

# CHOOSING A MODE OF TRANSPORTATION

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TEAM HOTLANTA

ARSHDEEP KAUR SOOD  
AALOK SHANBHAG

HYEMIN HWANG  
HIROMASA KAMEZAWA

# Introduction

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Our team project goal is to mimic the decision-making process of humans when they have to choose the mode of transportation for a journey. To answer this question, we plan to develop an agent that tries to understand the needs and constraints of the situation at hand and figure out a way like a human might. By interviewing students we want to figure out how people make their decision and what frames are considered while making such a decision, and the methods of these frames. Then we try to figure out the ordering of the possible rules that an agent applies on these frames to arrive at his/her decision. The project has been completed in two phases where Phase 1 involved the study of quantitative constraints for decision making (e.g. distance to destination, time available, etc.) while Phase 2 expanded on Phase 1 by incorporating effects of journey experiences into the process of habit development and negation. In summary, the project will start by first understanding the cognitive process humans go through and then working towards finding a suitable cognitive model that best represents this. We will use python to implement the rule-based model into a cognitive agent. The anticipated output is a file that mentions the decided mode of transportation and the process the cognitive agent went through to reach that decision. Our agent is also anticipated to learn from the input facts and experiences of the transportation mode used (after decision) to develop habits. Habits are expected to influence the decision-making process and experiences are expected to influence habits and in turn the decision-making process. The agent in this project is a rules-based engine.

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# Cognitive Analysis

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## 1. The Task

Our aim is to build a cognitive agent that arrives at transportation decisions using reasoning and considering the experience of past journeys and the emotions associated with them. It is an everyday task that every individual undertakes and thus is significantly important.

## 2. Our hypothesis

From [5][15], the strongest correlates of car use were intentions, perceived behavioural control, attitudes and habit. In our system, we are focussing on how habit reduces

cognitive load. So, we're extending the hypothesis here and stating that habit is a very strong driver of how we make any transportation decision, not just car use. We will consider attitude to some extent, by considering an individual's perception of transport e.g comfort level.

We have used the conclusions of [6][12] to model our system to override ingrained habits when a similar 'intervention' occurs. An 'intervention' in our case is a highly irregular event such as extremely bad weather like a hurricane or a snowstorm, or for example if a person is tired to the point of being unable to walk even a small distance, or, is travelling at 3 am in the morning. In such cases, the habit of the journey will not be considered and a re-evaluation of the circumstances will take place. The schemas will interact with each other considering this 'intervention'

In [7], the authors were able to confirm that when 'behavior is habitual, behavioral responses are activated automatically'. We used this to model habits in our system. A habit is formed when the same action (with minor changes e.g journey from home to campus when it's sunny and you're slightly tired at 11 am is the same as a journey at 1 pm. slightly cloudy and you're feeling fresh). Habitual responses are automatically evoked (bypassing cognitive processes and evaluation) in our system when the target journey is broadly similar to the ones that formed the habit.

Again in [8][9][11], the authors have tested the following hypothesis: 'when behavior is performed repeatedly and becomes habitual, it is guided by automated cognitive processes, rather than being preceded by elaborate decision processes'. This reinforces our hypothesis that habit reduces cognitive load, and our system is designed to form habits based on recurrent behaviour, and is also able to recognize whether a given set of factors is similar to the circumstances that led to the habit formation, and finally to provide the habitual response, effectively short circuiting other complex cognitive processes. So our central hypothesis is :

**Ho: Habit (defined as repeated behaviour) reduces cognitive load (elaborate decision making processes) when making transportation decisions.**

An associated hypothesis is:

**H1: Habit is broken only in highly unusual or extraordinary circumstances, in the context of habitual transportation decisions.**

## 2. Methods of study employed

To make sure we are encompassing as much of the real decision-making procedure of a human in our cognitive agent design we used the following three approaches:

1. Introspection / Self-Reflection
2. Literature review
3. Survey
4. Observation / Think (speak) Aloud Protocol
5. Interview

**For introspection** we looked into how we were making our decisions of choice of transport for reaching a particular place. This meant constant self-questioning. We asked ourselves questions as follows:

- I typically go to school by walking up till tech square and then taking the bus. Why do I use this combination?
- When and under what circumstances did I decide to do something different?
- What were my priorities in these situations?
- Which is the mode of transportations I have mostly used over the past couple of years? Have I developed some kind of habit towards it?
- When was the first time I used a particular mode of transportation out of personal choice? What were the factors I looked into for this?
- What are the situations that would be ideal for me to take a particular mode of transportation to any destination?
- What are the situations that would be non-ideal for me to take a particular mode of transportation to any destination?

of how and why helped us be more responsive and open-minded in this topic and it also helped us think of some open-ended questions that can bring out interesting information regarding this topic.

**For the observation** part of data collection, we keenly observed our friends and other acquaintances making their transportation decision. Not only did we observe them making a choice on the mode of transportation, we also requested them to vocalize every point, note, question or consideration that came into their mind for the given situation. This helped us collect the chain of thoughts, concerns and the mini-decisions that people do take before taking the bigger decision. An example of this would be that a human makes a choice of is he/she ready to pay a little more for a cab over public transit? Some of these act as excitations that promote a particular choice while others might act as inhibiting factors of this choice. There are other factors that though typically considered and not too relevant for the current situation. These smaller decisions factor into the bigger decision we are trying to make.

**For project 2,** we created a questionnaire with 13 questions. The survey was sent out through Messaging Applications to various groups to gather responses. We were able to successfully obtain 25 responses to our survey. The reason behind going ahead with an elaborate survey before a thorough interview for this round of analysis was to gather more information from a larger group of people so as to be able to ask better questions in our following interviews. We did some interviews before survey analysis also, to make sure that we understand the responses better. The survey aimed to capture

### 3. Description of study participants

- Introspection / Self-reflection

Name	Age	Gender	Occupation
Arshdeep Kaur Sood	22	Female	Student / Graduate Teaching Assistant
Hyemin Hwang	25	Female	Student/ Graduate Research Assistant
Hiromasa Kamezawa	25	Male	Student / Graduate
Aalok Shanbhag	27	Male	Student/Graduate Teaching Assistant

- Survey

The survey was responded to by 14 people in phase 1 and 25 people in phase 2. All of these people are university - level students. The survey was set to be voluntary and the identity of all respondents was kept anonymous. The survey was sent out through various student groups and social media channels to gather responses. The age group for these social media groups is 20 - 30 years old. The ethnicity of these groups is diverse - Americans, African-Americans, Indians, Koreans, Japanese and more. Due to the anonymity of the survey it is not possible for categorization of the respondents except of the fact that all are university-students.

- Observation / Think (Speak) Aloud Protocol

The participants of this study were people with whom the team spent a lot of time on daily basis and would typically commute with. The participants are in the age

group of 21 - 25 years old. All the participants are university students. Of the 6 participants in this study 3 are residents of Georgia (since August 2017), 2 are residents of Dallas who are visiting Atlanta for an internship and 1 is from India who is visiting Atlanta for an internship.

- **Interviews**

A total of 17 interviews were conducted over the duration of the 2 months of which 7 were conducted for phase 1 of the project while the remaining 10 were conducted for phase 2 of the project. Of these 17 interviews there was an overlap of 1 interviewee (female) who participated in both phases. In an overview the interviewees lie in the age group of 20 - 30 years. For phase 1, out of the 7 interviewees 4 were males and 3 were females while for phase 2 we had 6 female interviewees and 4 male interviewees. All interviewees are university - level students. A detailed characteristic table of interviewees is provided in Appendix A.

## 4. Study protocol

### Phase 1

Our study for phase 1 started out with **Introspection / Self - Reflection**. The reason for this was for the team members (Arshdeep Kaur Sood and Hyemin Hwang) to understand the topic at hand (Transportation mode choice) better. Since the goal of the project was to develop a cognitive agent that would mimic/close replicate the cognitive process of making travel mode decision we found it extremely important for the team members to understand oneself relative to this subject. We unanimously agreed that Introspection would not only aid in having a base on what kind of factors are considered but also to be able to empathize and thus better understand the responses we get for future study methods. Introspection was heavily based on asking "how", "what", "when" "why", etc. question on every step we mentally took to make a decision for our travel/journey. Some sample questions are as follows:

- Where do I travel to everyday?
- What is the mode of travel I take everyday? Why?
- When was the time I used an alternative mode? What made me do that?

.... So on.

This study continued for three days before we met to discuss our results and brainstorm.

Our brainstorming session included exchange of questions each of us asked ourselves followed by the responses we gave. The discussion continued further where we responded to the questions that the other one had which we did not ask ourselves. This then progressed to the discussion on compilation of the ideal questions we can ask in an interview. This process included selection and sorting of questions into two categories - diverse and narrow. The diverse questions gave us a birds-eye view on what are the person's preferences and what factors they consider while the narrow questions took us into the depth of why they factor things they do, the way they do. This process was then followed by rephrasing of the questions. The purpose of this was to avoid any biases that a question may tend to pose or suggests to the respondents mind. This was an extremely crucial step in our progress since we wanted to make sure that the responses we gather describes as accurately as possible what is that the person actually thinks or does while making transportation mode decision.

The **Interview Protocol** was for the team members to take 3 interviews individually and 1 interview together. The purpose of this was to gather more information while also making sure that we are in-tune with each other and the goals of the project by doing an interview together. The interview format followed is as follows:

#### Greet

Start with general introduction of self and the topic of discussion

1. What is the one place you travel to the most? How?
2. The first time you went to this place, how did you travel?
3. When was the last time you visited a new place? How did you travel to that place?
4. Which mode of transportation have you used the most until now out of personal choice? Do you think you are now habituated to it?
5. Do you feel group dynamics affect your decision for transport mode selection? If yes, explain why, with an example.

#### Types of follow-up questions:

- Why did you use this mode of transportation?
- So, if this is the reason for choosing it, why is this so important?
- What other things did you consider?
- Can you order them in rate of importance? - if answer, why is this your order of preference
- What would be the top 2 things that would have changed your decision on mode of transportation? (use the answer as conditions, now change conditions and see

how the interviewees choices change ) (use these details to create questions for the survey)

- Has your choice of mode of transportation to the same destination changed over time? If yes, why?
- Do you typically take the same mode of transportation to a particular destination/ region/ district?
- What is your favorite mode of commuting?
- Has there been any experience that has accounted for changes in your commuting over time?

The interviews conducted provided us with a diverse amount of qualitative information. The shared interview added extra value by providing better quality of notes and understanding of responses at the end.

The interviews were followed by a brainstorming session which including analysis of the responses gathered from the interviews. This session involved a step-by-step discussion on each question asked in the interview and the responses gathered for it. For each questions response we would make a list of the various keywords used and the frequency of the keywords for the individual and the whole interviewee group. This process continued till all questions were discussed and responses analyzed.

Our next session was brainstorming on creating a **Survey** to gather more responses and validating the analysis we did for the interviews. The survey questions were selected from the interview question sets and rephrased to suit the survey interface, by this we mean - limited number of questions covering diverse sections qualitatively were required. The survey was created using Qualtrics - a web platform that provides for survey design and analysis.

The survey questions are as follows:

**Q1 -**

Which is the one place you travel to the most? How far is it from your usual starting point? how do you travel to that place?

**Q2 -**

The first time you visited this place, how did you reach there? what all information did you gather and/ or use to reach the destination?

**Q3 -**

What would be the top 2 things that would have changed your decision on mode of transportation?

Q4 -

Do you particularly like/prefer any mode of transportation of the following - walk, bike, bus (marta/GT transport), marta, uber/cab, personal vehicle, other? If other, please mention.

Why?

Q5 -

Do you particularly dislike/avoid any mode of transportation of the following - walk, bike, bus (marta/GT transport), marta, uber/cab, personal vehicle, other? If other, please mention.

Why?

Q6 -

When you plan to travel, are there any constraints that come to your mind before you make your final decision? Please rank them in order of importance.

Most important consideration ..... to ..... least important consideration.

Q7 -

Give reason for the position you have given each consideration in the previous question.

Q8 -

Has your choice of mode of transportation to the same destination changed over time? If yes, why?

Q9 -

Has there been any experience that has accounted for changes in your commuting over time?

Q10 -

Is there anything regarding your mode of transportation decision making process that you would like to share or comment on? Any additional information would be highly valued. Please do consider answering this question to your best capacity.

This was followed by a final brainstorming session that involved analysis of responses to inform our cognitive agent design and to validate our interview responses.

## Phase 2

This phase was an extension of phase 1. In this phase we looked into incorporating the effect of experiences and emotion in the process of development and negation of a developed habit under various circumstances.

Our study started with **Introspection/Self - reflection** on personal experiences of various journeys we have made and the transportation mode we decided to take for it. Introspection was heavily based on asking "how", "what", "when" "why", etc. question on every step we mentally took to make a decision for our travel/journey or regarding past journeys that now inform our current decision making process. Some sample questions are as follows:

- When was a time when I experienced a strong emotion while or after completing a journey
- What is/was the mode of travel I took ? Why?
- What the mode of transportation I had this emotion with, the mode I always tend to take? Explain.
- What about the mode made me feel that way and would it alter future decisions?

.... So on.

This study continued a couple of days before we met to discuss our results and brainstorm.

Our brainstorming session followed the same protocol as the session for phase 1 i.e. it included exchange of questions each of us asked ourselves followed by the responses we gave. The discussion continued further where we responded to the questions that the other one had which we did not ask ourselves. This then progressed to the discussion on compilation of the ideal questions we can ask in a Survey. The questions for the survey for this phase included some of the questions from phase 1 followed by questions that encompassed emotions and habit. This was done to provide the respondents some context [4] for making their response while also providing us with a chain of thought kind of responses through the list of questions asked. This would help derive more clarity on what factors are considered by an individual and how all of that inter-relates to influence the decision-making process.

This was followed by the release of a **Survey**. The purpose of doing a survey before interviews was to get large number of responses and being able to analyze possible trends and patterns amongst the respondents regarding transportation mode choice and the factoring of emotions and habits in it.

Here is a list of questions asked in **Survey** phase 2:

**Q1 -**

Which is the one place you travel to the most? How far is it from your usual starting point? how do you travel to that place?

**Q2 -**

The first time you visited this place, how did you reach there? what all information did you gather and/ or use to reach the destination?

**Q3 -**

What would be the top 2 things that would have changed your decision on mode of transportation?

**Q4 -**

Do you particularly like/prefer any mode of transportation of the following - walk, bike, bus (marta/GT transport), marta, uber/cab, personal vehicle, other? If other, please mention.

Why?

**Q5 -**

Do you particularly dislike/avoid any mode of transportation of the following - walk, bike, bus (marta/GT transport), marta, uber/cab, personal vehicle, other? If other, please mention.

Why?

**Q6 -**

When you plan to travel, are there any constraints that come to your mind before you make your final decision? Please rank them in order of importance.

Most important consideration ..... to ..... least important consideration.

**Q7 -**

Give reason for the position you have given each consideration in the previous question.

Q8 -

Have you been using a particular mode of transportation all this while since you have been using it for a long time?

Q9 -

Has there been any experience that has accounted for changes in your commuting over time?

Q10 -

Have these emotions changed the way you decide or your older decision to a new one?

Q11 -

Which is the mode of transportation you take the most? Is it due to a habit/liking developed towards it over time? If yes, how long have you been using it?

Q12 -

Have you ever considered a different mode of transportation for the same destination that you routinely go to using a routine mode of transportation? If yes, why did you reconsider your choice? What is your review on the new mode of transportation you used? Any emotions?

Q13 -

Is there anything regarding your mode of transportation decision making process that you would like to share or comment on? Any additional information would be highly valued. Please do consider answering this question to your best capacity.

The survey was left open for a period of 10 days over which we gather 25 responses. A brainstorming session was held after this where we came together to analyze the responses and come up with questions for our interviews. The process for doing this was the same as phase 1 i.e. it included selection and sorting of questions into two categories - diverse and narrow. The diverse questions gave us a birds-eye view on what are the person's preferences and what factors they consider while the narrow questions took us into the depth of why they factor things they do, the way they do. This process was then followed by rephrasing of the questions. The purpose of this was to avoid any biases that a question may tend to pose or suggests to the respondents mind.

All our **Interviews** were conducted separately to gather more data to enable better understanding of the cognitive process. The interviews were conducted over a period of 5 days in which 10 people were interviewed.

The base format followed for the interviews is as follows:

### Greet

Start with general introduction of self and the topic of discussion

1. What is the one place you travel to the most? How?
2. The first time you went to this place, how did you travel?
3. When was the last time you visited a new place? How did you travel to that place?
4. Which mode of transportation have you used the most until now out of personal choice? Do you think you are now habituated to it?
5. Do you feel group dynamics affect your decision for transport mode selection? If yes, explain why, with an example.
6. Have you been using a particular mode of transportation for a very long time? If yes, which is it and why have you been using it for so long? Is any emotion associated with it?
7. What is your typical emotional state when you travel by “\*\*\*\*”? What is the reason for it? Have there been exceptions to this? If yes, elaborate.

\*\*\*\* = the various mode of transportation

### Types of follow-up questions:

- Why did you use this mode of transportation?
- So, if this is the reason for choosing it, why is this so important?
- What other things did you consider?
- Can you order them in rate of importance? - if answer, why is this your order of preference
- What would be the top 2 things that would have changed your decision on mode of transportation? (use the answer as conditions, now change conditions and see how the interviewees choices change ) (use these details to create questions for the survey)
- Has your choice of mode of transportation to the same destination changed over time? If yes, why?
- Do you typically take the same mode of transportation to a particular destination/ region/ district?
- What is your favorite mode of commuting?

- Has there been any experience that has accounted for changes in your commuting over time?
- Do you think habits influenced this decision?

Our interviews were then followed by multiple brainstorming sessions all involving analysis of the responses, validation through survey responses and the work on developing the system architecture of our agent.

## 5. Description of data collected with samples

### Survey

A total of 39 responses were collected over 2 phases of surveys. Phase 1 included questions and responses related to the quantitative factors that influence our decision-making process. We got 14 responses for the same. Our Phase 2 survey expanded on the first survey by incorporating questions concerning emotions, experiences and habits related to transportation mode choices. We received 25 responses for the same.

The reports for the survey can be found in Appendix C. Appendix C1 contains report for Phase 1 survey and Appendix C2 contains report for Phase 2 survey.

### Interviews

A total of 17 interviews were conducted over 2 phases of the project. Phase 1 interview responses included a lot of information regarding the factors considered and the relative priority each of these factors are given in the decision - making process.

Here are some key quotes from our interviews from Phase 1 that had a strong hand in the design of our rule-based system:

**NOTE** - These interviews have not been added as transcription in the report. Key information has been paraphrased below.

Interviewee 1: “ If there is heavy rain, I don’t go to the class, haha. Not worth it. But if I have to go, I should take the trolley. ”

“ If the travel time is late in the night I would call an Uber. ”

“ I don’t like biking or walking a lot since roads are uneven. ”

Interviewee 2: "There are a few factors that are very important - the money is very important, the weather is very important, the distance is very important, there is also a health factor, nowadays I prefer walking or running to a place instead of bike. What else? Ummmm... Time of the day? If it's very late I will not walk, safety is a very big problem here. Also, by time I mean the day and the time of the day. Saturday and Sunday, I get free parking, so I can take my car. Among all of this I would give safety the highest priority. Then weather then distance". " I can walk to anything until about 1.5-mile radius, more than that I would need a vehicle"

Interviewee 3: " I am near the bus stop, and trolley shows up, then I take that bus. If there were no trolley or express, I don't wait for the buses. "

Interviewee 4: "I usually try to check the cheapest mode of transportation. For office I take the MARTA and from my stop I take a shuttle to the office. I prefer MARTA because it is cheap, but when it is very early in the morning or late in the evening, I take a cab. I also take a cab if its important and I don't have much time for travel"

Interviewee 5: " If the purpose of my visit is of high priority I am open to spending some money on a cab otherwise I prefer walking or using the public transit."

" I think the time of the day and the safety level of the area also matters."

" I do not own a car, so I do not have that option available for me. "

Interviewee 6: " I am open to public transit but only during certain hours of the day since I have had a bad experience at one of the MARTA stations."

" I would give safety high priority."

" I like walking or taking my roommates bike when the distance is more, or I am tired or am carrying some heavier weight. "

" Sometimes I travel Decatur side where I cannot go my MARTA, so I take an Uber. "

The paraphrased interview transcripts for Phase 2 can be found in Appendix B.

## 6. Analysis of Data

### a) Survey Data

Our surveys provided a lot of key insight on what were the factors considered through a decision making process. Some of the key takeaways are as follows:

- As a whole the group of respondents have shown use of all modes of transportation thus clarifying that there is no direct rejection of a mode unanimously.
- During their first visit the factors taken into consideration are widespread in which cost of travel and distance associated with the journey has been mentioned four time while frequency of transport mode, and time associated with the mode has been mentioned 3 times in the 25 responses.
- Google map was considered as the first resource people use for making transportation mode decision by 11 out of the 16 valid responses gathered for this question.
- For priority of factors taken into consideration while making the decision cost of travel for mentioned by 11 out of the 25 responses followed by distance of travel and time taken which were tied at 6 mentions. Other considerations included in responses are comfort level, safety, frequency, and more.
- There are 13 of the 23 valid responses to a question that asks if they have reconsidered their mode of transportation and they answered no. This goes on to showcase the possibility of a developed habit.
- Of the 21 valid responses for the emotional experiences 5 have responded mentioning cases of dislike and bad experiences.

A more detailed view of the responses can be found in Appendix D.

### b) Interview Data

We interviewed 10 people (all but one university students, 8 from Georgia Tech). This is in addition to 7 interviews done for Project 1. But we're focussing mainly on the Phase 2 interviews, as it was in these that we asked people to consider emotion and habit. The interviews are attached in the appendix. The mapping of rules to these interviews is provided in the appendix. All rules were derived from a combination of logic, introspection, data from surveys and the interviews. The mapping may not be exact as it's done post-facto, so it's possible that not all interviews that contributed to a rule are mentioned. The questions in all interviews are not same, as they were taken at different times to understand different aspects of the problem, apart from their being a degree of improvisation to account for differences in individuals. Also, all the interviews were paraphrased, and some of the statements from these interviews were not recorded. But an overall sense of that person's thinking continued to be a source of inspiration while drawing up the rules.

Some of the key quotes/answers in bold (attributes of all interviewees in the appendix):

Interview 1 (heavily paraphrased):

What is the one place you travel to the most? How?

**Office. MARTA.**

Why did you use this mode of transportation?

**It's cheap and it's quick.**

So, if this is the reason for choosing it, why is this so important?

**"Coz I'm poor and I like getting up late in the morning".**

Interview 2 (heavily paraphrased):

What is the one place you travel to the most? How?

**Campus. Drive+Walk.**

Why did you use this mode of transportation?

**"Because trolley sucks".**

Interview 3 (heavily paraphrased):

Which mode of transportation have you used routinely since childhood? Name 3 and rank them in order and explain why the order. Is it still applicable (present)? Why? What do you like or dislike about each?

**1. Bus (school)**

**2. Car**

**3. Train (metro)**

**Bus- went to school in a bus. Car- used to drive during undergrad.**

**Before that parents would drive. Train- Delhi has a very good metro.**

**No, would prefer Car and walking (health reasons). Childhood I loved long distance trains. I liked that in India because people talk to you, whereas that doesn't happen here.**

**Bus: Not regular, time gets killed.**

**Car: Expensive**

**Train: Last mile of connectivity.**

Interview 4 (heavily paraphrased):

1. a) How do you decide if a distance is walkable/bikeable or needs a car? Answer given these variables:

a) Distance

**think in terms of time, not distance. Look at Google maps. Safety is important.**

b) Time of day

**At night, more inclined to drive/uber. Night means dark. Time depends on season**

c) Weather

**Weather-upper 90's or freezing or pouring (not walkable or bikeable).**

d) Urgency

**Drive or get an Uber for an interview if I have time**

e) Your fitness

**Lack of Fitness has never stopped me (from walking or biking)**

f) Your physical state (tiredness)

**Depends on what I have been doing that day. Walking is not an issue, but does it make it less likely**

g) Your past experience(s) (that would prevent you from choosing one)

**Hasn't happened to me.**

Interview 5 (heavily paraphrased):

Have you ever broken a habit related to transportation?

**Stopped walking super late at night, usually drive. Heard of things. Friends have been followed. General common sense things.**

Interview 6 (paraphrased):

What is your typical emotional state when using train as mode of transportation?

**Stressful when it is crowded. And I sometimes feel fear as sexual harassment in trains is one of the biggest problems. But when it is not that crowded, I feel happy as I can play with my phone.**

Interview 7 (paraphrased):

Did you ever feel fear on public transportation?

**Yes. So, If I feel scary, I use Uber instead of public transportation. I have a following experience. Someone in Marta asked me for a money. Someone in the bus is pointing at me. These experiences are remembered as my fear experiences. Based on the experiences, I**

**became to think buying a car to avoid these dangers. However, car is not always safe. It depends on how long I need to drive. 20 min drive from my house to school requires me to be cautious for the safe drive. If I feel sleepy, driving a car is dangerous as well.**

Interview 8 (paraphrased):

Did you ever feel fear on public transportation?

**Yes. Weird people, theft and people who is not nice to women on train make me feel fear on public transportation. I have an experience in which I bumped into first two type of people in public transportation. So, I usually try to avoid using transportation. But if I am with my friends who could help me out these kind of situation, I use public transportation.**

## 7. Conclusions

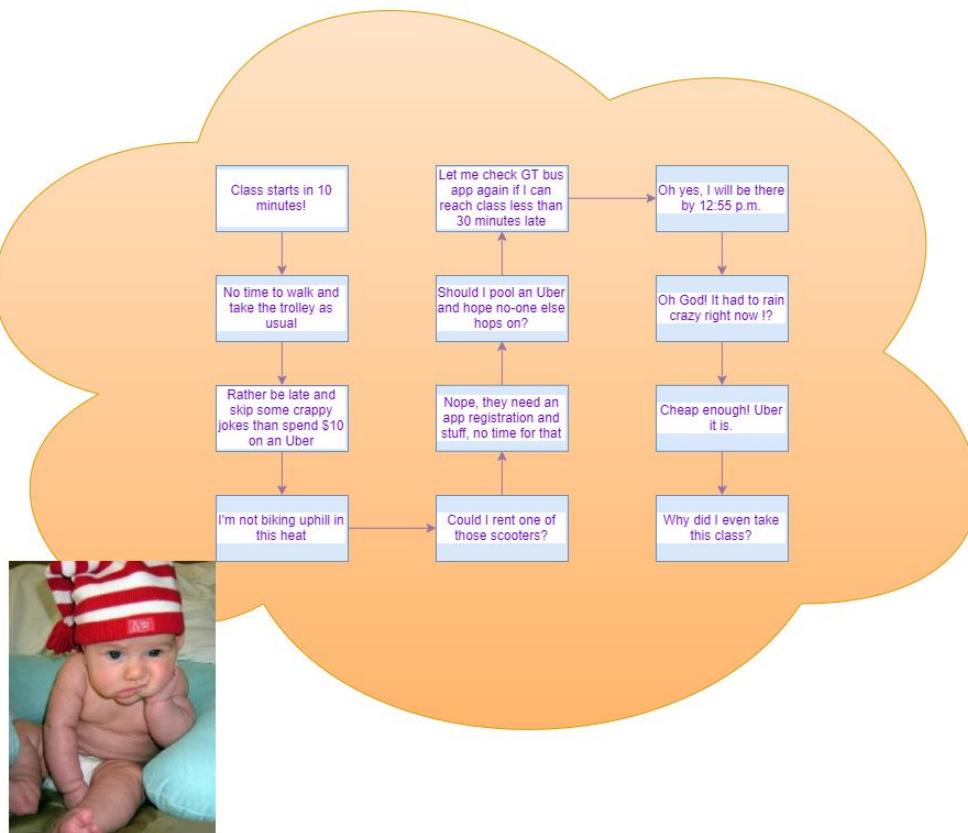
Our detailed study and analysis of data gathered from various sources has informed our system design. The literature review also provides significant validation to the trends observed in the responses provided in our surveys and interviews. The conclusions that can be drawn from them are as follows:

- Human mind can be considered to act as a rules-based system for the cognitive task of decision of transportation mode for a journey.
- Humans have different groups of factors that they consider for making their decision. They are - personal state (physical, financial), characteristics of the journey they are going to embark on, environment, characteristics of the transportation mode.
- Habit reduces cognitive load by reducing the need for thorough thinking and using goal related facts and cues.

- Habits are over-ruled by emotional experiences and extraordinary circumstances.
  - e.g. for a given journey our agent chose bus repeatedly, formed a habit. After a bad emotional experience, he reevaluated his choice and chose to bike.
- This shows the complexity of the agent to understand past and present cues and make decisions.

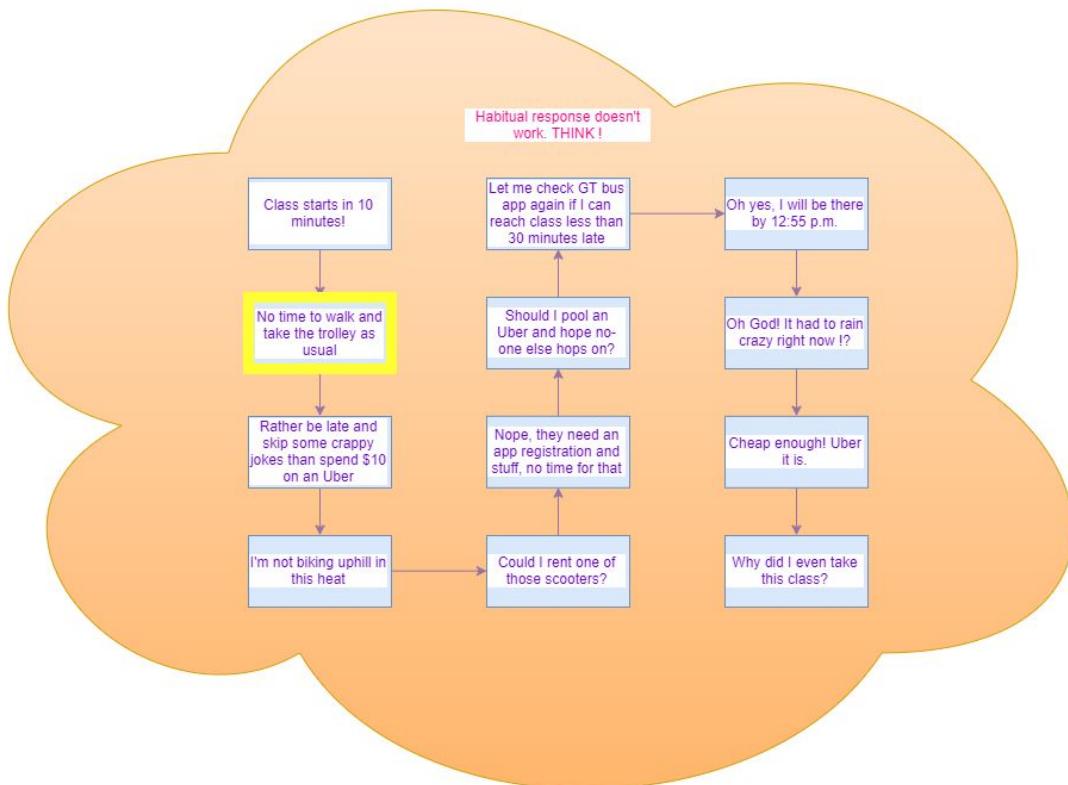
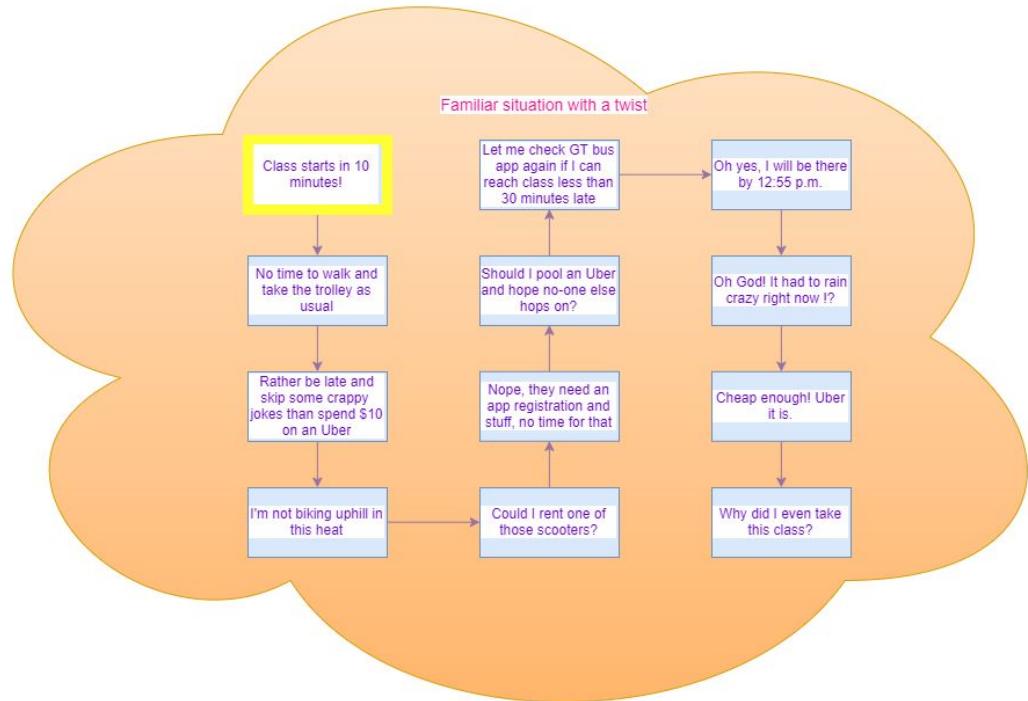
## 8. Implications for cognitive model

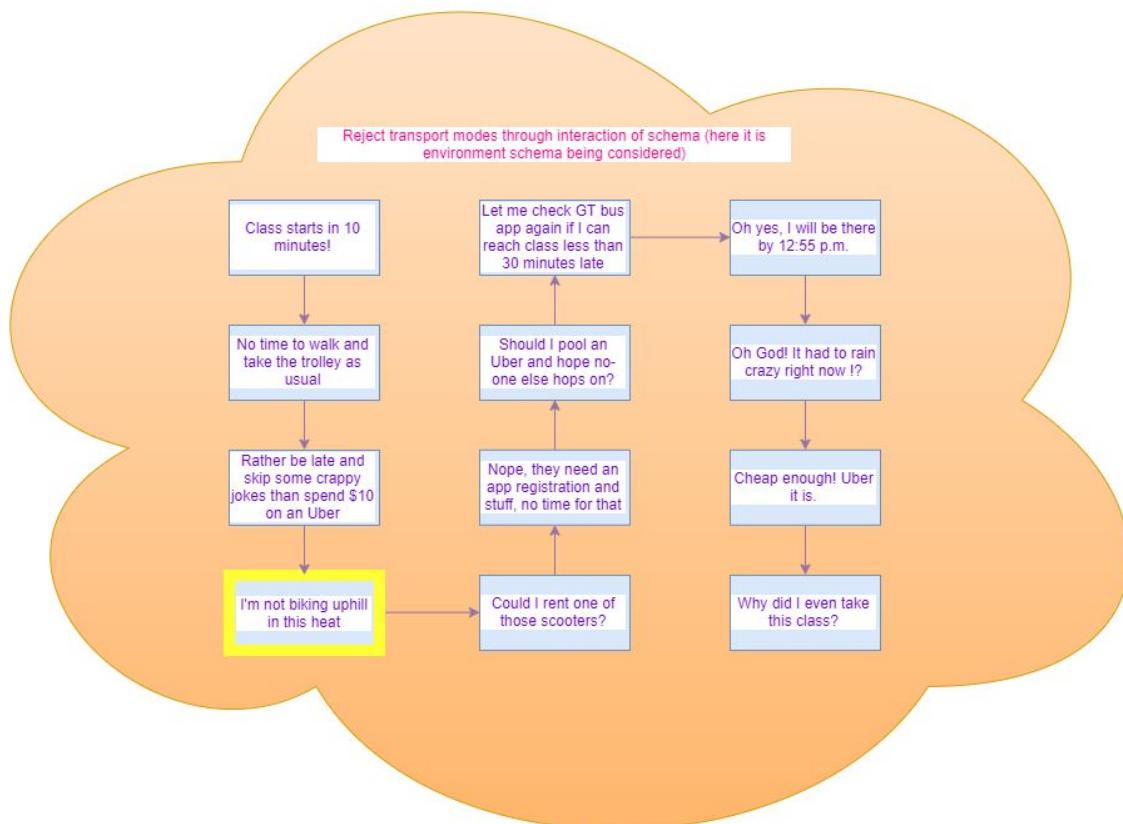
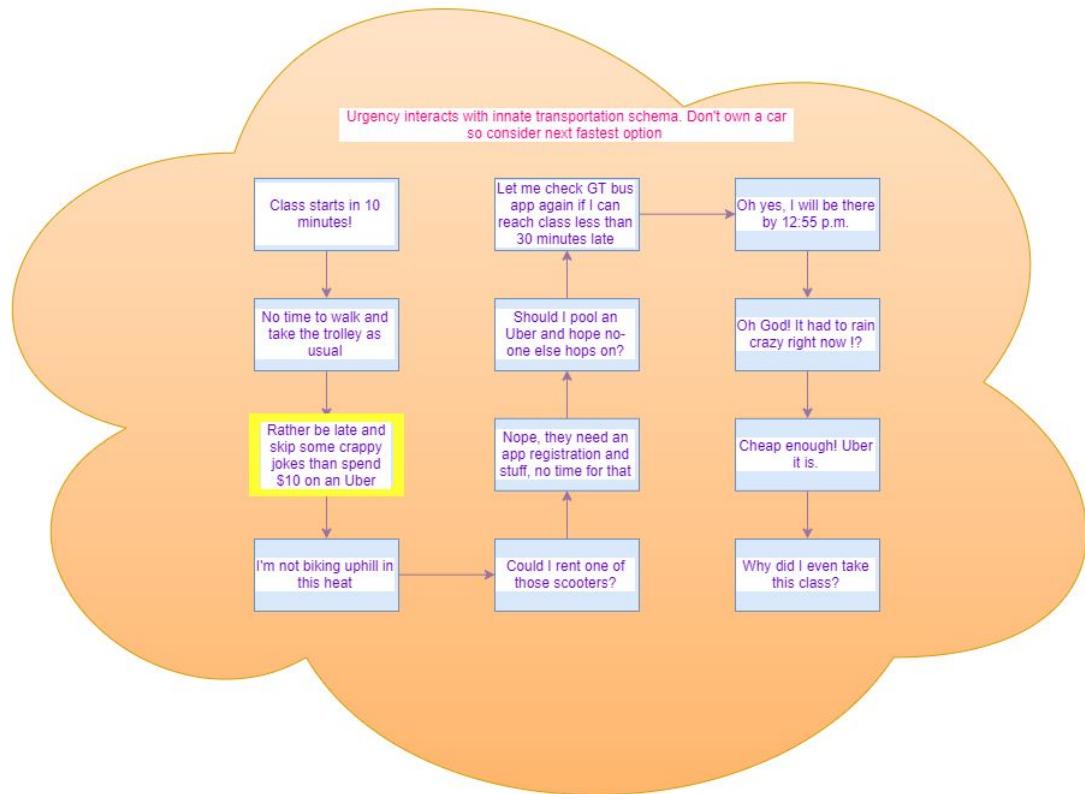
So let's discuss a typical situation in the given context and try to reconstruct how a person would reason and arrive at decision. Our cognitive agent is designed to mimic the process shown below as closely as possible.

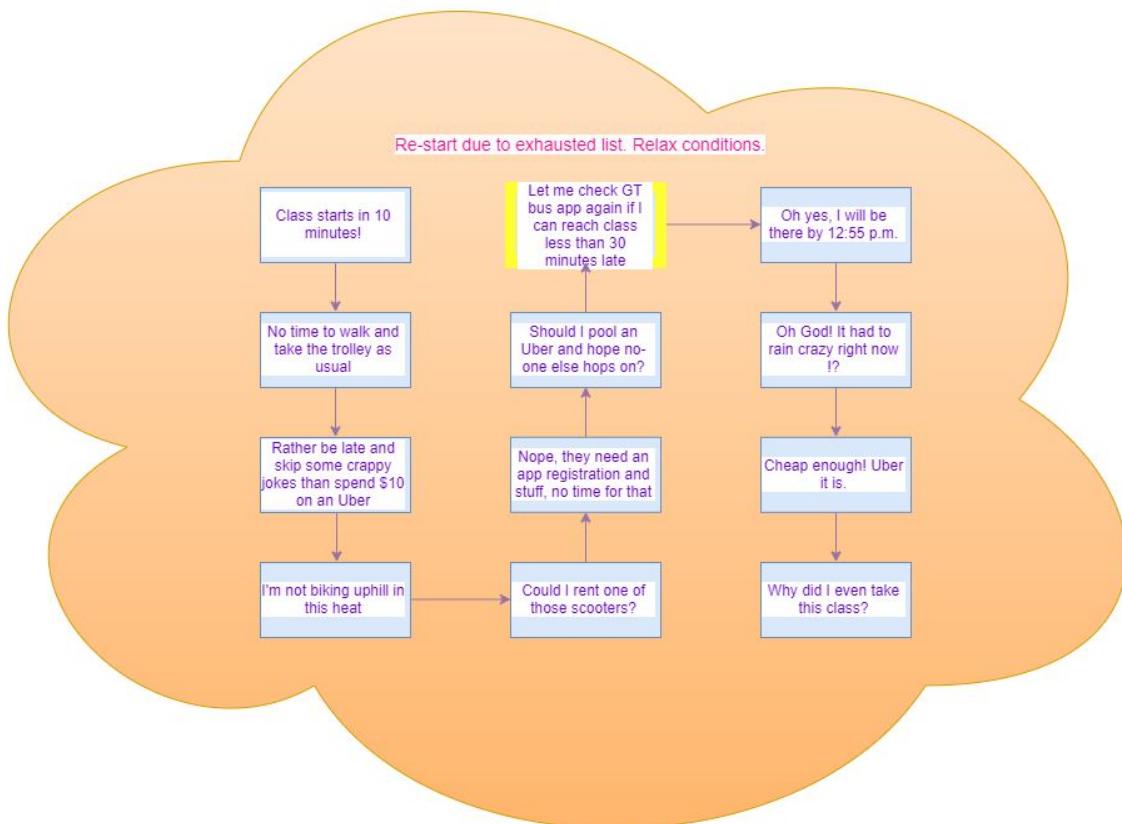
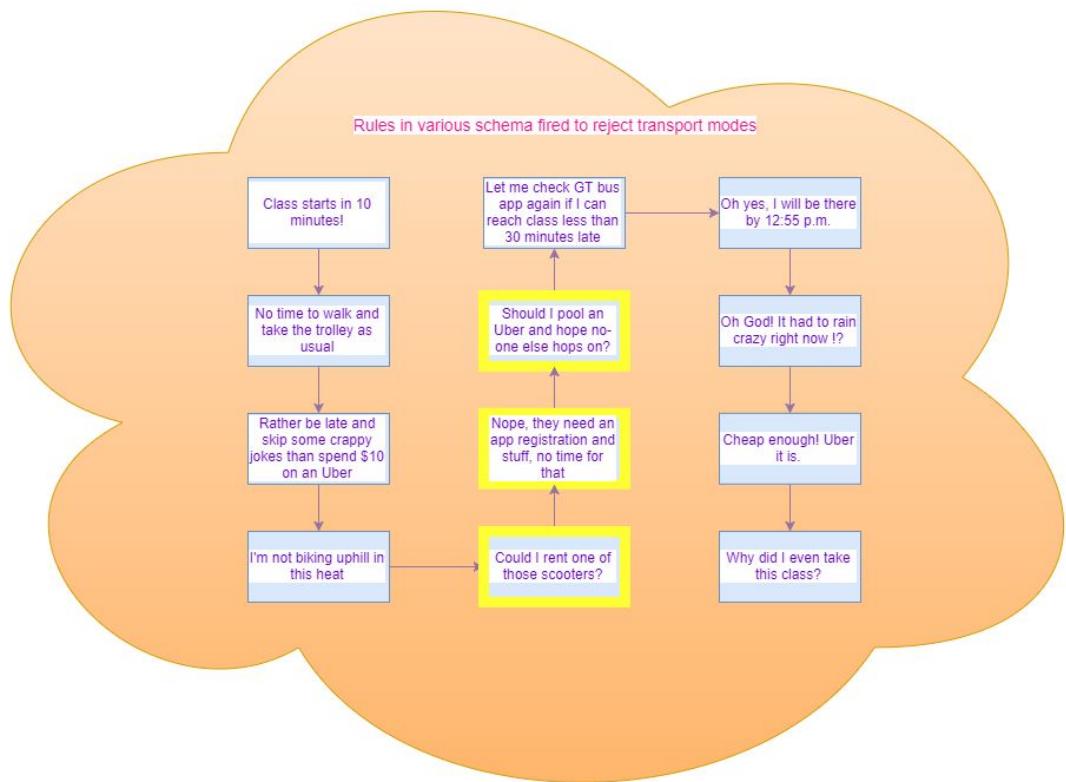


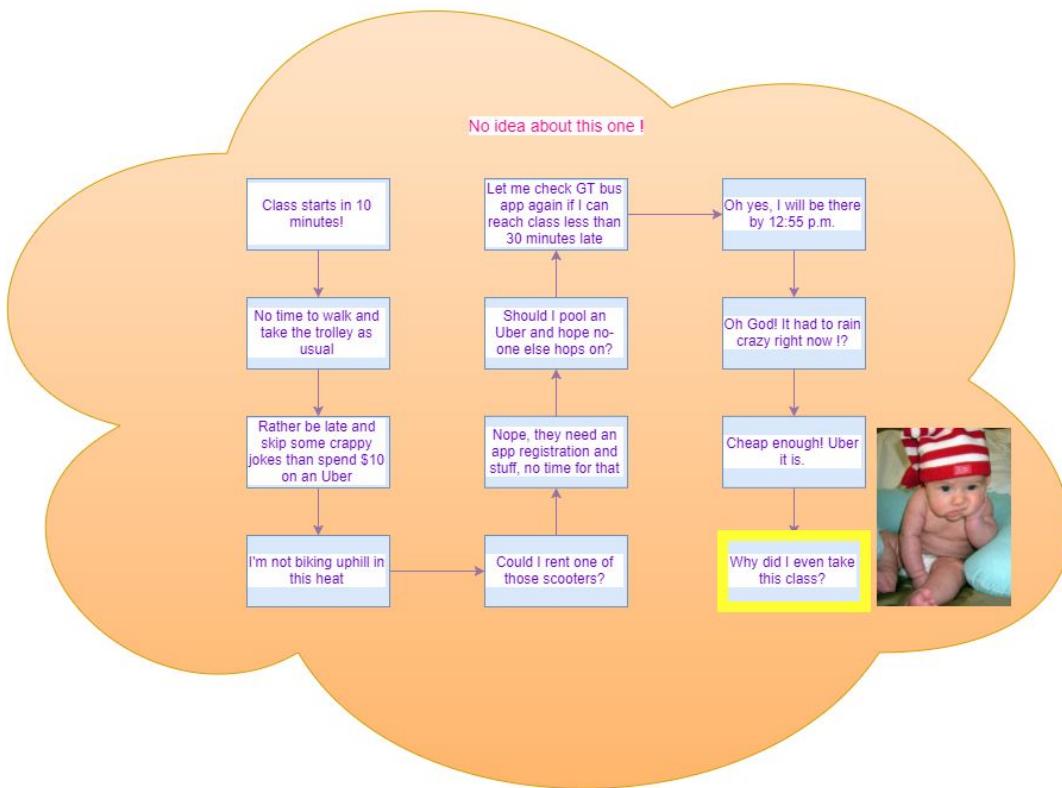
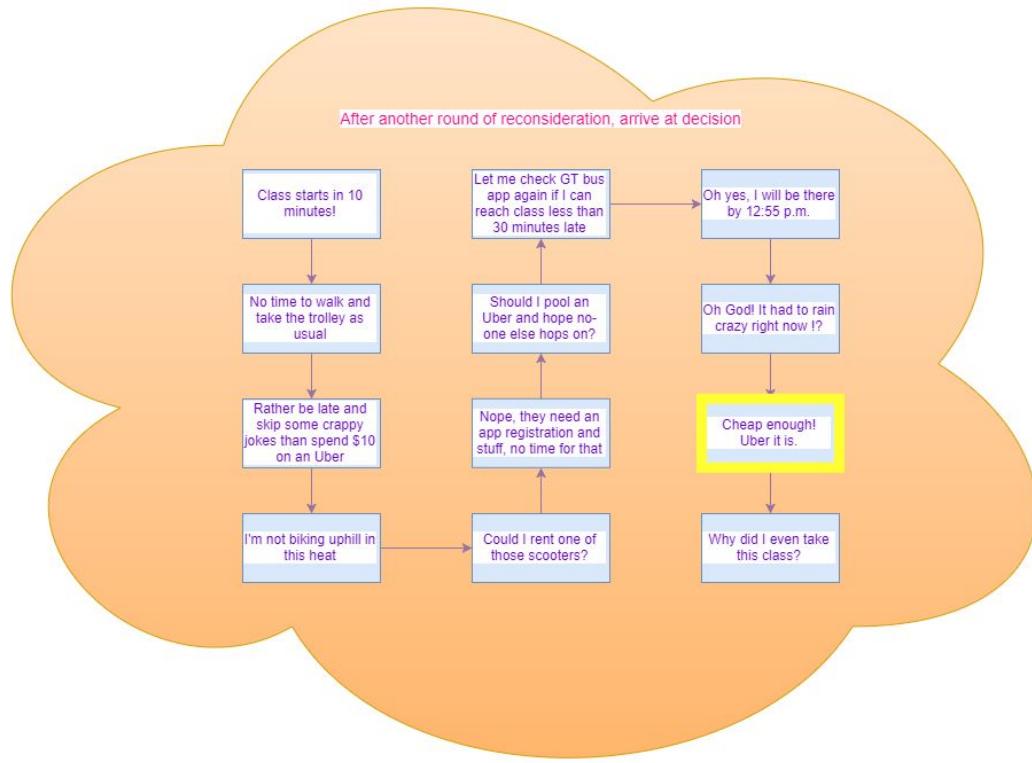
Here, we see firstly, the habitual response cannot be invoked due to urgency of the situation. Then we evaluate all transportation modes based on various factors such as cost, weather, accessibility etc. We reject choices one by one, till we are left with no choice. We then relax the condition (time constraint) and re-evaluate. We find an option, but other variables have changed (rain). So we again evaluate, and finally arrive at a decision. This kind of thinking has been done by everyone at some point (chalking off available options), even if not with regard to transportation, and is a good cognitive

model for human decision making in general, and certainly in the given problem context.









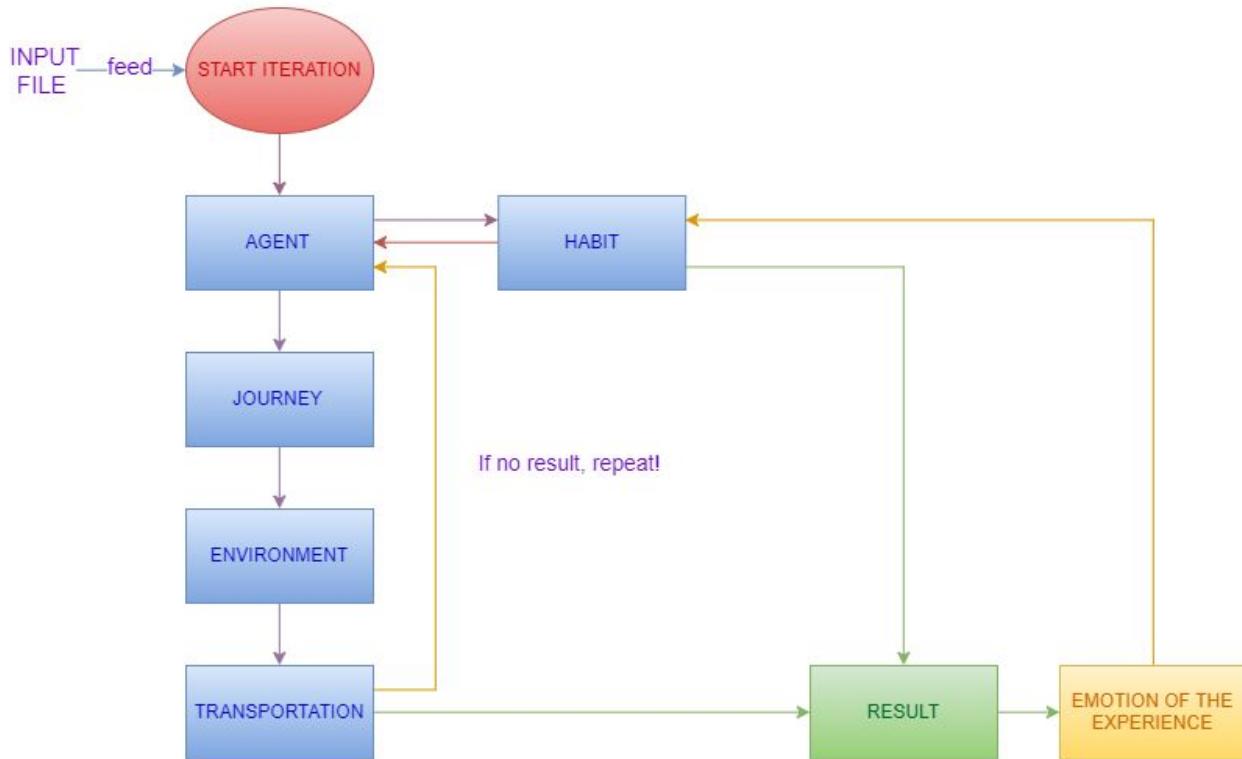


Fig. System Architecture

The system architecture works similar to the human example shown above. From our study, we decided to have 5 schemas, namely Agent, Habit, Journey, Environment and Modes of Transportation. These schemas have internal and external methods.

- Given certain input conditions, the agent first tries to invoke a habitual response, if it exists and applies it to the situation.
  - It then accesses the Agent, Journey, Environment and Transportation schemas sequentially (order obtained through surveys and interviews)
  - It runs until a result is obtained, relaxing conditions on the reruns as per agent preferences
  - We then attach an emotion to the journey, and this experience becomes part of a habit
  - Habit consists of journey conditions+attached emotion
  - Habit is rejected if a bad emotional experience is associated with it

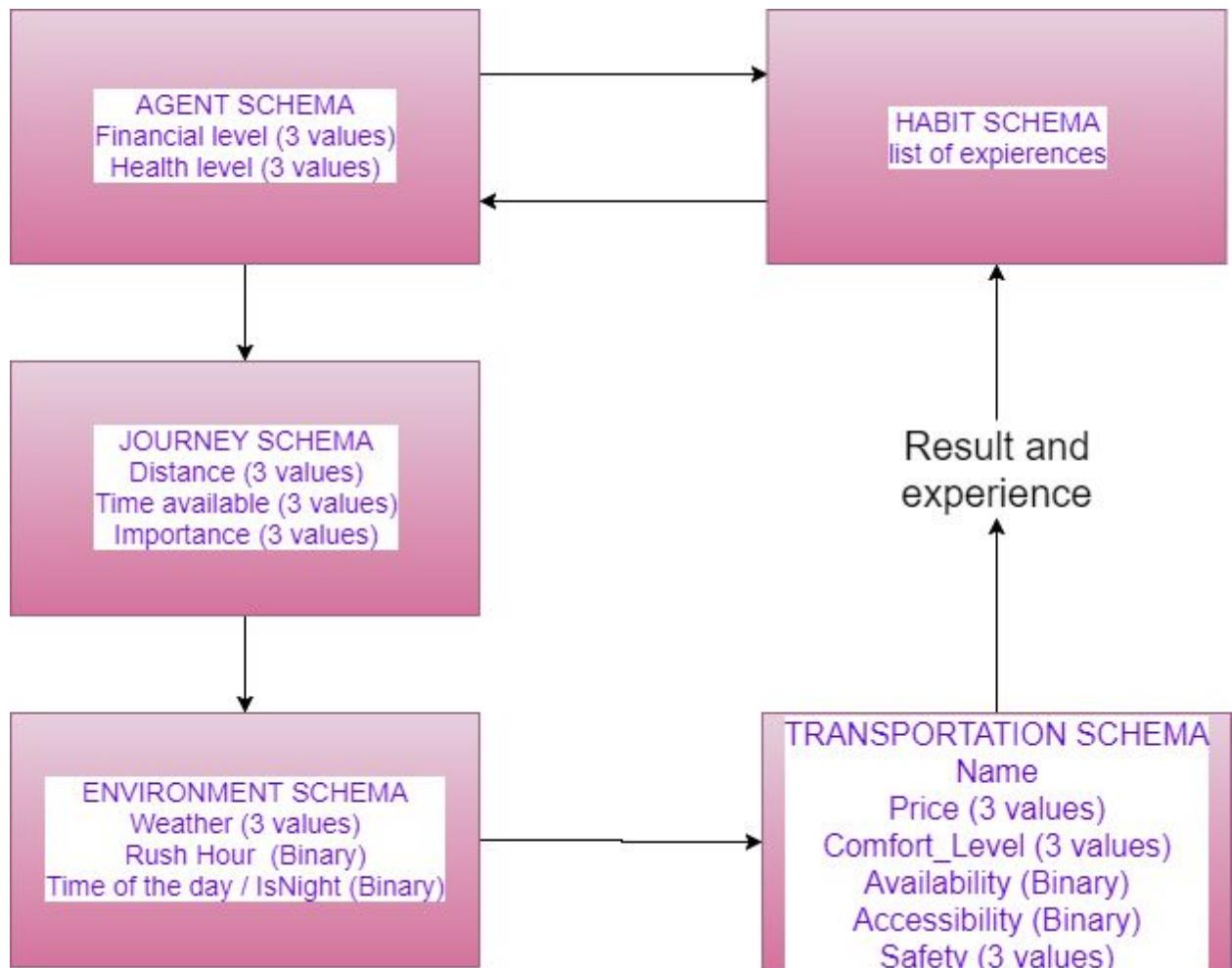


Fig. Schema and variables

## 9. Software description

### 9-1. Internal Representation - schema

Class Agent	Class Environment	Class Rule
Health_level Finance_level Preference_level emotion	Weather isRushHour isNight	health_level finance_level weather isRushHour isNight distance time_available importance_level  car_price car_comfort_level car_availability car_accessibility car_safety (bus, uber, marta, walk)
Class Transportation	Class Journey	_car_eliminate _walk_eliminate _bus_eliminate _uber_eliminate _train_eliminate _bike_eliminate _location_to_be_fired

Figure 9-1.

In our software, there are five classes as shown in Fig.9-1. From literature reviews, surveys and interviews, each variables for each schema are chosen. From the literature reviews, we found some variables do not affect the way we expect to have influence on the people's choice of transportation. For example, health\_level and preference. Health level is usually not so important for young adults [13] so that if the agent is young, the agent tends choose "price" as preference over "health level". And some research mentions that people chooses best transportation based on the preference. For example, people who prefers shorter travel time has willingness to pay more transportation fee to shorten the travel time[14].

- agent - representing an agent
  - health\_level - representing how healthy the user is

- finance\_level - representing how much budget the agent has
  - Preference - representing which variables the agent care most
  - Emotion - representing how much satisfied the experience
- environment - an environment factors
  - weather - representing how the weather is such as hot, rainy, or thunder
  - isRushHour - representing the time the user travel is in rush hour
  - isNight - representing the time the user travel is in night
- transportation - representing a type of transportation
  - name - "car", "bus", "walk", "uber", "train", "bike"
  - price - representing how much spend money to take the transportation
  - comfort\_level - representing how much familiar with the transportation
  - availability - representing whether available to use the transportation or not
  - accessibility - representing how easy to access to the transportation
  - Safety - representing how safe to access to the transportation
- journey - characteristics of a journey
  - distance - representing how far a destination is
  - time\_available - representing how much time is available for the user
  - importance\_level - representing how urgent the travel is for the user
- rule - characteristic of a rule
  - health\_level - representing user's health level required to be satisfied to fire the rule
  - finance\_level - representing user's financial level required to be satisfied to fire the rule
  - weather - representing weather state required to be satisfied to fire the rule
  - time\_of\_day - representing time of day required to be satisfied to fire the rule

- distance - representing distance from origin to destination required to be satisfied to fire the rule
- time\_available - representing available duration of time required to be satisfied to fire the rule
- importance\_level - representing user's urgent level required to be satisfied to fire the rule
- Car\_price - representing how pricy the agent feel about the car
- Car\_comfort\_level - representing how much the agent feel comfortable about car
- Car\_availability - representing the availability of the car. ex) if you have a car, it means that the car is available to use it.
- Car\_accessability - represent the accessibility of the car. ex) if you have a car but the tire is flattened, you can't use it.
- Car\_safety - representing how safe the agent feel about the car as the type of transportation.  
(Walk, Bike, Car, Uber, Marta has same attributes as well.)
- Rate\_car\_comfort\_level- representing how much the comfort\_level in car object is changed after the rule is fired
- Rate\_car\_availability- representing how much the car\_availability in car object is changed after the rule is fired
- Rate\_car\_accessability- representing how much the car\_accessability in car object is changed after the rule is fired
- Rate\_car\_safety- representing how much the car\_safety in car object is changed after the rule is fired  
(Walk, Bike, Car, Uber, Marta has same attributes as well.)
- Car\_eliminate - representing that the car is not an option for type of transportation and remove from the possible option list.
- Bus\_eliminate - representing that the bus is not an option for type of transportation and remove from the possible option list.
- Walk\_eliminate - representing that the walk is not an option for type of transportation and remove from the possible option list.
- Train\_eliminate - representing that the train is not an option for type of transportation and remove from the possible option list.

- Uber\_eliminate - representing that the uber is not an option for type of transportation and remove from the possible option list.
- Bike\_eliminate - representing that the bike is not an option for type of transportation and remove from the possible option list.
- Location\_to\_be\_fired - representing where the rule should be fired.

## 9-2. Input

As a input, we create input excel file that represent agent's list of conditions. To be specific, each row of the excel represent one sorts of facts for one experience. For example, first experience, the agent have enough money to travel(finance\_level), the time of day is night (isNight), I'm going to urgent care(importance\_level). Input file means these facts.

- Health\_level - How is your health condition? input 0 for not tired, 1 for tired, 2 for sick
- Finance\_level - How is your financial condition? input 0 for low, 1 for mid, 2 for high (budget of transportation)
- Preference - which factor is your high priority? Input "Cost" or "Time available"
- Weather - How is the weather now? input 0 for normal, 1 for so so, 2 for extremely bad
- isNight - Are you travel in the night? Input 0 for No and 1 for Yes.
- isRushHour - Are you travel in rush hour? Input 0 for No and 1 for Yes.
- Distance- How far is your destination? input 0 for close, 1 for medium, 2 for far away
- time\_available - How much time is available for you? -> input 0 for short, 1 for mid, 2 for long
- Importance\_level - How urgent is this journey for you? ->input 0 for No, 1 for just so so, 2 for yes
- Car\_price - How much is the car worth to you? -> input 0 for low, 1 for medium, 2 for high
- Car\_comfort\_level - How much is the car comfortable to you? -> input 0 for low, 1 for medium, 2 for high
- car\_availability - Is car available for you now? input 1 for Yes and 0 for No.

- car\_accessability - Is car accessible for you now? input 1 for Yes and 0 for No.
- Car\_safety - How much is the car safe to you? -> input 0 for low, 1 for medium, 2 for high
- Bus\_price - How much is the bus worth to you? -> input 0 for low, 1 for medium, 2 for high
- Bus\_comfort\_level - How much is the bus comfortable to you? -> input 0 for low, 1 for medium, 2 for high
- Bus\_availability - Is bus available for you now? input 1 for Yes and 0 for No.
- bus\_accessibility - Is bus accessible for you now? input 1 for Yes and 0 for No.
- Bus\_safety - How safe is using a bus for you? input 0 for low, 1 for mid, 2 for high
- Walk\_price - How much is the walk worth to you? -> input 0 for low, 1 for medium, 2 for high
- Walk\_comfort\_level - How much is the walk comfortable to you? -> input 0 for low, 1 for medium, 2 for high
- Walk\_availability - Is walk available for you now? input 1 for Yes and 0 for No.
- Walk\_accessibility - Is walk accessible for you now? input 1 for Yes and 0 for No.
- walk\_safety
- Uber\_price - How much is the uber worth to you? -> input 0 for low, 1 for medium, 2 for high
- Uber\_comfort\_level - How much is the uber comfortable to you? -> input 0 for low, 1 for medium, 2 for high
- Uber\_availability - Is uber available for you now? input 1 for Yes and 0 for No.
- Uber\_accessibility - Is uber accessible for you now? input 1 for Yes and 0 for No.
- Uber\_safety - How safe is using a uber for you? input 0 for low, 1 for mid, 2 for high
- Train\_price - How much is the train worth to you? -> input 0 for low, 1 for medium, 2 for high
- Train\_comfort\_level - How much is the train comfortable to you? -> input 0 for low, 1 for medium, 2 for high
- Train\_availability - Is train available for you now? input 1 for Yes and 0 for No.

- Train\_accessability - Is train accessible for you now? input 1 for Yes and 0 for No.
- train\_safety - How safe is using a train for you? input 0 for low, 1 for mid, 2 for high
- bike\_price - How much is the bike worth to you? -> input 0 for low, 1 for medium, 2 for high
- Bike\_comfort\_level - How much is the bike comfortable to you? -> input 0 for low, 1 for medium, 2 for high
- Bike\_availability - Is bike available for you now? input 1 for Yes and 0 for No.
- Bike\_accessability - Is walk accessible for you now? input 1 for Yes and 0 for No.
- Bike\_safety - How safe is using a bike for you? input 0 for low, 1 for mid, 2 for high

### **9-3. Learning (program)**

In our hypothesis, habit (defined as repeated behaviour) reduces cognitive load when making transportation decisions. Every time the agent does trip, one experience is created. And it will be stored in the list of experiences. To make a list of habits, we scan list of the experiences. And if there exists multiple similar experiences, we can consider it as habit and store it in the list of habit. Our system checks whether the upcoming trip's conditions are matched with the conditions of one of previous habits or not. If the upcoming trip's conditions are matched, the agent decides the best transportation only based on the matched habit. Thus, the agent does not use the normal cognitive procedures which is loop shown in the previous section. That way, the agent reduces cognitive load.

In another our hypothesis, the habit is broken only in highly unusual or extraordinary circumstances, in the context of habitual transportation decisions. In our interview, some of interviewee mentioned that the feeling of the experience was extremely bad, they don't want to make the same choice for the next travel. In our system, if the current experience has similar conditions with the previous habit but the post emotion of the the trip based on the habit was horrible, the agent can't use the habit to choose the type of transportation. In this case, we just re-run(starting whole cognitive process) our system to choose the mode of transportation.

By adding and deleting habits, the agent keeps learning in the sense that the agent tries to choose the best transportation with updated information while keeping the level of cognitive task to choose transportation from very complex.

## 9-4. Sample output and Insight

There are two types of output from the software

- output in command line which is either "car", "bus", "walk", "uber", "train", "bike"
- "Output.txt" file in which explanations why an agent chooses a transportation in each trips are stores.

As sample output, here shows the case where an agent without any prior trip experience travel 47 different trips. The overview of inputs for this agent is in shown Table 9-1 and 9-2. Table 9-1 shows attitudes towards each type of transportsations by the agent. "L", "M", "H" represent "Low", "Medium", and "High". For example price is "L" means the agent thinks walk is cheap transportation. Each column in Table 9-2 represent one trip by the agent. Thus in the actual input, there are 47 lines as the agent will experience 47 different trips.

	price	comfort-level	availability	accessibility	safety
walk	L	M	1	1	M
bike	L	L	1	1	M
car	M	H	1	1	H
bus	L	L	1	1	L
marta	L	L	1	1	L
uber	H	H	1	1	M

Table 9-1 Attitudes towards each type of transportsations by the agent

health level	L	M	M	M
finance	L	M	M	M
weather	L	L	L	M
rush hour	L	L	L	L
isnight	L	L	L	L
Distance	L	L	L	L
Time available	L	L	L	L
Importance	M	M	M	M

Table 9-2 Variables for each trips

After running the software, output in command looks like Fig,9-2. Each line represents one trip by this agent and shows the best transportation chosen by the agent.

```

5-th travel
Best transportation for this trip = bus

6-th travel
Best transportation for this trip = bus

7-th travel
Best transportation for this trip = bus

8-th travel
Best transportation for this trip = bus

9-th travel
Best transportation for this trip = bus

10-th travel
Best transportation for this trip = bus

```

Fig.9-2 Output in command lines

“Output.txt” has explanations about how an agent chooses best transportation for each trip. From this file, the formation of habits, the chronological change in the agent’s habit, and inhibition of habits use by emotion can be observed.

Fig.9-3 shows how the agent chooses “bus” as best transportation. As can be seen, there is no habit output under the sentence “Habits from the experiences are as follows.”. This is because the agent does not have any trip experience before so that there is no way for this agent to make habits. Therefore, the agent performs rule-based cognitive tasks to decide the transportation. Under the sentence “As found through the literature reviews and interviews, rules associated with agent schema are fired first. rules associated with journey schema, environment schema, transportation schema follows. ”, rules are fired in the appropriate order. Whenever, a rule is fired, there is the explanation of the rule shown up in the following format.

“ - Rule ”**i**” is fired, which is if “**condition here**”, then “**operation here**”. Then the last few lines in each trip always shows what transportation the agent chooses for the trip in the following format.

“ **“How the agent select one transportation after firing all rules which can be fired”**. The agent chooses “**Chosen Transportation**” for the transportation for the trip!.”

In Fig.9-3, the agent chooses “bus” for his first transportation based on fired rules and his preference which is the agent cares safety so much.

1-th travel  
The agent decides the best transportation among car, walk, bus, uber, train, bike for the trip in the following way.  
Habits from the experiences are as follows.  
Summary of states in this upcoming trip is as follows  
- The agent is not sick and the weather is not extremely bad and now is not in rush hour, now is not at night, the agent does not have a lot of time to get a destination, the trip is really not really in a hurry, the agents posttrip emotion is great,  
Habit cannot be used since the current trip characteristics does not match to any habit. Thus, the agent uses the normal cognitive procedure to decide the transportation.  
As found through the literature reviews and interviews, rules associated with agent schema are fired first. rules associated with journey schema, environment schema,j transporation schema follows.  
Rules associated with agent schema is going to be fired as follows.  
- Rule 1 is fired, which is if the agent is not tired, then agent is okay with every mode of transportation.  
- Rule 8 is fired, which is if the agent is okay to use money to transportation, then agent is okay with train and bus and less consider car and uber as their option..  
Rules associated with journey schema is going to be fired as follows.  
- Rule 13 is fired, which is if travel distance is short, agent have less time, and the importance level for the travel is so so, then agent choose bike and bus..  
Rules associated with environment schema is going to be fired as follows.  
- Rule 4 is fired, which is if weather is normal, then agent is okay with every mode of transportation.  
Rules associated with car schema is going to be fired as follows.  
Rules associated with walk schema is going to be fired as follows.  
Rules associated with bus schema is going to be fired as follows.  
Rules associated with uber schema is going to be fired as follows.  
Rules associated with train schema is going to be fired as follows.  
Rules associated with bike schema is going to be fired as follows.  
As there are still more than one transportation left in candidate\_transportations list, the agent chooses one transportation with highest safety from the list since agent current preference is safety.  
The agent chooses bus for the transportation for the trip!

Fig. 9-3 Explanation of 1st trip by the agent Output.txt

Fig.9-4 shows how the agent chooses best transportation in 5th and 6th trip. As can be seen in 5 th trip, the agent created his first habit indicated as “habit\_o” as his previous 4 trips. However, the agent does not use this habit as the characteristics of 5th trip does not match to the conditions “habit\_o” has. Therefore, the agent performs rule-based cognitive tasks to decide the transportation.

In 6th trip, the agent uses this habit as the characteristics of 6th trip does match to the conditions “habit\_o” has. Thus, the agent succeeds in avoiding performing rule-based cognitive tasks to decide the transportation. And the agent decides to use “bus” only based on the habit.

5-th travel  
The agent decides the best transportation among car, walk, bus, uber, train, bike for the trip in the following way.  
Habits from the experiences are as follows.  
- habit\_0 is If the agent is not sick and, the weather is not extremely bad and, now is not in rush hour, now is not at night, the agent does not have a lot of time to get a destination, the trip is really not really in a hurry, the agents posttrip emotion is great, Then the agent uses bus for the trip!  
Summary of states in this upcoming trip is as follows  
- The agent is not sick and the weather is not extremely bad and now is not in rush hour, now is not at night, the agent does not have a lot of time to get a destination, the trip is really not really in a hurry, the agents posttrip emotion is great,  
Habit cannot be used since the current trip characteristics does not match to any habit. Thus, the agent uses the normal cognitive procedure to decide the transportation.  
As found through the literature reviews and interviews, rules associated with agent schema are fired first. rules associated with journey schema, environment schema,j transporation schema follows.  
Rules associated with agent schema is going to be fired as follows.  
- Rule 1 is fired, which is if the agent is not tired, then agent is okay with every mode of transportation.  
- Rule 8 is fired, which is if the agent is okay to use money to transportation, then agent is okay with train and bus and less consider car and uber as their option..  
Rules associated with journey schema is going to be fired as follows.  
- Rule 13 is fired, which is if travel distance is short, agent have less time, and the importance level for the travel is so so, then agent choose bike and bus..  
Rules associated with environment schema is going to be fired as follows.  
- Rule 4 is fired, which is if weather is normal, then agent is okay with every mode of transportation.  
Rules associated with car schema is going to be fired as follows.  
Rules associated with walk schema is going to be fired as follows.  
Rules associated with bus schema is going to be fired as follows.  
Rules associated with uber schema is going to be fired as follows.  
Rules associated with train schema is going to be fired as follows.  
Rules associated with bike schema is going to be fired as follows.  
As there are still more than one transportation left in candidate\_transportations list, the agent chooses one transportation with highest safety from the list since agent current preference is safety.  
The agent chooses bus for the transportation for the trip!

6-th travel  
The agent decides the best transportation among car, walk, bus, uber, train, bike for the trip in the following way.  
Habits from the experiences are as follows.  
- habit\_0 is If the agent is not sick and, the weather is not extremely bad and, now is not in rush hour, now is not at night, the agent does not have a lot of time to get a destination, the trip is really not really in a hurry, the agents posttrip emotion is great, Then the agent uses bus for the trip!  
Summary of states in this upcoming trip is as follows  
- The agent is not sick and the weather is not extremely bad and now is not in rush hour, now is not at night, the agent does not have a lot of time to get a destination, the trip is really not really in a hurry, the agents posttrip emotion is great,  
Habit is being used to decide the transportation since the states in this upcoming trip match to one of the habits above.  
Based on the habit, The agent chooses bus for the transportation for the trip!

Fig. 9-4 Explanation of 5th and 6th trips by the agent Output.txt

Fig.9-5 shows how the agent discards one habit in 24th because of terrible experience.

As can be seen in 23 th trip, the agent has two habits “habity\_o” and “habbit\_1”.

However, in 24th trip, there is only “habit\_1” since the agent experienced terrible trip

whose conditions match to the one for “habit\_1”. This “terrible” emotion in agent make the agent discard the habit. This follows that people’s choices are very dependent on their anticipated emotion as researches mentioned[16]. Therefore, the agent chooses to discard the habit he used to have and performs rule-based cognitive tasks to re-decide the transportation over keeping using the habit.

23-th travel  
The agent decides the best transportation among car, walk, bus, uber, train, bike for the trip in the following way.  
Habits from the experiences are as follows.  
- habit\_0 is If the agent is not sick and, the weather is not extremely bad and, now is not in rush hour, now is not at night, the agent does not have a lot of time to get a destination, the trip is really not really in a hurry, the agents posttrip emotion is great, Then the agent uses bus for the trip!  
- habit\_1 is If the agent is not sick and, the weather is not extremely bad and, now is in rush hour, now is not at night, the agent does not have a lot of time to get a destination, the trip is really not really in a hurry, the agents posttrip emotion is great, Then the agent uses bus for the trip!  
Summary of states in this upcoming trip is as follows  
- The agent is not sick and the weather is not extremely bad and now is not in rush hour, now is not at night, the agent does not have a lot of time to get a destination, the trip is really not really in a hurry, the agents posttrip emotion is great,  
Habit is being used to decide the transportation since the states in this upcoming trip match to one of the habits above.  
Based on the habit, The agent chooses bus for the transportation for the trip!

24-th travel  
The agent decides the best transportation among car, walk, bus, uber, train, bike for the trip in the following way.  
Habits from the experiences are as follows.  
- habit\_1 is If the agent is not sick and, the weather is not extremely bad and, now is in rush hour, now is not at night, the agent does not have a lot of time to get a destination, the trip is really not really in a hurry, the agents posttrip emotion is great, Then the agent uses bus for the trip!  
Summary of states in this upcoming trip is as follows  
- The agent is not sick and the weather is not extremely bad and now is not in rush hour, now is not at night, the agent does not have a lot of time to get a destination, the trip is really not really in a hurry, the agents posttrip emotion is great,  
Habit cannot be used since the current trip characteristics does not match to any habit. Thus, the agent uses the normal cognitive procedure to decide the transportation.  
As found through the literature reviews and interviews, rules associated with agent schema are fired first. rules associated with journey schema, environment schema,j transporation schema follows.  
Rules associated with agent schema is going to be fired as follows.  
- Rule 2 is fired, which is if the agent is tired, then agent is less consider walk and bike as their possible option..  
- Rule 8 is fired, which is if the agent is okay to use money to transportation, then agent is okay with train and bus and less consider car and uber as their option..  
Rules associated with journey schema is going to be fired as follows.  
- Rule 13 is fired, which is if travel distance is short, agent have less time, and the importance level for the travel is so so, then agent choose bike and bus..  
Rules associated with environment schema is going to be fired as follows.  
- Rule 4 is fired, which is if weather is normal, then agent is okay with every mode of transportation.  
Rules associated with car schema is going to be fired as follows.  
Rules associated with walk schema is going to be fired as follows.  
Rules associated with bus schema is going to be fired as follows.  
Rules associated with uber schema is going to be fired as follows.  
Rules associated with train schema is going to be fired as follows.  
Rules associated with bike schema is going to be fired as follows.  
As there are still more than one transportation left in candidate\_transportations list, the agent chooses one transportation with highest safety from the list since agent current preference is safety.  
The agent chooses bus for the transportation for the trip!

Fig. 9-5 Explanation of 23th and 24th trips by the agent Output.txt

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15. Factors Influencing to Travel Behavior on Transport Mode Choice – A Case of Colombo Metropolitan Area in Sri Lanka – R.A.M. MADHUWANTHI, Ashu MARASINGHE, R.P.C. Janaka RAJAPAKSE, Asanka D. DHARMAWANSA and Shusaku NOMURA
16. Emotions, habits and rational choices in ecological behaviors: The case of recycling and use of public transportation, Giuseppe Carrus, Paola Passafaro, Mirilia Bonnes

## Appendix

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### A. Description of Phase 2 Interviewees

Interviewee ID	Age	Gender	Occupation
1	24	M	Masters' student
2	27	F	Masters' student
3	25	M	Masters' student
4	24	M	Undergrad
5	21	F	Undergrad
6	21	F	Undergrad
7	26	M	PhD
8	23	F	Masters' student
9	23	F	Masters' student
10	21	F	Working

### B. Interviews (1-8, 9 and 10 have not been transcribed)

## **Interview 1:**

1. What is the one place you travel to the most? How?

**Office. MARTA.**

Why did you use this mode of transportation?

**It's cheap and it's quick.**

- a. So, if this is the reason for choosing it, why is this so important?
  - a **Coz I'm poor and I like getting up late in the morning.**
- b. What other things did you consider?
  - a **Nothing else**
- c. Can you order them in rate of importance? - if answer, why is this your order of preference
  - a **NA**
- d. What would be the top 2 things that would have changed your decision on mode of transportation?
  - a Had more money (buy own car), or if could go to office whenever I want (car).  
(use the answer as conditions, now change conditions and see how the interviewees choices change ) (use these details to create questions for the survey)
- e. Has your choice of mode of transportation to the same destination changed over time? If yes, why?
  - a **No**
- f. Do you typically take the same mode of transportation to a particular destination/ region/ district?
  - a **Yes**
- g. What is your favorite mode of commuting?
  - a **Car**
- h. Has there been any experience that has accounted for changes in your commuting over time?
  - a **Lack of money. In India would use car, here don't have a car and the distance as well.**

2. The first time you went to this place, how did you travel?

**a. Uber**

Why did you use this mode of transportation?

**Because I was late and didn't have a MARTA pass.**

- a. So, if this is the reason for choosing it, why is this so important?
  - a **Was raining on the first day, and also wasn't in the mood to go the station.**
- b. What other things did you consider?
  - a **It was raining**
- c. Can you order them in rate of importance? - if answer, why is this your order of preference
  - a **1) Didn't have MARTA pass 2) Raining 3) Didn't want to be late**
- d. What would be the top 2 things that would have changed your decision on mode of transportation?
  - a **If it was nearby, would have walked. Wasn't raining, would have found the MARTA station.**

(use the answer as conditions, now change conditions and see how the interviewees choices change ) (use these details to create questions for the survey)
- e. Has your choice of mode of transportation to the same destination changed over time? If yes, why?
  - a **Yes, changed from Uber to Marta because MARTA is cheaper and quicker.**

3. When was the last time you visited a new place? How did you travel to that place?

**Went to Perimeter Mall. I walked.**

Why did you use this mode of transportation?

**Because it's close enough to walk.**

- a. So, if this is the reason for choosing it, why is this so important?
  - a **Wouldn't spend 10\$ on something I can walk to in 5 minutes.**
- b. What other things did you consider?
  - a **Nothing else**
- c. Can you order them in rate of importance? - if answer, why is this your order of preference
  - a **NA**
- d. What would be the top 2 things that would have changed your decision on mode of transportation?
  - a **1. If it was farther.2. If it was raining.**

(use the answer as conditions, now change conditions and see how the interviewees choices change ) (use these details to create questions for the survey)

- e. Has your choice of mode of transportation to the same destination changed over time? If yes, why?  
a **No, only been there once.**

4. Which mode of transportation have you used routinely since childhood? Name 3 and rank them in order and explain why the order. Is it still applicable (present)? Why? What do you like or dislike about each?

**1. Walking**

**2. Car**

**3. Bike**

**Walking because it's convenient. Car because comfortable. Bike gives exercise.**

**No. Don't have a car or a bicycle.**

**Walking: Can't travel long distances.**

**Car: Not convenient for a completely new place that's near.**

**Bike: Strenous.**

- a. What is the emotion you associate with any of these?

**No**

- b. Have there been other instances where this emotion has played a role in making the decision?

**No**

- c. What are the top 3 emotions you would associate with travel/ transportation? why do you say so?

**Impatience, if I need to get somewhere on time, if there's traffic.**

**Boredom, on long car rides. Not bored on flights, coz there is more in-flight entertainment**

**Feeling of discovery, on car journeys, can't feel it on MARTA**

- d. Give instances of when you have felt these emotions specific to transportation and how have this affect your decision-making process? Explain the situation under consideration as well.

**Yes, for impatience. When I first went to office**

- e. how does the group dynamics effect the decision? i.e. no. of people you are travelling with, level of interaction with those people, etc.

**Doesn't affect my choice.**

### **Interview 2:**

- 1. What is the one place you travel to the most? How?

**Campus. Drive+Walk.**

Why did you use this mode of transportation?

**Because trolley sucks.**

- a. So, if this is the reason for choosing it, why is this so important?
  - a **Schedule is unreliable, waiting time is long and is fully packed during peak hours.**
- b. What other things did you consider?
  - a **Nothing else**
- c. Can you order them in rate of importance? - if answer, why is this your order of preference
  - a **NA**
- d. What would be the top 2 things that would have changed your decision on mode of transportation?
  - a **Convenience (if trolley was more regular)**

(use the answer as conditions, now change conditions and see how the interviewees choices change ) (use these details to create questions for the survey)

- e. Has your choice of mode of transportation to the same destination changed over time? If yes, why?

- a **Yes (first tried trolley)**

- f. Do you typically take the same mode of transportation to a particular destination/ region/ district?

- a **Yes**

- g. What is your favorite mode of commuting?

- a **Drive**

- h. Has there been any experience that has accounted for changes in your commuting over time?

**No**

- 2. The first time you went to this place, how did you travel?

- a. **Trolley**

Why did you use this mode of transportation?

**I thought it's good and has reliable service.**

- a. So, if this is the reason for choosing it, why is this so important?
    - a **To make sure I don't miss class and don't waste time waiting at the bus station.**
  - b. What other things did you consider?
    - a **No**
  - c. Can you order them in rate of importance? - if answer, why is this your order of preference
    - a **No**
  - d. What would be the top 2 things that would have changed your decision on mode of transportation?
    - a **If trolley stop was nearby my apartment** (use the answer as conditions, now change conditions and see how the interviewees choices change ) (use these details to create questions for the survey)
  - e. Has your choice of mode of transportation to the same destination changed over time? If yes, why?
    - a **Yes, explained above.**
3. When was the last time you visited a new place? How did you travel to that place?

**Went to the museum. Drove there**

Why did you use this mode of transportation?

**Convenient.**

- a. So, if this is the reason for choosing it, why is this so important?
  - a **Easy to park.**
- b. What other things did you consider?
  - a **Save time**
- c. Can you order them in rate of importance? - if answer, why is this your order of preference
  - a **1) Easy to park 2) Save time**
- d. What would be the top 2 things that would have changed your decision on mode of transportation?
  - a **1. Efficiency (if something was cheaper and faster)**  
(use the answer as conditions, now change conditions and see how the interviewees choices change ) (use these details to create questions for the survey)

- e. Has your choice of mode of transportation to the same destination changed over time? If yes, why?  
a **No, only been there once.**

4. Which mode of transportation have you used routinely since childhood? Name 3 and rank them in order and explain why the order. Is it still applicable (present)? Why? What do you like or dislike about each?

**1. Bike**

**2. Walk**

**3. Drive**

**Bike was cheapest for school (not in walking distance). Walking because for some years lived pretty close to campus. Car because trolley sucks.**

**No. Because driving is faster, hence is prioritized.**

**Walking: Too tiring**

**Car: Parking is expensive**

**Bike: Inconvenient if weather is bad.**

a. What is the emotion you associate with any of these?

**No**

b. Have there been other instances where this emotion has played a role in making the decision?

**No**

c. What are the top 3 emotions you would associate with travel/ transportation? why do you say so?

**None.**

d. Give instances of when you have felt these emotions specific to transportation and how have this affect your decision-making process? Explain the situation under consideration as well.

NA

e. how does the group dynamics effect the decision? i.e. no. of people you are travelling with, level of interaction with those people, etc.

**Yes. Go with the majority.**

**Interview 3:**

1. What is the one place you travel to the most? How?

**Campus.Walk.**

Why did you use this mode of transportation?

### **Easy and cheap.**

- a. So, if this is the reason for choosing it, why is this so important?
  - a **Because I'm a student on loan, and it's a walkable distance. Ensures I'm not late.**
- b. What other things did you consider?
  - a **Nothing else**
- c. Can you order them in rate of importance? - if answer, why is this your order of preference
  - a **NA**
- d. What would be the top 2 things that would have changed your decision on mode of transportation?
  - a **Distance, cost and ease (parking, time factor)**

(use the answer as conditions, now change conditions and see how the interviewees choices change ) (use these details to create questions for the survey)

- e. Has your choice of mode of transportation to the same destination changed over time? If yes, why?
  - a **Nope**
- f. Do you typically take the same mode of transportation to a particular destination/ region/ district?
  - a **Yes**
- g. What is your favorite mode of commuting?
  - a **Car (considering ease) Not able to evaluate right now.**
- h. Has there been any experience that has accounted for changes in your commuting over time?  
No

2. The first time you went to this place, how did you travel?

- a. **Walked**

Why did you use this mode of transportation?

**Same as above**

3. When was the last time you visited a new place? How did you travel to that place?

**Went to Helen. Drove there**

Why did you use this mode of transportation?

**Love driving. Most sensible because there is no other option.**

- a. So, if this is the reason for choosing it, why is this so important?
  - a **Would love to drive if circumstances allow**
- b. What other things did you consider?
  - a **(money and ease and time)**
- c. Can you order them in rate of importance? - if answer, why is this your order of preference
  - a **1) Money, as I'm not earning right now. 2) Time because I have a lot of work 3) Ease. This can change. Once I'll start working, time is more important than money. Will prefer car or Uber to MARTA once I have money. Saving time will be very useful in terms of ease and money as well. Can invest that time elsewhere.**
- d. What would be the top 2 things that would have changed your decision on mode of transportation?
  - a **Nothing.**  
(use the answer as conditions, now change conditions and see how the interviewees choices change ) (use these details to create questions for the survey)
- e. Has your choice of mode of transportation to the same destination changed over time? If yes, why?
  - a **No, only visited once.**

4. Which mode of transportation have you used routinely since childhood? Name 3 and rank them in order and explain why the order. Is it still applicable (present)? Why? What do you like or dislike about each?

**1. Bus (school)**

**2. Car**

**3. Train (metro)**

**Bus- went to school in a bus. Car- used to drive during undergrad. Before that parents would drive. Train- Delhi has a very good metro.**

**No, would prefer Car and walking (health reasons). Childhood I loved long distance trains. I liked that in India because people talk to you, whereas that doesn't happen here.**

**Bus: Not regular, time gets killed.**

**Car: Expensive**

**Train: Last mile of connectivity.**

a. What is the emotion you associate with any of these?

**I love driving. Like long drives. Scenery. Environment. Keeps me serene. Concentrated on one thing.**

b. Have there been other instances where this emotion has played a role in making the decision?

**No**

c. What are the top 3 emotions you would associate with travel/ transportation? why do you say so?

**Love for driving. Look forward to meeting new people in a long, distance journey on a train. Excitement (new place).**

d. Give instances of when you have felt these emotions specific to transportation and how have this affect your decision-making process? Explain the situation under consideration as well.

**Was returning from Pune to Delhi. Could have used a flight but wanted to go by train. To try the experience once. I liked it.**

e. how does the group dynamics effect the decision? i.e. no. of people you are travelling with, level of interaction with those people, etc.

**Yes. Go with the majority opinion. I'll try and weigh my options. Even I don't want to interact with the group, I'll read a book or listen to a podcast rather than change mode of transportation. Depends on ease and time of course.**

#### **Interview 4:**

1. a) How do you decide if a distance is walkable/bikeable or needs a car? List the variables you consider.

**Google maps. Like using Marta if it's near. More than a 15 minute walk, then drive, uber etc. 30 minutes absolute max.**

b) Answer above question given these variables:

a) Distance

**think in terms of time, not distance. Look at Google maps. Safety is important.**

b) Time of day

**At night, more inclined to drive/uber. Night means dark. Time depends on season**

c) Weather

**Weather-upper 90's or freezing or pouring (won't walk or bike)**

d) Urgency

**Drive or get an Uber for an interview if I have time**

e) Your fitness

**Lack of Fitness has never stopped me**

f) Your physical state (tiredness)

**Depends on what I have been doing that day. Walking is not an issue, but does it make it less likely**

g) Your past experience(s)

**Hasn't happened to me**

2. Have you ever broken a habit related to transportation? Please explain the process. (If not then any habit, unrelated to transportation will also do)

**If I love a walk (specific route), I'll do it instead of Uber.**

**Had bad experiences on bikes (near accidents when I had a phone in my hands), so stopped having phone in my hands.**

### **Interview 5:**

1. a) How do you decide if a distance is walkable/bikeable or needs a car? List the variables you consider.

**temperature, where I'd be going (need to be presentable), if it's a safe area, distance, (wouldn't walk longer than 2 miles), current health state, if going with someone else who couldn't physically make it.**

b) Answer above question given these variables:

**Budget a lot of time for walking. I love walking, love being outside.**

a) Distance- **2 miles one way is maximum I would walk**

b) Time of day- **Walking time is 7 am to 8 pm. When it's light. Depends on how dark.**

c) Weather- **If it's super hot and humid (95 is the limit). Distance max would be a mile (walking)**

d) Urgency- **Would drive.**

e) Your fitness- **Would walk more if was fitter.**

f) Your physical state (tiredness)- **If I stand up and I'm sore, working at the end of the day (wouldn't walk)**

g) Your past experience(s)-

**Stopped walking super late at night, usually drive. Heard of things. Friends have been followed. General common-sense things.**

2. Have you ever broken a habit related to transportation? Please explain the process. (If not then any habit, unrelated to transportation will also do)

**a) See above**

**b) Used to get to bed super late, stopped that. Felt I can't function well or make good decisions at night.**

More about emotions related to walking:

**Like being outside, stress reliever, good exercise, good relaxing mechanism. Will try to walk as much as possible. Walked off campus to study at a coffee shop, was mid -day, was super-hot.**

#### **Interview 6:**

H: Interviewer

K: Interviewee

H: What is the one place you travel to the most? How?

**K: My school by train.**

H: Why do you prefer train over other type of transportation?

**K: Since it is fastest method. If I use my bicycle, I need to use my energy. But I do use any energy when I ride on train.**

H: What other type of transportation do you consider for going to school?

**K: Bicycle, because it is usually second fastest transportation and it can be an exercise. And bus is also the option but I do not like bus so much as it is sometimes delayed.**

H: What would be the top 2 things that would have changed your decision on mode of transportation?

**K: Sometimes the train is very crowded which makes me feel uncomfortable. This is definitely disadvantage of the train. Also as the train gets crowded, the air in the train becomes unclear, while the air in the bus usually cleaner since it opens its doors at bus stops. The other advantage of bus is that bus stops are usually closer than train stations. In this point bus is more convenient than train.**

H: Has your choice of mode of transportation to the same destination changed over time? If yes, why?

**K: Mostly no. I stick to use train to go to school. But, if the destination is a convenient store close to my house, the situation becomes different. For example, the first choice is bicycle as it would take 10 min on foot. But I would choose walking there if a weather is not stable such as rain or I wear nice clothing that I don't want them to get dirt.**

H: What is your favorite mode of commuting, in your case going to school?

**K: Train. I never change this. I have been using train since I was an elementary school student. I think this is because I live in Tokyo where the public transportation especially trains and metro is really well developed.**

H: Has there been any experience that has accounted for changes in your commuting over time?

**K: No. Again, there are way many number of stations in Tokyo so that train is always the easiest and fastest transportation. And on train I can talk with my friends.**

H: When you go to the place where you went for your first time, how do or did you travel?

**K: It actually depends on the distance.**

H: How about the case where the destination is far from your place?

**K: If it is really far away, airplane is the only option. If it is not, train may be the first choice as bus is less convenient than train. And train is much cheaper than airplane. Taxi is not the option at all as it is really expensive.**

H: Okay. So how about the case where destination is kinda close?

**K: I guess walking would be the first choice if the destination is in the walkable. When I use bike, I need to get it out from the garage, which takes some time. So walking may be the fastest method. But I prefer bike when it is too hot outside or when I have many bags so that walking is tired.**

H: Have you ever had experience that your choice of transportation changed because of others?

**K: Yes, when I went to Harajuku from my university. I suggested to go there by train. But one of my friends suggested using taxi saying that cost of taxi split among us is as cheap as train.**

H: Which mode of transportation have you used routinely since childhood? Name 3 and rank them in order and explain why the order.

**K: Train, bus and bike. I have used train to go to school since I was in elementary school. It is punctual and very convenient. I have used bus from my house to the station. By using bus, I need to walk less. Bus is very important for me as a girl since it is dangerous to walk alone at night. Actually, car recently cuts in this ranking as I like sitting in the car. Also, I can have a private space when I use car. But I do not drive by myself since heavy traffic in Japan is terrible and the road is very narrow.**

H: how does the group dynamics effect the decision? i.e. no. of people you are travelling with, level of interaction with those people, etc.

**K: Yes. If I am with many friends, I would choose train since I do not need arrangement which I would need to do by car. If I am with a few friends, biking could be an option. Taxi can be option only when the destination is close enough so that the taxi fare is not very different from train fare.**

H: What are the places you typically travel to by car?

**K: Golf course, shopping mall in suburb area. I use car since I would need to change train many time if I went these places by train. When I go to golf course, I have a lot of bags. So I prefer to using car as I do not need to carry them by myself all the time.**

H: What is your typical emotional state when using car as mode of transportation?

**K: I feel happy since I don't drive and someone drives for me. I can listen to music and talk to driver. Or I can sleep. Another reason may be I can go to a destination by door to door, which makes me happy.**

H: How about bus? What are the places you typically travel to by bus?

**K: Shibuya station or when I go to the airport. I usually take train actually. But bus stop is closer than train station so I don't need to walk a lot. So sometimes I use bus. Especially, if it is not rush hour, I may use bus since I'm sure that I can have seat. When I am going to airport, bus takes me to the airport door to door which is very convenient.**

H: What is your typical emotional state when using bus as mode of transportation?

**K: I feel nostalgic as I remember my old days when I was in the elementary school since I used bus to go to school that time. I also feel interesting when I observe other passengers such as some people's giving up the seats to elderly people.**

H: How about bicycle? What are the places you typically travel to by bicycle?

**K: Nearest station, convenient store, super market. Compared to walking, biking is usually faster method. When I have bags, biking helps me a lot as I do not carry them. The major advantage of bike over train is that I don't need to pay. It is free! I can bike as long as it takes no more than 30 mins.**

H: What is your typical emotional state when using biking as mode of transportation?

**K: I feel refreshing by bicycle. But at the same time, I feel stressful as I have to be careful about people suddenly cutting in and so on.**

H: How about train? What are the places you typically travel to by train?

**K: Basically everywhere. Mostly school, amusement park, restaurant. It is the fastest method in Tokyo. If I am with my friends, I can talk to them. Even if I am alone, I can read books to use time effectively.**

H: What is your typical emotional state when using train as mode of transportation?

**K: Stressful when it is crowded. And I sometimes feel fear as sexual harassment in trains is one of the biggest problems. But when it is not that crowded, I feel happy as I can play with my phone.**

## **Interview 2:**

H: Interviewer

M: Interviewee

H: What is the one place you travel to the most? How?

**M: From my house to Georgia Tech using Marta, bus, and walk.**

H: Why did you choose these transportations?

**M: Ideally, I want to use a car. But, I don't have a car> So next fastest way to go to Georgia Tech is Marta train.**

H: What other type of transportation do you consider?

**M: It depends on a weather. If it rains, I use Uber. If it is sunny and my leg does not hurt, I can walk to the station from my house instead of bus. Bus station is 5 minutes away on foot. It takes 10 minutes for me to the train station from the bus station by bus.**

H: What would be the top 2 things that would have changed your decision on mode of transportation?

**M: Weather is definitely one thing. And physical condition follows. Oh, actually if I know I am going to have many stuff I tend to use Uber instead of walk and bus. If I am going to date with my girlfriend, I will use Uber since I do not want to get sweat before meeting her.**

**At first, I thought to use a motor bike. But it turns out to be very difficult as my house is far away from school. And using bus and train are convenient. Another reason why I do not choose bicycle and bike in Atlanta is that Atlanta has a lot of hills which make me hastate to use bike and bicycle since I got tired easily.**

H: The first time you went to this place, how did you travel?

**M: I have a ride by my roommate. I was not sure about the transportation and I am not familiar with the campus.**

H: How did you form your choice of transportation?

**M: I know that I cannot ask my roommate every day to give me a ride. That is going to strict his free time. So, I was thinking what is the next thing by which I can get to the campus without car. So I used google map.**

H: Didn't Google map suggest different route day by day.

**M: Yes, it changed a little bit depending on the bus schedule. I always follow google even if google map recommended a different route. Only think I do not trust in Google Map is the walking speed. I can walk faster than google map thinks I can.**

H: Did you consider any other transportations?

**M: I thought to buy bike. But bike route has a lot of steep hills. If a bike route did not have such hills, I would use bike. Another thing is that a probability of causality of bike is higher than other type of transportation such as car, which makes me want to avoid a bike.**

H: When you visit a new place, how do you travel to that place?

**M: That depends on distance. If the destination is outside of Atlanta in Georgia State. I think I borrow car or ask my friend to give me a ride.**

H: Why car?

**M: Since I prioritize time over other factors in the case. Car is the fastest method. And borrowing a rental car is not that expensive. If it is one way, I may think to use Uber but for not the round trip. Time and money would be the best factor to be prioritized in this case.**

**If the destination is close such as a place in downtown in Atlanta. Marta would be the best since it is cheapest and I have a monthly pass. If it takes more than 30 min on foot, I would like to use Marta. A bike would also be the best if my roommate says yes to rent a bike for me.**

H: Why do you think you stick to using Marta?

**M: If a travel time is not different so much, I would like to use Marta. If I can save more than 20 dollars per hour by using Marta and I feel tired, I**

**think I use Marta. I cannot save more than 10 dollars per hour by using Marta, I think I use Uber.**

H: Which mode of transportation have you used routinely since childhood? Name 3 and rank them in order and explain why the order.

**M: If I rank in terms of frequency. In Japan, a bicycle is the best. Walk is the next. And train follows. I did not use train until high school. If I rank them in the case where I need to travel a long distance. Train would be the highest. Buses next. If it is far enough, I would use airplane.**

H: Why is a train first?

**M: Especially in Tokyo, train is very convenient. We can go almost all the place in Tokyo by train. For some places even in Tokyo, buses are not available so that I needed to walk more than 30 min.**

H: How about Atlanta?

**M: Train is a first, buses are next. Train is faster than buses. The reason why I do not include bicycle here is again there are a lot of hills in Atlanta. Density of houses in Tokyo is higher than here. So, I can go a lot of place by bike in Tokyo but I can't here.**

H: Do you think emotion plays a role in decision making?

**M: Yes, if I am depressed and it is not wasting too much time, I tend to choose walking since I want to think stuffs during a walking. If I am sad and I do not want to talk to someone, I avoid using Uber. If I am happy, I would choose the shortest way to get there.**

H: Did you ever feel fear on public transportation?

**M: Yes. So, If I feel scary, I use Uber instead of public transportation. I have a following experience. Someone in Marta asked me for a money. Someone in the bus is pointing at me. These experiences are remembered as my fear experiences. Based on the experiences, I became to think buying a car to avoid these dangers. However, car is not always safe. It depends on how long I need to drive. 20 min drive from my house to school requires me to**

**be cautious for the safe drive. If I feel sleepy, driving a car is dangerous as well.**

H: Do you think the group dynamics effect the decision making? i.e. no. of people you are travelling with, level of interaction with those people, etc.

**M: I usually agree with the other's opinion. When I go to bar to drink alcohol from school, it usually cost 7 dollars to use Uber. If I have two my friends, 2 bucks for each. So I tend to use Uber in such case. The number of people I am with is one factor for decision making. Or I would ask my friend to drive there. It takes time for these people to get the destination at the same time. So using one car with four or five people would be the good idea.**

H: What are three main transportation you use?

**M: Train, bus, Uber**

H: What are the places you typically travel by train?

**M: Stores along the train stations, school**

H: What conditions make you select a train as mode of transportation?

**M: If a weather is sunny and if I am not going to a date. If I wear nice clothing, I would like to use Uber so that I don't need to walk outside.**

H: What is your typical emotional state when using car as mode of transportation?

**M: Normal and not excited since I use train to go to school.**

H: What are the places you typically travel by bus?

**M: Kroger (I could walk though), haircut, station**

H: What conditions make you select a bus as mode of transportation?

**M: If it is rainy so hard or if I plan to buy a lot of stuffs or if I have stuff heavier than usual. To go to haircut, that is the only cheap way to go there. If I walk to the station, it takes 30 min to get to the station.**

H: What is your typical emotional state when using bus as mode of transportation?

**M: normal, not that exited since I know I am going to do something ordinary later which is going to school.**

H: What are the places you typically go by Uber?

**M: Friend's houses and the places where I cannot use public transportation**

H: What conditions make you select a Uber as mode of transportation?

**M: If it is rain too heavy. If I plan to drink outside. When I go date with my girlfriend.**

H: What is your typical emotional state when using Uber as mode of transportation?

**M: excited to go to party, going to airport(excited and convenient), annoying if it rains outside , irritate since I need to pay**

### **Interview 8:**

H: Interviewer

F: Interviewee

H: What is the one place you travel to the most? How?

**F: Student center from my house on foot.**

H: Why did you choose these transportations?

**F: To lose weight.**

H: What other type of transportation do you consider?

**F: I can drive to student center. If it rains like a heck or very hot or if I know that I have packages back.**

H: What would be the top 2 things that would have changed your decision on mode of transportation?

**F: Weather and weight of bag.**

H: Do you change your type of transportation based on your mood or emotion?

**F: No at all.**

H: The first time you went to this place, how did you travel?

**F: On foot from Freeman dormitory to student center with two of my friends.**

H: Why did you choose on foot rather than by trolley or by Tech bus

**F: Since I did not know where the bus stops were.**

H: Have you ever changed your mode of transportation from on foot?

**F: Since it is too close.**

H: Which type of transportation did you use to go to your future company in Atlanta for the first time?

**F: Uber since I did not have a car. I did not know how to get the taxi and did not know where the bus stop were.**

H: How do you go to your future company?

**F: I choose to go there on foot since walking counts as exercise.**

H: Did you consider any other transportations to go to your future company?

**F: No since parking is too expensive. But I may use car only when it rains hard and I have a lot of stuff.**

H: When you visit a new place, how do you travel to that place?

**F: I use google map and always follow it. But I may avoid highway if possible since driving skill is not mature so that I am worry that I get involved into the car accident.**

H: Which mode of transportation have you used routinely since childhood? Name 3 and rank them in order and explain why the order.

**F: On foot is the first. Bus and Car follow.**

H: Why is on foot first?

**F: Since I want to lose weight. Buses are more in cities. I have been using car in village.**

H: How about buses and car?

**F: I feel very comfortable when I ride on car by skilled driver. But if I drive, I feel uncomfortable because I need to concentrate on surrounding which is very tiring. Based on these, it ranks at third place. The reason why buses is on second place is that I am not the driver. Buses are have less comfort level than my friends car.**

H: How about in Shanghai?

**M: buses, on foot, car. I put buses first because bus system in Shanghai is very mature so that I can go everywhere in Shanghai by bus conveniently.**

H: Did you ever feel fear on public transportation?

**M: Yes. Weird people, theft and people who is not nice to women on train make me feel fear on public transportation. I have an experience in which I bumped into first two type of people in public transportation. So, I usually try to avoid using transportation. But if I am with my friends who could help me out these kind of situation, I use public transportation.**

H: Do you think the group dynamics effect the decision making? i.e. no. of people you are travelling with, level of interaction with those people, etc.

**F: Actually in most case, cost is the only criteria to agree with others' suggestion or not. Let's say I want to go downtown by Marta and others suggest Uber. I stick to my opinion since Marta is cheaper unless they pay for my Uber.**

**I think the number of people also matter in terms of selecting the type of transportation. If total number of people I am with cannot fit into one Uber, I can choose Marta to save money.**

H: What are three main transportation you use?

**F: On foot, Car, Uber**

H: What are the places you typically travel on foot?

**F: Campus**

H: What conditions make you select on foot as mode of transportation?

**F: Weather and weight of bag. If a weather is not bad and I am not carrying heavy stuff, I tend to choose walking. What I wear does not matter so much.**

H: What is your typical emotional state when using on foot as mode of transportation?

**F: I feel good and healthy.**

H: What are the places you typically travel by car?

**F: If I go to the place which is far away**

H: What conditions make you select a car as mode of transportation?

**F: If the destination is far away or it rains or I have heavy stuff, I choose car as type of transportation.**

H: What is your typical emotional state when using car as mode of transportation?

**F: When you ride on other's car, I feel happy since I can play any music I like. And comfort level is very high. But when I am driver, I am angry since I do not like driving as I have bad skill. Cruise could be best in terms of comfort level since they provide stable ride and nice view!**

H: What are the places you typically go by Uber?

**F: Airport.**

H: What conditions make you select Uber as mode of transportation?

**F: Since airport has no parking. I could use Marta but I don't because it is dangerous. If my friend comes with me, I do not care which transportation I use.**

H: What is your typical emotional state when using Uber as mode of transportation?

**F: I feel afraid since I share a ride with unknown driver. They could take me to anywhere. There is a risk that I will be kidnapped. Some of the driver have dangerous driving skill which increases the car accident risk.**

H: Do you think your habit affect the decision making?

**F: I may have a habit to go to place on foot so that I may have a tendency to go on foot. But I cannot choose this type of transportation sometimes for example at night when it is dangerous for me to walk alone.**

## C. RULES AND DATA MAPPING

Sr. No	Rule	Source
1	if the agent is not tired, then agent is okay with every mode of transportation	Introspection and Discussion
2	if the agent is tired, then agent is less consider walk and bike as their possible option.	Introspection and Discussion, interview 4,5
3	if the agent is sick then agent is not consider walk and bike and less consider train and bus as their option.	Interview 4,5
4	if weather is normal, then agent is okay with every mode of transportation	Introspection and Discussion
5	if weather is slightly bad, then agent is less consider walk, bike, train and bus as their possible option.	Extrapolating from Interview 4,5
6	if weather is extreamply bad, then agent is not consider walk, bike, train and bus as their possible option.	Interview 4,5
7	if the agent is not enough to use money to transportation, then agent is not okay with car and uber and less consider train and bus as their option.	Interview 1,7
8	if the agent is okay to use money to transportation, then agent is okay with train and bus and less consider car and uber as their option.	Interview 1,7
9	if the agent has enough money, then agent is consider car, uber, train, bus as their option.	Interview 1,2,3,4
10	if the agent in the rush hour, the agent consider train, walk and bike as their option not uber, car, bus.	Interview 1,3
11	if the agent in the night, the agent dose not consider walk aand less consider bus and train.	Interview 4,5
12	if travel distance is short, agent have less time, and the importance level for the travel is less, then agent choose walk and bike.	Interview 1,2,3,4,5,6
13	if travel distance is short, agent have less time, and the importance level for the travel is so so, then agent choose bike and bus.	Interview 6,7
14	if travel distance is short, agent have less time, and the importance level for the travel is high, then agent choose uber, bike, bus and car	Interview 4,5
15	if travel distance is short, agent have enough time, and the importance level for the travel is less, then agent choose walk.	Interview 1,2,3,4,5
16	if travel distance is short, agent have enough time, and the importance level for the travel is okay, then agent choose bike and bus.	Interview 6,7
17	if travel distance is short, agent have enough time, and the importance level for the travel is high, then agent choose bus, car and uber.	Interview 1,3
18	if travel distance is short, agent have a lot of time, and the importance level for the travel is less, then agent choose walk.	Interview 1,2
19	if travel distance is short, agent have a lot of time, and the importance level for the travel is okay, then agent choose walk.	Interview 1,3
20	if travel distance is short, agent have a lot of time, and the importance level for the travel is high, then agent choose walk, bike and bus.	Interview 1,3
21	if travel distance is medium, agent have less time, and the importance level for the travel is less, then agent choose bike, bus, and marta	Interview 6,7
22	if travel distance is medium, agent have less time, and the importance level for the travel is okay, then agent choose bike, bus, uber , and marta	Interview 1,2,3
23	if travel distance is medium, agent have less time, and the importance level for the travel is high, then agent choose car and uber	Interview 2,4,5
24	if travel distance is medium, agent have enough time, and the importance level for the travel is less, then agent choose bike, bus and marta	Interview 1,2,3,4
25	if travel distance is medium, agent have enough time, and the importance level for the travel is okay, then agent choose bike, bus, car and marta	Interview 1,2,3,4
26	if travel distance is medium, agent have enough time, and the importance level for the travel is high, then agent choose bus, marta, car and uber	Interview 1,2,3,4
27	if travel distance is medium, agent have a lot of time, and the importance level for the travel is less, then agent choose bike, bus and marta	Interview 1,2,3,4
28	if travel distance is medium, agent have a lot of time, and the importance level for the travel is okay, then agent choose bike, bus and marta	Interview 1,2,3,4
29	if travel distance is medium, agent have a lot of time, and the importance level for the travel is high, then agent choose bike, bus and marta	Interview 1,2,3,4
30	if travel distance is long, agent less time, and the importance level for the travel is less, then agent choose car, bus and marta	Interview 1,2,3,4
31	if travel distance is long, agent less time, and the importance level for the travel is okay, then agent choose car, bus, uber and marta	Interview 1,2,3,4
32	if travel distance is long, agent less time, and the importance level for the travel is high, then agent choose car and uber	Interview 1,2,3,4,5,6,7,8
33	if travel distance is long, agent has enough time, and the importance level for the travel is less, then agent choose bus and marta	Interview 1,3,4
34	if travel distance is long, agent has enough time, and the importance level for the travel is okay, then agent choose bus, car and marta	Interview 1,2,3,4
35	if travel distance is long, agent has enough time, and the importance level for the travel is high, then agent choose car and uber	Interview 1,2,3,4,5
36	if travel distance is long, agent has a lot of time, and the importance level for the travel is less, then agent choose bus and marta	Interview 1,3
37	if travel distance is long, agent has a lot of time, and the importance level for the travel is okay, then agent choose bus, car, uber and marta	Interview 1,2,3,4,5,6,7,8
38	if travel distance is long, agent has a lot of time, and the importance level for the travel is high, then agent choose car, uber and marta	Interview 1,2,3,4,5,6,7,8
39	If car is safe transportation and cheap for the agent, then the agent tends to choose car as transportation	Introspection and Discussion
40	If walk is safe transportation and cheap for the agent, then the agent tends to choose walk as transportation	Introspection and Discussion
41	If bus is safe transportation and cheap for the agent, then the agent tends to choose bus as transportation	Introspection and Discussion
42	If uber is safe transportation and cheap for the agent, then the agent tends to choose uber as transportation	Introspection and Discussion
43	If train is safe transportation and cheap for the agent, then the agent tends to choose train as transportation	Introspection and Discussion
44	If bike is safe transportation and cheap for the agent, then the agent tends to choose bike as transportation	Introspection and Discussion
45	If car is dangerous and uncomfortable transportation, then the agent tends NOT to choose car as transportation	Introspection and Discussion
46	If walk is dangerous and uncomfortable transportation, then the agent tends NOT to choose walk as transportation	Introspection and Discussion
47	If bus is dangerous and uncomfortable transportation, then the agent tends NOT to choose bus as transportation	Introspection and Discussion
48	If uber is dangerous and uncomfortable transportation, then the agent tends NOT to choose uber as transportation	Introspection and Discussion
49	If train is dangerous and uncomfortable transportation, then the agent tends NOT to choose train as transportation	Introspection and Discussion
50	If bike is dangerous and uncomfortable transportation, then the agent tends NOT to choose bike as transportation	Introspection and Discussion

## **D. Survey Analysis**

# Default Report

Transportation Choice Decision ver2

July 10, 2018 2:00 PM MDT

Q1 - Which is the one place you travel to the most? How far is it from your usual starting point? how do you travel to that place?

Which is the one place you travel to the most? How far is it from your usual...

Work. 15 miles. MARTA

School, 2.5 miles, public bus

Klaus. I walk from TAH.

TSRB

School - 1.5 miles - school transport

Work. 5 mi.

Costco 20 miles. Drive

Campus, 6.2mi. MARTA-Trolley

Emory - Uber/Lyft, GaTech emory shuttle

Georgia Tech Library. 1.1 miles. Bicycle

Tech Square. It's 1.2 miles from my home (starting point). I walk.

Office. 15 km. Marta

Work. 9 miles. Car

ISyE department at Georgia Tech. Its close to a mile from my place. I always travel by walking to that place.

TAH to Klaus, on foot.

NYC a ballpark figure of 1000 miles

Currently I travel every day to office in Smyrna just outside the ATL perimeter. Distance - 12 miles I car pool with my roommate.

Work, 10 min drive, car

Ponce Market About 1.6 miles. Drive, uber, walk



University. 4 miles. Local Bus

Hmart 25 mins travel Car

Techsquare. 8 minutes by car. I use my car.

Duluth H-mart Supercenter, Georgia 15 miles away from my home By driving

- Most frequented place: Buford highway - Distance from usual starting point (Georgia Tech Campus/Midtown): 12 miles - Mode of transport: Car  
(MARTA rail lines don't stop there)

USA/Japan; airplane

test

test

Showing Records: 1 - 27 Of 27

Q2 - The first time you visited this place, how did you reach there? what all information did you gather and/ or use to reach the destination?

The first time you visited this place, how did you reach there? what all in...

Asked people who worked there as well as people who were familiar with the area. Google mapped transit directions. I took MARTA.

Bus, frequency of bus, timings, route

freq. |||

I walked to there using Google maps.

Timing |||

Tech trolley

route off ||

School transport - asked seniors around

name of stat' |

By marta. Google maps and marta website.

distance |||

Google map

service avail. |

Possible routes, train timings/frequencies, Trolley frequencies, names of stations

price . |||

Uber

travel time |

Walked. Used campus maps to get there.

weather |

I took an Uber.

accessibility |

Uber. Google maps

conveni'ence |

Uber. Distance and whether Uber Pool service is available or not. Price of the trip as well.

I reached there using help google maps.

I walked with Google map.

took a plane to NYC nothing much; usually just wing it a day or two ahead

I took a share cab (Uber) to the place the first time. I looked up Google maps a day before to check out the distance and approximate travel time.

Car, google maps

Drive Distance, weather, time of the day

Local Bus. Easy Access, Free travelling, convenient and comfortable, frequency of bus, stops that are covered

Car Google map

google map THH NN |

people ||

website ||

other maps |

I used MARTA from the airport. I looked up the internet to gather info.

Google map

- Uber; \$25 each way - List of restaurants, Google Maps for restaurant address

where to go, ticket price, cheapest date, hotel, food, total cost

test

test

Showing Records: 1 - 27 Of 27

Q3 - What would be the top 2 things that would have changed your decision on mode of transportation?

What would be the top 2 things that would have changed your decision on mod...

If there aren't substantial delays or if it's expensive.

Cheaper car rental and insurance, carpool options

Distance and shuttle bus line/schedule

Ease and frequency.

Walking distance

Price and time taken.

Time Convince

Time required, cost of travel

none

More frequent Green route buses. Car parking right next to the Library.

1. Urgency 2. Time of day

Cost, time

Distance, Cost of travel

1.) Distance 2.) Price of transportation

Distance and available public transportation (in particular, Stinger bus or Tech trolley)

time convenience

1. Cost 2. Number of interchanges in case of mass public transportation.

If there was a carpool or bus

Time of the day and distance

Distance and cost

1. A friend's car to get on 2. My car is broken

freq	
less delays	
price	
carpool opt <sup>n</sup>	
distance	
ease/convenience	
distance	
time taken	
parking	
urgency	
time of day	
availability of alt.	
safety	
Traffic	

Time taken. Safety.

Traffics and costs to get there

1. MARTA rail availability (this needs to improve!) 2. Feeder bus availability (easily accessible bus from MARTA stations to Buford highway)

price, cheapest date

test

test

Showing Records: 1 - 27 Of 27

Q4 - Do you particularly like/prefer any mode of transportation of the following - walk, bike, bus (marta/GT transport), marta, uber/cab, personal vehicle, other? If other, please mention.Why?

Do you particularly like/prefer any mode of transportation of the following--

Walking! It's peaceful and you get to see a place

Uber, convenience

Personal vehicle because I can save much time unless I am moving during rush hour.

Bike, GT busses

GT transport Ease of access and cost included in fee

uber/cab is convenient and not too expensive.

Personal vehicle Convenient

Walking I prefer it over any mode of transportation if I can reach there in a reasonable amount of time. Convenient and healthy too.

walk

Yes, biking or walking. Less polluting and can practically go anywhere from Library without having to consider other factors (buss frequency, parking availability etc.)

Walk, I just like to walk.

Marta, walk, Cost and convenience

Personal Car, Freedom and flexibility of travel

I prefer to walk provide the place is within 2 miles. For places which are at larger distances I prefer Uber. The reason for taking Uber is its readily available and its cheap if you pool it with other fellow passengers.

I prefer personal vehicle because I can save my time most unless I travel during rush hours.

personal vehicle can leave anytime I want, comparatively safe

I prefer MARTA (metro). I like mass rapid transit.

I prefer walking when possible for the exercise

I prefer walking if the distance is not too far, the weather is not bad, and it is not too late. Because I personally enjoy walking.

**Personal Vehicle**, Ease of access to any place, cheap, quick and no time deadlines, anytime anywhere travel

**Personal vehicle Convenience**

**Personal car**, Because I can use it whenever I need it.

**Personal vehicle** Since I have a car, it's faster and cheap than Uber. Marta cannot reach out most places in Atlanta yet.

**Rail transport/MARTA** is my ideal form of transport because it offers the smoothest ride (i.e. I won't get car sick) and I have the luxury of working/relaxing without having to concentrate on or be stuck in Atlanta traffic. It is also much cheaper than owning a personal vehicle. Nonetheless, the grossly underdeveloped public rail system along with the large distances between locations in Atlanta have necessitated the use of cars/Uber, further contributing to chronic traffic problems in the city. I view the recent taxation bill for the expansion of MARTA as a step in the right direction for the city.

i like rails rather than buses since buses take longer time to distance ratio. Hoping there are more station of marta/train.

test

test

Showing Records: 1 ~ 27 Of 27

Q5 - Do you particularly dislike/avoid any mode of transportation of the following - walk, bike, bus (marta/GT transport), marta, uber/cab, personal vehicle, other? If other, please mention. Why?

Do you particularly dislike/avoid any mode of transportation of the followi...

Personal vehicle because I don't have one.

Marta

Marta - bad frequencies, horrible connectivity

marta bus. Wait time is too long.

GT transport Schedule is never on time

No

bus - location and timings are not convenient

None

No.

Bike safety

Marta and walk. Safety concerns

Bus as I don't have an idea of how to know which bus goes on to which route.

Marta. In certain time (early in the morning or in the evening), I don't feel safe in Marta.

walk restricted & too hot

No. I am open to any but I'd prefer mass transport and if available electric to minimize pollution and traffic.

I don't love trains

I avoid taking buses in USA because of two reasons. Public transportation in Atlanta is bad for so many reasons :)

None. All useful during various situations

Marta Safety concern

Bus. Because there are very few.

Walking in US is not a good option unless you want to get wet.

Buses because they are: 1. Unreliable because they are frequently delayed 2. Inconvenient due to the lack of available information and clarity regarding the correct routes (and direction) to take.

I usually avoid uber/cabs and rental cars because of the higher cost than others.

test

test

Showing Records: 1 - 25 Of 25

Q6 - When you plan to travel, are there any constraints that come to your mind before you make your final decision? Please rank them in order of importance. Most important consideration ..... to ..... least important consideration.

When you plan to travel, are there any constraints that come to your mind b...

Weather, safety, timeliness

Time Weather

Distance Time

time price comfort

Parking Efficiency

Safety of mode of transportation, Cost of travel, Time taken to reach destination

time of commute and arrival time

How hot is it outside. Is it raining/snowing? Is the road/sidewalk slushy or extremely wet? If I can spend at least 2 hours at the place without having other tasks elsewhere.

1. Health condition 2. Distance 3. Urgency 4. Time of day 5. Mood

1) time 2) money

Cost Safety concern at drop off point

1.) Distance 2.) Availability of Time 3.) Weather 4.) Price of transportation

Safety, travel time, and budget

N/A

I look at the inflexibility of arrival time. If it is essential to be on time come what may, I'd probably ignore the cost. But more often than not, I'll make a decision based on a trade-off between cost and time.

None

Time of the day Distance Weather Who else is with me How important is to be in that place in a specific time

Constraints in order of access, cost and time

I don't want to drive

Do I have time to travel? Do I have money to travel? Can my friends travel with me?

Cost > Time > Safety > Comfortable environment.

1. Travel time 2. Travel comfort 3. Travel cost 4. Travel safety

total cost time available rooms in hotels available cars in rental car companies

test

test

Showing Records: 1 - 25 Of 25

excel

Q7 - Give reason for the position you have given each consideration in the previous question.

Give reason for the position you have given each consideration in the previ...

Weather is most important because taking public transit you are more exposed to the elements. I also consider safety and whether it's a safe time when deciding. Lastly, timeliness determines if there is one option that is faster

Bike takes less time Can't ride my bike in rain

Based on the distance and time one can figure out the schedule they want to follow at the place they want to go

As a poor student, I put time and price over comfort. Lol

Parking affects if I want to drive Efficiency is what I care a lot

I think they are self explanatory

itna time nahi hai

Will sweat a lot because I bike or walk. Going to the place involves some physical & time costs. It should be worthwhile to make that investment.

1. If I'm unwell, I'll take a cab. 2. If it's too far, I'll take a cab. 3. If it's urgent, I'll take a cab. 4. If it's too sunny, I might take the bus. 5. If I'm feeling lazy to walk, I might take the bus.

1) can't go late to office 2) student loan debt

Both are obviously important

1.) Distance- Some distances are just suited for a mode of transport 2.) Availability of Time- If one needs to be somewhere at a short notice, its better to take a cab. 3.) Rainy or high temperatures can dictate mode of transportation 4.) Price as one wants to optimize his travel cost.

Safety is one of the most important things for people. I believe there's no objections for this. And time is the most important resource for (not limited to) grad students. Budget is in the lowest priority. The worst case for budget could be taking Uber, but it costs less than \$50 even for a trip to airport.

N/A

If arriving late at work or at an event is unacceptable, then the risk of depending on public transportation is too high.

None

Time of the day -- In US, you cannot walk when it is too late because it is dangerous Distance -- Distance is very important I am not going to walk if where I want to go is 10 miles away Weather -- I am not gonna walk if it is raining Who else is with me -- How important is to be in that place in a specific time

Access because if a particular mode of transport doesn't drop you where you wanna go, it's useless. Cost because as a student I want it to be affordable. I need to reach there on time. But cost has to be seen first.

I'm not a skilled driver.

They are ordered by how much impact each item has on making the travel possible.

I sometimes use Marta that I think it is not that safe, but cost of it is cheapest. Time is very important when we drive since it is directly related to fuel cost. Safety is sometimes considered next as I travel at night. If I need to travel in summer, it will be very uncomfortable by walking or bike.

1. Would like to arrive as early as possible (or depart as late as possible) 2. Would like an enjoyable commute - as long as I get there on time 3. Want a good trade-off between cost and comfort 4. Want to arrive safe

Not having much money

test

test

Showing Records: 1 - 25 Of 25

Q8 - Have you been using a particular mode of transportation all this while since you have been using it for a long time?

Always the same mode of transportation to the same destination every day.

Used to have personal vehicle when I lived in another city. Now walk and use MARTA and bikes

Bicycle

GT transport

n/a

Car

Yes

maybe

Yea, I have been using bicycles for a large part of the last 9 years.

Yes

Walk

No

Georgia Tech buses especially Tech Trolley

Yes

yes

No. I have just been in ATL for 3 semesters. First 2 sems I walked to campus, now I am car pooling. I really don't know what I'll be doing next.

Car

Not really

May be bus...

No

My car

Driving

Personal vehicle

marta train and buses, uber/lyft

test

test

Showing Records: 1 - 25 Of 25

Q9 - Has there been any experience that has accounted for changes in your commuting over time?

Has there been any experience that has accounted for changes in your commut...

City change and ATL traffic

No

No

no

No

No

no

Yea, less travel at noon. Have to check if it is raining and if the road is slushy.

No

Ease of traveling by Marta

No

Not really.

Constructions in walk way. In particular, the construction around Klaus from last year.

no

While I growing up, I was habituated to using a personal vehicle driven by my driver or my father. But when I started staying in big cities in India like Mumbai and Bangalore, I accepted public transportation despite its flaws and inefficiency. Since that point, I tend to look for mass transit alternatives.

No

Yeah, it is harder for me to walk during winter. I dont like cold weather.

Yes... Travelling from home to airport is expensive using Uber. So I started using public transport. But now I use zipped car, because public transport is inconvenient and a waste of time.

No

No. I have been using my car since I bought it.

- relocation 0 2
- case where public transportation is used 3 0
- 10 Yes
- 13 No.
- construction 1 1
- age 0 1
- weather 0 2
- cont 0 1

Yes

Frequently delayed buses and confusing bus routes have diminished my confidence in that mode of transportation.

weather; if it rains, i take an uber or ask my roommate for a ride to the station or to the destination.

test

test

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Q10 - Have these emotions changed the way you decide or your older decision to a new one?

Have these emotions changed the way you decide or your older decision to a...

I'm not a fan of being irritated in traffic

5 YES

bad experience |  
just want to avoid public transportation |

NA

16 NO

No

n/a

No

No

no

Yea, they decide if I choose an alternate mode of transport as compared to biking or walking or some other mode.

Not really

Yes

No

No.

No

no

No. Nothing different.

No

I dont understand the question

.....

No

N/A

None

Yes - I try to avoid the bus and instead rely on walking, biking or Uber

yes

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~~4 Pass~~  
~~16~~

Q11 - Which is the mode of transportation you take the most? Is it due to a habit/liking developed towards it over time? If yes, how long have you been using it?

Which is the mode of transportation you take the most? Is it due to a habit...

Walking or MARTA (1 month)

Bicycle. Have always biked in the past.

GT transport

MARTA train. By habit. For 4 years

Drive Habit

Walking+MARTA, walking because I enjoy it, MARTA for the convenience/economy

Ride sharing. Maybe. Public transport comes to almost the same cost and is inconvenient

Biking. It is due to habit and convenience. Have been using it in college during under graduation, graduation and during my 2nd graduate degree at Georgia Tech.

Walking. About 3 years.

Walking, habit developed very young, for the past 23 years.

Personal car. Daily commute. 2 months

Walk, due to habit and a certain consciousness for fitness.

Walking. Just as an optimization for my routine.

personal vehicle about 10 years

Right now I car pool with my roommates to office, which is 12 miles away. But when I need to go to the store or to a shop or to a restaurant nearby, I usually walk. I call a cab only if it's quite late at night. Not before 11 PM.

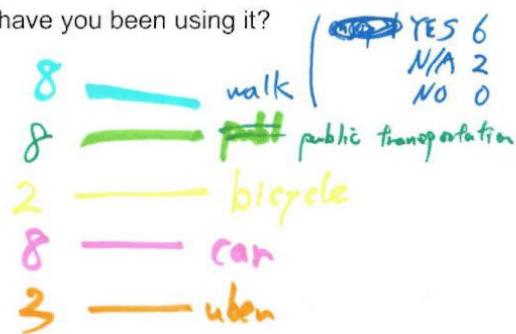
Car for convenience

Walk/Drive with personal vehicle

Bus... No... It's the best for regular travel

Public transportation! I can utilize the travel time more wisely

My car. Because it is convenient and safe. I have used my car for 4 years.



Q12 - Have you ever considered a different mode of transportation for the same destination that you routinely go to using a routine mode of transportation? If yes, why did you reconsider your choice? What is your review on the new mode of transportation you used? Any emotions?

Have you ever considered a different mode of transportation for the same de...

Not applicable

Lyft share rides because it's cheap and sometimes I'm lazy.

No

yes. Marta schedule is sometimes not dependable. I often use uber/cab instead. Much better experience but pricier.

No

Uber/Lyft/private car: for the convenience

bhai phone pe pooch le

Nope.

Yes, I've taken the GaTech bus. The bus services are excellent. I just like walking more and dislike waiting.

No

Uber. If it was cheaper than owning a car.

No. Mostly its the same

When I am in a hurry, I sometimes drove to public parking lots in GT to save my time. No special "emotions" for it; just a reasonable decision considering my situations

No

I did think of taking the MARTA bus to office but the buses run every hour and the wait time was too long, so the option never materialized.

No

Yeah I sometimes prefer not walking because I feel tired or exhausted. Also, if I generally feel happy I prefer walking over anything else.

Yes... I used a bike from college to home. For thrill...

YES

Uber	- cost	- lazy
	<del>convenience</del>	
bus	- convenience	
public	- no jam	
walk	-	- exercise.
bike		- happy
car	- flexibility	- thrill
		no dependence on weather



Y      N  
17      6

Q13 - Is there anything regarding your mode of transportation decision making process that you would like to share or comment on? Any additional information would be highly valued. Please do consider answering this question to your best capacity.

~~Is there anything regarding your mode of transportation decision making process...~~

Public transit works for me, but I have to plan the places I go depending on where it is. It's not convenient to see all of the city

Nope

Public Transport - 3 4 times

NIL

Sustainable/green - 2

I usually take marta. When time is an issue, I choose uber/cab.

Time - 3 4

No

Cost - 3 4

No

City/Location dependent - 2.

cost similarity between my choice and other choices

handicap - 1.

The mode that will take me the least amount of time. Possibly a low polluting mode of transport if I make the commute regularly. Should not affect my ability to perform at the destination (eg: No sweating if it is the commute to office, no dirt on clothes if I am going to meet clients, but it is relatively acceptable if it is just a trip to the park)

Well walking has health benefits which is why I started walking to my destinations in the first place.

No

Sustainability is important. So is safety and affordability.

Listed all the factors as before

I value my time over small extra expenses. If I can save 30 mins by paying extra \$10, I'll probably pay for it.

nope

The transportation decisions have got to be made based on what the city has to offer, how vast the city is spread out and the distance between the commercial and residential areas. So, the decisions do vary. For instance, making a decision in NYC would be quite different from one in ATL.

I like walking when possible

I really think my answers would change significantly if I was living in another country or even city. I personally believe your answers are very dependent on the city and country. For example, if I was living in NYC, I would never take my car. I am not even sure if I would buy a car.

I make decision based on access, cost, convenience and then thrill...

The traffic on highway is usually bad

The best transportation is the one that I can use as soon as I need it. It also needs to be cheap, safe, fast, and requires minimal effort. In my opinion, the best transportation is an autonomous (flying) car.

Sharing ride with friends is the good thing. Actually a lot of my friends are doing that.

Rail transport/MARTA is my ideal form of transport because it offers the smoothest ride (i.e. I won't get car sick) and I have the luxury of working/relaxing without having to concentrate on or be stuck in Atlanta traffic. It is also much cheaper than owning a personal vehicle. Nonetheless, the grossly underdeveloped public rail system along with the large distances between locations in Atlanta have necessitated the use of cars/Uber, further contributing to chronic traffic problems in the city. I view the recent taxation bill for the expansion of MARTA as a step in the right direction for the city. Atlanta should really learn from other cities/countries in the planning of its public transportation system.

this should be different under the handicapped condition, e.g. when legs are broken, riding a wheel chair, etc.

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**End of Report**