ‘presence’ and a ‘sense of presence’ in the process of engaging with the environment” (E. Sanders 1999, 2002). Through the “Postdesign approach, design and related activities are centered around potential factors, and experience becomes sources of inspiration and ideation for design. To get at those experiences Sonic Rim uses custom designed “Say, Make, Do” tools to help people communicate their experiences to researchers and designers. Some “Say, Make, Do” methods include collage work, group activities, video diaries, lottery modeling kits and more. Each tool facilitates expression of the user’s dreams, desires, hopes, and needs (E. Sanders 1999; Martin and Schmidt 2001).”

Central to planning and information gathering for users of Metrorail, is signage. Designed by Italian architect Massimo Vignelli in the early 1970’s, Metro’s signage has a distinctly minimal feel. Designed by Italian architect Massimo Vignelli in the early 1970’s, Metro’s signage has a distinctly minimal feel. Metro’s signage has a distinctly minimal feel.

The point of the user’s perspective, it is thought that the artifacts we choose to live with will become both useful, and usable, to us. This directed experience will not be the same for all Metrorail riders, but

Throughout this document members of the general public are referred to as “consumers,” “users,” “riders,” “passengers,” and “customers.” This kind of terminology is used because it deals a good job of describing people’s roles in particular instances or scenarios. However not all members of the design community accept this limited “user” vocabulary (Martin and Schmidt 2001). Sanders also writes about instances or scenarios. However not all members of the design community accept this limited “user” vocabulary (Martin and Schmidt 2001). Sanders also writes about instances or scenarios. However not all members of the design community accept this limited “user” vocabulary (Martin and Schmidt 2001).

Sanders is instead an advocate of “Postdesign,” defined as “design for experiencing” , “users” , “riders” , “ridership” , “passengers” , and “customers” . This kind of terminology masks the aspects that make individuals unique people, which then go unconsidered during the design process. In Sanders’ opinion, such generic “user” terms say nothing of someone’s life experiences, emotions, age, gender, ethnicity, or skills, all of which are important to the consideration of a user’s perspective.

To avoid such pitfalls, this thesis utilizes a broad research base (including photographs, videos, some biographical information about interviewees, storyboarding and more) to enrich the idea of Metrorail’s ridership and create a sense of connection for the reader with that ridership. In the case of Metrorail, this system’s ridership is rich in variety. Designs for such a transit system should give consideration to the generous differences within such a varied diverse population. In Metrorail stations, primarily visual signage delivers information about the entrance systems to riders. Two-dimensional signage used includes: backlit, printed, and painted signage, as well as signage printed on a transparent material. Postcards are used to designate phone booths, their wall surfaces doubling as backlit fare charts and maps. Signage lettering is either black or white, with colors used only to indicate rail lines. A small percentage of information is presented in both black and white, with directions for using the AFC machines are, but fare charts and maps are not. Information in the form of service and safety updates and advisory notices are broadcast over a public address system.

To watch a video of riders using Metro’s signage from the PDF or CD versions of this document, click on the “visual information systems” icon in the lower right-hand corner of this page. If you are reading this document as a printed book and viewing this document, click on the “visual information systems” icon in the lower right-hand corner of this page. If you are reading this document as a printed book and viewing the videos on your computer, select the corresponding title of the CD menu.

Navigating the Metrorail system continues to become more complex as surrounding neighborhoods and their feeder bus and transit systems develop and expand. The WMATA website thoughtfully addresses these issues with trip planning features that allow riders to map their travel routes from start to finish and find information about choosing neighboring transportation options. However not all members of the design community accept this limited “user” vocabulary (Martin and Schmidt 2001).

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It is this cooperation between signage and architecture that Metrorail is now attempting to renegotiate. To create clear signage Mijskenaar uses bold color combinations, like the black on yellow signs he designed for Schiphol Airport, and imaginative pictograms to universally communicate information. There are similarly good examples of informational graphics and signage. His work ranges from small-scale product labels and airline wayfinding systems for airports, metro stations, and train stations, to metro systems in and around the Washington D.C. area. Mijskenaar is known for making it easy to read information and providing useful information for visually impaired persons.

The Americans with Disabilities Act of 1990 mandates that Braille language translation access for all users. This may not work as well for Metrorail however since the noise of the trains entering and exiting a station is difficult to even talk over. Instead, it would be smarter for Metrorail to implement a system where passengers can hear personalized instructions through mobile phones or other wireless technology.

Another successful Touch Graphics product, the “Talking Kiosk,” provides audible wayfinding information to visually impaired users and is accessible across all ability levels; it can be used to activate bus stops, and is ideal for wayfinding applications in public spaces. Song, audible from 150 feet away, to attract the attention of visually impaired persons. It was developed by Touch Graphics, makers of graphical tools for the visually impaired, and incorporates touch-sensitive 3-dimensional tactile graphics to universally communicate information. There are similarly good examples of informational graphics and signage. His work ranges from small-scale product labels and airline wayfinding systems for airports, metro stations, and train stations, to metro systems in and around the Washington D.C. area. Mijskenaar is known for making it easy to read information and providing useful information for visually impaired persons.

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This thesis investigates how all riders of a mass transit system experience using the automated entrance system. The intention of this thesis was to develop an informed picture of the Metrorail's user's perspective, develop a design strategy from the collective research findings, and communicate design ideas for an entrance system that is universally, gracefully accessible, and safely usable, simultaneously preserving the system's architectural elegance. Anchoring the design ideas presented in this thesis is a desire to see public transportation be universally accessible to all members of the public, for all purposes, if the public can’t access the transit system what is it really worth?

A product or environment is considered to be “universal” in its design when it can be used by all people to the fullest extent possible, without the use of any assistive devices or extra design elements. In its current incarnation the AFCS is not equipped to handle many of the special needs that Metro riders might have. In accordance with the Americans with Disabilities Act of 1990, Braille lettering provides instructions for use on the forward facing menu face, and elevators are available for use by persons with mobility impairments. But the VQAATA did not improve its visual information systems. Farecharts, system maps, and street maps, all lack Braille counterparts, audio outputs, or foreign language options.

When a rider does need extra assistance, the only resource available to them is often Metrorail personnel. Presently, when a passenger experiences navigation, trip planning, or farecard purchase difficulties that they are unable to resolve on their own, a Metro employee must assist that individual with their full attention, often having to leave their office/booth to do so. This heavy reliance on station managers and Metro personnel is problematic. Police officers to provide assistance to passengers with additional needs does a disservice to all riders. It is not surprising that often a rider’s best option for assistance is another rider with more experience or knowledge, though it should be noted that riders with language difficulties or disabilities may find this difficult, if not impossible, to do.

Visible design issues with the Metro system’s existing components can be categorized using terms that describe the nature of a problem, such as physical access, graphic visual hierarchy, and information accessibility. Is this adequately descriptive? Yes, but without a consistent set of criteria to evaluate each component I ran into the problem of not being able to compare designs, existing and future. I knew what each problem was like and what its shortcomings were, but lacked a common language of comparison.

The design’s features should require little or no physical effort to use.

The design must have an adequate amount of space appropriately arranged so that anyone and everyone can use it.

The design should anticipate the user’s actions and protect them from hazards or danger by providing warnings in a variety of sensory modes.

It should be easy to understand the purpose of each design feature and how to use it.

The design’s features should require little or no physical effort to use.

The design is equally usable by everyone and does not privilege one group of users over another.

The design allows people to use the design features in different ways, for example right and left-handed options, slow and fast speeds.

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Tolerance for Error •

Perceptible Information •

Size and Space for Approach and Use •

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