A ride to remember: experienced vs. remembered emotion on public transit

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ABSTRACT

Prior research has shown disconnects between the subjective well-being a person experiences during an event and the subjective well-being the same individual remembers once the event has passed. Despite the differences that exist between experience and memory, memory is often used as a basis for making decisions about the future. Measures of utility in transportation decision models have begun to incorporate concepts of subjective well-being. A better understanding of the differences between experience and memory will allow researchers to understand the human decision making process more accurately. This paper describes a survey used to examine differences between experience and memory for riders of public transit. The survey was given to people riding the Boston subway system and respondents were asked to rate the emotions they felt during their trip on several scales. Later, a follow-up survey was given where respondents rated the emotions they remembered feeling on the previously surveyed trip using the same scales.

The results of this survey show that there is a statistically significant difference between the emotional net affect reported during the trip and in the follow-up survey. Respondents indicated significantly more emotional satisfaction while onboard than they did when recalling the trip. Significant differences were also found specifically in feelings of comfort and boredom. This research indicates that the subjective well-being which people experience during a trip is not the same as they remember from it, which has possible impacts on the understanding and modeling of transportation decision-making.

1 INTRODUCTION

Memory is a key tool which people use when making decisions in everyday life *(1)*. When faced with a variety of options to choose from, people use memories of past experience as a guide in making new choices. Although used to make decisions, the memory of past experiences is often substantially different than what people experience during the actual event *(1, 2)*. Although people frequently rely on memory, it can deviate from actual past experiences due to the passage of time and other biases in the human mind.

In models of transportation decision making, such as mode choice models, travelers' utility is used as a key factor in these decisions *(3)*. Recent transportation research has recognized that emotional well-being is a large component of utility, and measures of happiness have accordingly been incorporated into new transportation decision models *(3, 4)*.

A person's experience of an event, such as travel, generates an emotional response. Over time, these emotions fade into memory and begin to diverge from the experienced emotions. However, the difference between the experienced emotions during travel and the remembered emotions which people reference during decision making is not well understood. This research provides a first step in understanding how memories of happiness during transportation differ from the experiences of travelers during their journey. It focuses specifically on the results of two surveys given to riders of the Red Line within the Massachusetts Bay Transportation Authority (MBTA) subway system.

First, riders were asked to rate their happiness by rating several aspects of their emotions during a ride on the subway. Later, respondents were provided a follow-up survey between one and five days later where they rated their happiness during the previously surveyed trip using a similar scale. The goal of this survey structure was to provide quantifiable measures of the discrepancies between the respondents' happiness during the trip, and the happiness they later report remembering.

This paper presents the results of this research. In section 2, existing work is discussed which relates to the impacts of happiness on decision making, as well as how to measure happiness. In section 3, the survey is described in detail. In section 4, information about the collection of data and the demographics of the collected responses is provided. In section 5, analysis of the survey responses is presented. In section 6, a discussion of these results, their implications, and their limitations is presented, along with recommendations for future work in this area.

2 EXISTING WORK

Happiness plays a large role in the decision making of daily life. Happiness is also referred to as subjective well-being in the field of psychology *(3, 5, 6)*. This subjective well-being is made up of several components. Kahneman *(1)* separates happiness into two distinct categories, experience and memory. Experienced happiness is the happiness felt in the present as a result of a person's current activities and surroundings. Remembered happiness is an assessment of past experiences. Kahneman finds that decisions are made in the realm of remembered happiness, based on predictions of how a person will remember that experience after it has passed. Additionally, he finds little correlation between the experience and memory of happiness.

Diener et al. *(7)* provides a similar analysis of subjective well-being, separating it into three components: frequency and intensity of positive affect, frequency and intensity of negative affect, and a cognitive judgment of overall life satisfaction. Positive and negative affect describe the moods and emotions felt during the aggregate, while the cognitive judgment is a retrospective evaluation which considers the aggregate well-being of many past memories. This relationship between positive and negative affect and cognitive evaluation reflect Kahneman's description of experienced and remembered happiness.

The research of these different types of happiness has provided several different ways to measure them. Experienced happiness is best measured during the experience itself due to the lack of correlation between experience and memory. The experience sampling method is one way of measuring this *(6, 8)*. Using this method, respondents report their experience and indicate the presence or absence of certain emotions at multiple intervals throughout the day. The Satisfaction with Travel Scale (STS), introduced by Ettema et al. *(9)*, measures subjective well-being of travelers during transit rides. This scale asks users

to rate affective states on dimensions of both valance (pleasant-unpleasant) and activation (activation-deactivation). This scale has demonstrated a close relation to other measures of subjective well-being and satisfaction with travel. Remembered happiness is often measured with the day reconstruction method, in which respondents fill out a diary at the end of the day that describes the day's events and rates the positive and negative emotions felt during each *(10)*.

Daniel Kahneman and others have conducted significant research in not only how to quantify happiness, but also how the memory of happiness may differ from its experience. Redelmeier and Kahneman *(2)* studied memories of a colonoscopy procedure to understand how memory is constructed from events. They found that the residual memory of an event is created by recalling a collection of specific moments rather than an overview of the overall experience. This finding is consistent with prior literature that suggests a systematic discrepancy between experience and memory. Kahneman et al. *(11)* propose the Peak-End rule as a psychological bias in which the memory of an experience is based on the most extreme "peak" events during an episode, and the events which take place towards its end. According to the Peak-End rule, mild events or the duration of the episode have little to no impact on remembered happiness.

In transportation research, measurements of happiness are increasing in importance as happiness is factored into measures of utility used in decision models. Utility represents the benefit or well-being obtained from an activity; maximizing utility forms the underpinning of almost all models of individual decision making in transportation *(3, 12)*. Kahneman *(13)* identifies three components of utility: remembered utility, moment utility, and predicted utility. Remembered utility is based on the memory of past events, subject to similar biases as remembered happiness. Moment utility is constructed from judgments about experiences based on the current context of an individual. Predicted utility is the anticipation of utility to be obtained in the future, and references the remembered utility of past events. This predicted utility is the basis of decision making. To measure utility, subjective well-being is often measured instead as a proxy. Several studies *(6, 14)* have validated the use of subjective well-being in this context.

Subjective well-being is an increasingly large topic of study within transportation contexts. Ettema et al. *(5, 9)* has conducted several studies analyzing differences in subjective well-being in different trip contexts. Part of this research consisted of an investigation of the effects of in-vehicle activities, socio-demographics, and trip characteristics on subjective well-being among public transit riders in Sweden using STS *(5)*. This research found no significant impacts from socio-demographics, significant impacts from trip characteristics regarding cognitive evaluation of train and bus, and mixed results for travel mode. Other research did find significant differences between commuting trips across different modes: pedestrians and cyclists report the highest levels of happiness, while traveled to work by car or bus reported the lowest *(9)*.

Subjective well-being is also being used in the context of transportation decision models. Duarte et al. *(6)* found self-reported happiness to be a significant indicator in mode choice between car and public transit. Abou-Zeid et al. *(3, 4)* incorporated measures of happiness into traditional models of mode choice, finding that utility is positively correlated with travel satisfaction. However, these models do not take into account the differences between experienced and remembered happiness, or experienced, remembered, and predicted utility.

Because of the relationship between predicted utility and remembered utility, as well as relationships between subjective well-being and utility, understanding how people remember happiness is an important component of understanding decision making. An example of this is an experiment conducted by Abou-Zeid et al. *(15)*. Participants who had previously commuted by car were required to use public transportation for their commute for 2-3 days in a certain week. After switching back to commuting by car, participants reported higher levels of satisfaction with their car commute: the experienced utility of the same mode had increased. However, in a follow-up survey several months after the experiment, satisfaction levels reported by participants had returned to the initial levels reported before the switch. This indicates that the increased satisfaction was a temporary response to the disruption in their usual commute. On longer timescales, the happiness from a particular mode remained stable. The

results of this experiment demonstrate that subjective well-being related to the same experience may change over time due to the nature of memory.

3 METHODOLOGY

The goal of this research was to develop an understanding of what differences exist between the happiness experienced by people during travel and their memory of that experience at a later time. For this purpose, a method was devised to survey randomly chosen riders about the same transit trip once during the trip and once at a later date. This allows a rigorous comparison between the experience, collected during the trip itself, and the memory, collected later.

3.1 Emotional Survey

An emotional survey was constructed to yield a metric which could be used to compare the happiness of the timeframes in question, based off the multi-attribute scale of Ettema et al *(9)*. The survey asked riders to describe their experience using six emotional descriptors: happy, comfortable, excited, anxious, bored, and frustrated. The first three of these descriptors represent positive emotions, the last three negative. Each descriptor was presented on a scale from one to five, where one indicates that the descriptor did not match the respondent's experience at all while five indicates that it was a very good match of their experience.

With the responses gathered using these six descriptors, we construct a net affect as described by Kahneman et al. *(16)* as a measure of subjectivel well-being. The net affect combines the information from each descriptor by averaging the three positive emotions (happy, comfortable, and excited) and subtracting from that the average of the negative emotions (anxious, bored, and frustrated). Because each of these responses is measured on a scale between 1 and 5, the net affect therefore ranges between -4, representing the least happiness possible, to +4, representing the most.

3.2 Survey Structure

Respondents were asked about their emotions regarding their transit trips in three different contexts. While riding the subway, randomly selected riders were approached and asked to fill out a paper survey, which will be referred to as the "onboard survey". The onboard survey first asked respondents to fill out an emotional survey of describing their typical trip on the subway. This response provides a baseline of their typical happiness on this mode. The second portion of the onboard survey asked respondents to fill out an emotional survey of their current trip, which will be referred to as the "surveyed trip." This response was used as a description of the in-the-moment experience of the surveyed trip.

Next, the onboard survey asked participants to provide their age and gender and to describe the frequency of their travel on this mode. Finally, respondents were asked to provide their email address so that they could be contacted with a follow-up survey. The third portion of the study, which will be referred to as the "follow-up survey," asked respondents to repeat the emotional survey and describe their memory of their experience during the surveyed trip. A link to this online portion was sent to respondents approximately 24 hours after their participation in the onboard survey.

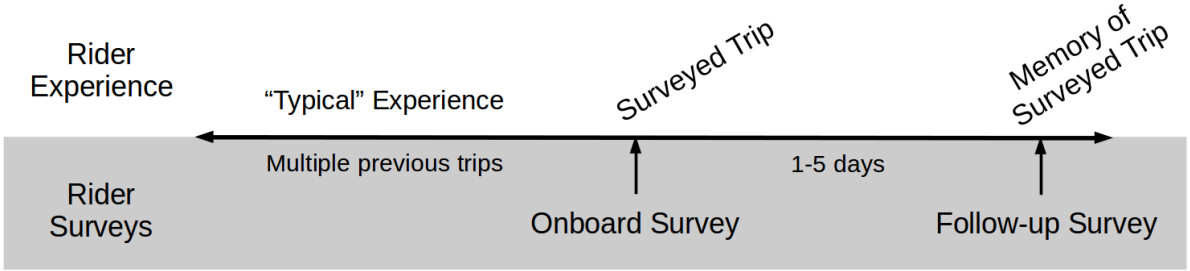

FIGURE 1 Timeline of rider experiences and surveys used for this experiment.

Figure 1 provides a graphical representation of the timeline of this experiment. The onboard survey collects both an aggregate memory of many past trips (typical experience) and their in-the-moment experience on the surveyed trip. Between one and five days later, the remembered experience on the surveyed trip is collected. Because the follow-up survey was solicited by email, some respondents completed it immediately while others waited as many as five days before responding. Regression analysis showed a weak relationship between this response delay and the difference between the net affects reported in the two surveys, with an R-squared value of 0.063. Because of this weak relationship, the data analysis that follows does not differentiate the surveys based on the time that elapsed between completion of the onboard and follow-up surveys.

4 DATA COLLECTION

The survey described above was implemented on the Red Line in the MBTA system. A researcher boarded the train and solicited responses from all riders in a randomly selected car. The surveys were solicited exclusively between the Harvard and Park Street stations, although respondents were allowed to complete the survey after leaving this section as long as they remained on the train. Riders were surveyed on three weekdays during non-peak periods of travel, which totaled roughly seven hours of data collection.

A total of 203 questionnaires were collected over the three-day onboard survey period. Of these surveys, 89 respondents (44%) provided their email address for the follow-up survey, and 47 of those completed the follow-up survey, meaning that 23% of the onboard participants completed the follow-up survey. Although these respondents self-selected for providing data in the follow-up survey, the assumption is made that this does not introduce bias in the analysis. There does not appear to be an obvious relationship between people volunteering for the follow-up survey and the accuracy of their recollection of the surveyed trip.

Table 1 provides the demographic breakdown of the 47 follow-up survey participants. The ratio of female respondents to male respondents was almost two to one. Respondents skewed on average very young, with 39 of the 47 respondents under age 34. Additionally, riders who responded to the follow-up survey were often very frequent riders, with 39 respondents saying they take the Red Line every day or a few times per week. Because of our surveying methodology, these responses may not be a representative sample of all transit riders. However, their responses may still yield interesting insights which in the future can be extended to a more representative sample.

Gender					
Male			**Female**		
16			31		
Age					
18-24	**25-34**	**35-44**	**45-54**	**55-64**	**65 or above**
17	22	1	3	3	1
Usage Frequency					
Every day	**A few times per week**	**A few times per month**	**Rarely**	**Never / This is the first time**	
23	16	4	4	0	

TABLE 2 Demographic Information of Riders Who Responded to Follow-up Survey

5 RESULTS

This section presents an analysis of the data obtained from the surveys and discusses the results of this analysis. The main purpose of this research is to determine the existence of any differences between the happiness experienced during travel and the remembered happiness which is recalled at a later time regarding the same trip. Using the data obtained from the surveys, the net affect obtained from the

onboard survey is used as a measure of the happiness experienced during the trip, and the net affect obtained from the follow-up survey is used as a measure of the remembered happiness between 1 and 5 days later.

A paired t-test was conducted to determine whether there is a statistically significant difference between the experienced net affect, obtained from the onboard survey, and the remembered net affect, obtained from the follow-up survey. Because we are able to match the riders' follow-up and onboard surveys, this test eliminates differences that arise from the various experiences which riders may have encountered during the surveyed trip. A significance level of $\alpha = 0.05$ was used and obtained a p-value of 0.013 from the paired t-test. As this value is less than the significance level, we find that there is a significant difference between the experienced net affect and the remembered net affect for these riders. This result is presented in Table 2.

Variable	Mean Experienced	Mean Recalled	t-statistic	p-value	Significant
Net Affect	1.26	0.97	-2.59	0.013	Yes
Positive Affect	3.14	2.94	-2.29	0.027	No
Negative Affect	1.93	2.11	1.76	0.085	No
Happy	3.55	3.34	-1.94	0.058	No
Comfortable	3.72	3.32	-2.93	0.005	Yes
Excited	2.11	2.15	0.55	0.583	No
Anxious	1.93	2.00	0.39	0.696	No
Bored	2.20	2.55	2.70	0.010	Yes
Frustrated	1.67	1.77	0.93	0.359	No

TABLE 2 Results of Significance Tests

Table 2 also displays the mean value recorded for net affect in the onboard survey ("Mean Experienced") and in the follow-up survey ("Mean Recalled"). Because the mean net affect in the follow-up survey is less than the mean net affect in the onboard survey, respondents on average reported less satisfaction with the surveyed trip when recalling it later than during the experience. Not only was there a significant difference between memory and experience, but also the remembered trip was worse than the experienced trip.

In addition to testing the existence of a significant difference in the net affect, it is also of interest to test whether differences exist for the other measures of emotion surveyed. These include positive affect (the average of the scores given to positive emotions), negative affect (the average of the scores given to negative emotions), and the six individual emotions. We perform t-tests for each measure to determine whether there is a significant difference between the score reported for that measure in the onboard survey and that reported in the follow-up survey. To mitigate the problem of multiple comparisons, we use a more strict significance threshold of $\alpha = 0.01$. Assuming independence between these 8 different categories, this significance level provides a family-wide error rate of approximately 7.7%. These results are also provided in Table 2, which displays whether each emotion was found to exhibit a statistically significant difference between the onboard and follow-up surveys.

As with net affect, the mean values reported for each emotion in the onboard and follow-up survey are provided in Table 2. Statistically significant differences were found for the emotions of comfort and boredom. The mean value which respondents reported for comfort in the follow-up survey was lower than in the onboard survey, which indicates that respondents remembered the surveyed trip as less comfortable than they reported during the trip. Meanwhile, the mean value they reported for boredom increased in the follow-up survey, which indicates that respondents remembered being more bored in the follow-up survey than they reported in the onboard survey. These results make sense in light of the results for net affect. Here, a positive emotion (comfortable) decreases in memory while a negative emotion

(bored) increases; this corresponds with a decrease in net affect. For the other four emotions surveyed, no statistically significant differences were found.

In addition to these statistical tests, visualizations of the data were also made to improve the understanding of these survey results. Figure 2 presents the results by plotting the net affect reported in the follow-up survey on the horizontal axis and the net affect reported in the onboard survey on the vertical axis. Each point in the plot represents the surveys of one individual respondent. The points are colored to indicate the net affect: green points correspond to positive net affect and red points to negative net affect. The plot also displays a black line, which represents points where the follow-up net affect is equal to the onboard net affect. Along this line, the respondents' memory is the same as their reported experience.

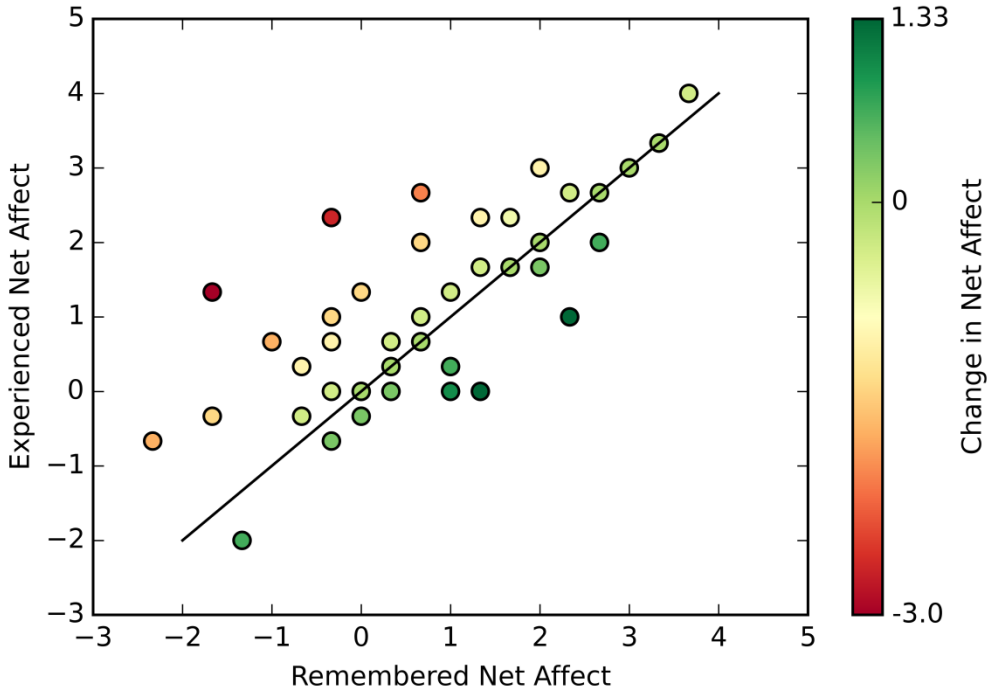

FIGURE 2 Net affect from follow-up survey plotted against net affect from onboard survey. The black line represents points where the net affects on the two surveys are equal.

Figure 2 visually represents the significant difference that was observed in the survey data between memory and experience. A large majority of the points do not fall along the black line; this indicates that differences between the remembered net affect and the experienced net affect were very common among respondents. These differences existed both above the black line, where the experience was better than the memory, and below it, where the experience was worse. However, more points fall above the line, which corroborates the finding that net affect was higher in the onboard survey than in the follow-up survey.

Another aspect to consider is whether the variance in net affect is different in the results of the onboard survey and the follow-up survey. If there is a change, this could indicate that similar experiences on transit could lead to largely varying memories in different riders. In this sample, the variance of experienced net affect was 1.723, while the variance of remembered net affect was 2.032. The variance in memory was higher than the variance in experience, although only a small difference. With a small sample size like this no definitive conclusions can be drawn.

Similar plots were made for each individual emotion which was surveyed, which are presented in Figure 3. In each of the six subplots, the horizontal axis represents the score of that emotion provided in the follow-up survey, while the vertical axis represents the score provided in the onboard survey. Each circle indicates received responses of that combination of remembered score and experienced score, with the area of the circle corresponding to the number who reported that combination. A larger circle means that more respondents reported that combination of memory and experience. The black line in each plot represents the points where experience and memory are the same. The p-value for the t-test performed previously is also shown with each plot.

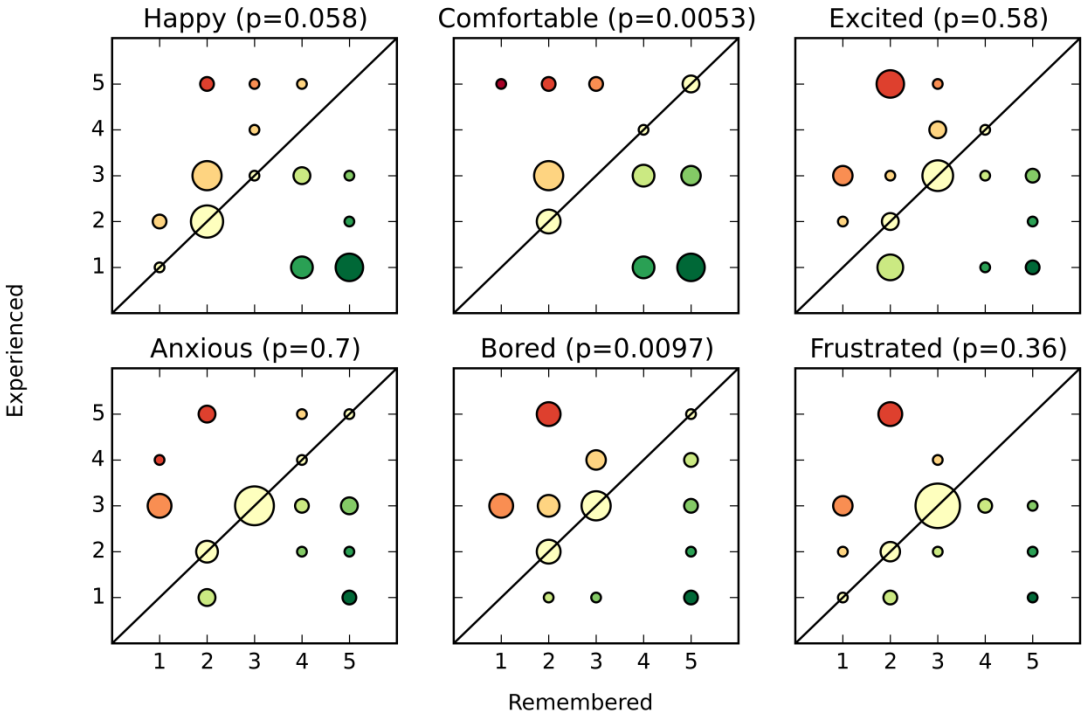

FIGURE 3 Emotional score from follow-up surveys plotted against emotional scores from onboard surveys for each of the six emotions surveyed. The black lines represent points where the memory is equal to the experience.

The visualization of this data provides interesting results, even for those emotional aspects where we found no significant differences. Once again, it can be seen that the responses indicate large deviations between memory and experience which implies that memory is very unreliable even for a trip on the day prior. Several respondents, especially for the happy and comfortable emotions, reported values of four or five in the follow-up survey while putting one in the in-person survey. This indicates that during their trip they felt extremely unhappy, for example, but when recalling it later they remembered being very happy. For some other emotional descriptors, we see patterns emerge in the data. For example, of the respondents who remembered being extremely bored (rated as a five) when taking the follow-up survey, there was a roughly equal distribution between all levels of boredom reported during the travel. Despite the small sample size of respondents to the follow-up survey which makes it difficult to draw other conclusions from this data, these observations provide interesting insights which spur questions for further research.

To provide further context for these results, an analysis is conducted regarding the differences that exist between respondents' characterization of the surveyed trip and their typical trip. In the onboard survey, respondents fill out the emotional survey to describe their typical trip on the Red Line, followed by filling out the emotional survey to describe their current trip. As the surveyed trips are not assumed to

be a representative sample of all transit rides taken on the Red Line, this comparison to the typical ride helps to understand how these rides may deviate from normal rides, or how respondents perceived them as deviating from their memory of typical rides.

The majority of respondents (35 out of 47, or 74%) had a better-than-typical experience on the surveyed trip, while only a small minority (6 out of 47, or 13%) had a worse-than-typical experience. This is possibly because Boston residents experienced an especially severe winter season with significantly impaired transit service. As the surveys were conducted in April, the conditions under which we surveyed riders was significantly better than this winter and were likely better than typical conditions on the Red Line. Alternatively, this result could indicate a bias present in many transit riders which leads them to remember their typical rides as being worse than their current one. Because these factors cannot be isolated given the data in this study, it is impossible to determine the exact causes of this disparity.

While most respondents reported a better experience on the surveyed ride than on their self-described typical rides, they remembered those same rides as a worse experience on average merely one to five days later. It seems plausible that these two observations are connected: the degradation of the experience in memory could be caused by the memory drifting towards their memory of the typical ride, similar to regression toward the mean. To understand this effect, further analysis was conducted that controls for typical net affect by subtracting the net affect of a rider's typical ride from both their experienced and remembered net affect. This analysis compares how much better the onboard experience was than the typical trip and how much better the remembered experience was better than the typical trip.

Figure 4 presents the results of this analysis. The remembered net affect less typical net affect is the horizontal axis. The experienced net affect less typical net affect is the vertical axis. Each point plotted shows these values obtained from one rider's surveys. The plot is further broken up into six regions labeled I-VI, each representing a different story for riders in that category.

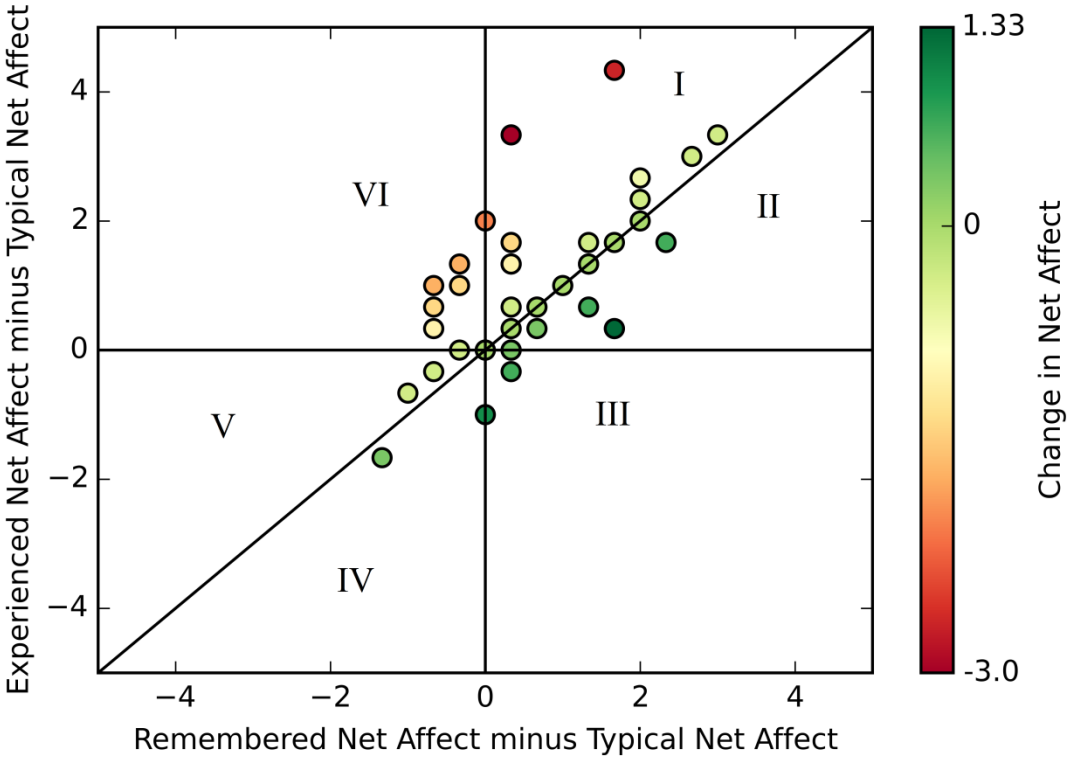

FIGURE 4 The difference between the experienced net affect and the net affect of a typical ride plotted against the difference between the remembered net affect and the net affect of a typical ride.

Region I comprises riders who experienced a better than typical trip, and whose memory was worse than the experience, but still better than the typical trip. Similarly, Region IV contains riders who experienced a worse than typical trip, and whose memory improved from the experience, but was still worse than typical. These two categories represent riders whose memory lies somewhere between the experience and the typical trip. If the regression to the mean hypothesis presented above is correct, many riders should fall within these categories.

In Regions II and V are riders whose memories are exaggerated from their experiences: they experienced a trip which deviated from the typical trip, and they remember the deviation as even larger than they reported during the trip itself. In Regions III and VI are riders whose memories of the trip have opposite deviations than their reported experience. Riders in these regions experienced the trip as worse than typical but remember it as better than typical, or vice versa.

Looking solely at figure 4, it is difficult to draw substantive conclusions. Many points appear to exist on the boundaries of two regions, and there does not seem to be any overwhelming trend towards any of the distinct regions or groups of regions. If points on the boundary between multiple regions are excluded, 31 of the 47 surveys fall into a unique region on the plot. Of these 31 points, 15 are in Region I, 6 in Region II, 1 in Region III, 1 in Region IV, 2 in Region V, and 6 in Region VI. As over half of the points lie in Region I or Region IV, it appears that many riders' memories of the trip lie in between the actual experience of the surveyed trip and their memory of a typical trip. This seems to indicate that the regression to the mean effect may be common among these riders. However, the large number of points in other regions suggests that this is not the only cause of deviations between the experience and the memory of the surveyed trip.

6 DISCUSSION

These results suggest that there exist significant differences between the emotions reported during a transit trip and the emotions reported when recalling the same trip one to five days later. The sampled riders predominantly reported their current ride as better than their typical ride on the same line. By analyzing the net affect reported in an onboard survey and in a follow-up survey between one and five days afterwards, it was found that there was a significant decrease in the reported quality when these respondents recalled the trip from memory. It was also found that respondents recalled their rides being significantly less comfortable than they reported while onboard, and that they recalled them being significantly more boring than they reported while onboard. Findings close to the significance threshold also showed that the average of the three positive emotions surveyed, and the happiness they reported experiencing, was decreased when participants recalled the trip.

These results demonstrate that the difference between the net affect of the experienced ride and the remembered ride has complex drivers. By controlling for the net affect reported for a typical ride on transit, it was found that an effect similar to regression towards the mean may be responsible for the decrease in net affect of some riders, but that this could not exclusively explain these results.

However, there were several limitations to the work conducted. This research surveyed a small number of transit riders on a single section of the Boston subway system. Responses were collected for a combined seven hours over three days, during which the weather conditions and transit operations were favorable. This limited segment of the population limits the applicability of these results to other systems, modes, and conditions. Because of the favorable conditions during the surveys, these findings cannot be generalized to understand how memory relates to experience in the general case, such as when the experience is worse than a typical ride.

Moving forward, future studies should attempt to overcome the limitations of this research by drawing from a larger sample of rides which feature more diversity in time of day, season, level of crowding, weather, and other factors. Introducing more variation in these factors would improve the representativeness and the applicability of this research. One way to explore the differences between experience and memory in travel under poor conditions would be to conduct experiments during planned disruptions of public transit service. These disruptions may yield worse than typical experiences for riders, providing an opportunity to understand this impact in a more controllable manner.

Additionally, the analysis presented in this paper could be extended to other transit systems and modes. This study was conducted only on the Red Line of the Boston subway. Additional studies could be done on other lines within Boston's subway system, on different modes within Boston, or in different cities and transit systems altogether. Additionally, studies could be done to compare these findings with different modes such as car or bus. The information gathered in these ways would allow researchers to better understand the differences between experience and memory across different modes and develop a more comprehensive understanding of transportation mode choice.

Future research could also explore whether the differences between experience and memory observed in this study are the same across different groups, or whether certain factors may affect the relationship between experience and memory. This could be done by surveying groups with different socioeconomic characteristics or groups that use different travel modes and comparing the results between these different groups. Differences that exist between groups would demonstrate that individual characteristics may influence the relationship between experience and memory.

This research takes the first step toward an understanding of the memory of transit riders and how it differs from experience. Future research should examine the emotions experienced on transit more precisely, in different contexts, or on different timescales. This research would provide a more complete picture of the interaction between experienced and remembered emotional well-being on public transit, which have ties to concepts of emotional and remembered utility. These concepts of utility are integrated in a variety of mode choice models and other transportation decision models. Ultimately, a more accurate understanding of experienced and remembered happiness may be leveraged to improve models of human behavior and mode choice used in transportation research.

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