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Original Paper

Observational Study on Passenger Behavior in the Beijing Subway

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Abstract

To understand the primary behaviors of contemporary passengers during subway travel, a traditional observational research method was employed to observe and record the behaviors of individuals in the last car of Beijing Subway Line 5. The observed behaviors were then analyzed and explained using relevant theories. The results indicated that: a. The main behaviors of subway passengers included activities such as using mobile phones, sleeping, daydreaming, reading, and interacting with others. b. The predominant use of mobile phones was closely related to the development of the internet era and the widespread adoption of smartphones. c. The limited communication and interaction among subway passengers were linked to the phenomenon of interpersonal apathy prevalent in modern society.

Keywords

observational method, event sampling, subway passengers

1. Introduction

Observation refers to the process by which individuals acquire an understanding of phenomena and processes occurring in their surroundings. Its primary characteristic lies in emphasizing the recognition of the subject under naturally occurring conditions, without any interference or control over the object of observation (Chen et al., 2014). In contrast, the observational method refers to scientific observation, which is a research technique involving the purposeful and systematic perception of an objective subject through sensory organs or with the aid of scientific instruments, aiming to obtain scientific facts (Wang & Wang, 1992). By employing the observational method to study human behavior in specific daily life settings, one can gain insights into aspects of interpersonal interactions.

In recent years, public transportation options have become increasingly diverse, and subway transportation in large cities has emerged as a significant choice for travel due to its convenience and

speed. Based on this, to understand the primary behaviors of contemporary individuals while traveling on the subway, this study predominantly employs the observational method. The research focuses on observing the passengers in the last carriage of Beijing Subway Line 5 (from TIANTONGYUAN North station to SONGJIAZHUANG station), supplemented by the event sampling method to systematically record the observed phenomena.

2. Method

This study primarily employs natural observation to collect data on the main behaviors of individuals on the subway, followed by a combined qualitative and quantitative analysis. Finally, typical behavioral variables are summarized to analyze the related causes. The observation was conducted on December 1, 2023, from 7:00 to 7:30 am, in the sixth carriage of the Beijing Subway Line 5 traveling toward Songjiazhuang, covering the segment from Huixinxijie Beikou Station to Puhuangyu Station.

The event sampling method, which is based on the occurrence of specific behaviors or events, serves as the sampling criterion. It refers to observing and recording aspects such as the background, cause, process, result, and duration of a particular behavior or phenomenon that is relevant to the research objectives and has been predetermined as representative (Chen et al., 2014). Using the event sampling method to categorize and summarize the observed content, the study identified that the primary behaviors of individuals on the subway mainly include using mobile phones, sleeping with eyes closed, staring blankly with eyes open, reading books, and engaging in communication involving multiple people (two or more individuals).

3. Result

3.1 Mobile Phone Usage

In this observational study, the operational definition of mobile phone usage was established as follows, a. Continuous phone use for more than 1 minute. b. Using the phone to take a call for over 1 minute, even if not continuously viewing the screen. c. The phone screen remaining lit for more than 1 minute. Based on these criteria, the total number of observed instances of mobile phone usage is summarized in Table 1.

Additionally, it was observed that there was no significant gender difference in mobile phone usage, with a nearly 1:1 male-to-female ratio. Moreover, the age distribution of individuals using mobile phones was quite diverse, spanning an estimated range of 20 to 60 years old.

Table 1. Descriptive Statistics of Mobile Phone Users on the Subway

Travel Interval	Number of Mobile Phone Users	Total Number of Passengers in the Carriage	Percentage of the Current Travel Interval and Carriage Population
HUIXINXIJIEBEIKOU Station→HUIXINXIJIENANKOU Station	6	28	21%
HUIXINXIJIENANKOU Station→HEPINGXIQIAO Station	10	26	26%
HEPINGXIQIAO Station→HEPINGBEIJIE Station	11	28	39%
Station→YONGHEGONG Lama Temple Station	11	27	41%
YONGHEGONG Lama Temple Station→BEIXINQIAO Station	9	24	38%
BEIXINQIAO Station→ZHANGZIZHONGLU Station	9	23	39%
ZHANGZIZHONGLU Station→DONGSI Station	9	23	39%
DONGSI Station→DENGSHIKOU Station	10	20	50%
DENGSHIKOU Station→DONGDAN Station	8	16	50%
DONGDAN Station→CHONGWENMEN Station	7	15	47%
CHONGWENMEN Station→CIQIKOU Station	9	14	57%
CIQIKOU Station→Temple of Heaven east gate Station	8	12	67%
Temple of Heaven east gate Station→PUHUANGYU Station	7	11	64%

In modern society, where mobile phones are ubiquitous, the initial hypothesis of this study was that the number of people using mobile phones on the subway would overwhelmingly surpass those engaged in other activities. However, the actual observations did not fully support this assumption. During the course of this observation, the absolute number of mobile phone users on the subway did not exhibit a dominant advantage. The proportion of mobile phone users increased gradually from around 20% to approximately 60%. However, this rise in the percentage of mobile phone users was not due to an absolute increase in their numbers, but rather a reduction in the total number of passengers in the subway car. This suggests that the number of mobile phone users remained relatively stable.

3.2 Sleeping

In this observational study, sleeping was operationally defined as having one's eyes closed, with no continuous activities such as reading a book or using a mobile phone, and without engaging in any verbal behavior. Based on this definition, the total number of individuals observed sleeping is summarized in Table 2.

Table 2. Descriptive Statistics of People Sleeping on the Subway

Travel Interval	Number of People Sleeping	Total Number of Passengers in the Carriage	Percentage of the Current Travel Interval and Carriage Population
HUIXINXIJIEBEIKOU Station→HUIXINXIJIENANKOU Station	15	28	54%
HUIXINXIJIENANKOU Station→HEPINGXIQIAO Station	13	26	50%
HEPINGXIQIAO Station→HEPINGBEIJIE Station	13	28	46%
Station→YONGHEGONG Lama Temple Station	9	27	33%
YONGHEGONG Lama Temple Station→BEIXINQIAO Station	8	24	33%
BEIXINQIAO Station→ZHANGZIZHONGLU Station	8	23	35%
ZHANGZIZHONGLU Station→DONGSI Station	8	23	35%

DONGSI Station→DENGSHIKOU Station	7	20	35%
DENGSHIKOU Station→DONGDAN Station	5	16	31%
DONGDAN Station→CHONGWENMEN Station	5	15	33%
CHONGWENMEN Station→CIQIKOU Station	2	14	15%
CIQIKOU Station→Temple of Heaven east gate Station	2	12	17%
Temple of Heaven east gate Station→PUHUANGYU Station	1	11	9%

Unlike the distribution of mobile phone users, the absolute number of individuals sleeping showed a continuous decreasing trend throughout the entire observation period, leading to a corresponding decline in their proportion of the total population. It is noteworthy, however, that during the first three observation intervals, the total number of people sleeping was significantly higher than those using mobile phones, accounting for approximately half of the population.

3.3 Daydreaming

In this observational study, daydreaming was operationally defined as having one's eyes open, with no continuous activities such as reading a book or using a mobile phone, and without engaging in any verbal behavior. Based on this definition, the total number of individuals observed daydreaming is summarized in Table 3.

Table 3. Descriptive Statistics of People Daydreaming on the Subway

Travel Interval	Number of People Daydreaming	Total Number of Passengers in the Carriage	Percentage of the Current Travel Interval and Carriage Population
HUIXINXIJIEBEIKOU Station→HUIXINXIJIENANKOU Station	6	28	21%
HUIXINXIJIENANKOU Station→HEPINGXIQIAO Station	2	26	8%
HEPINGXIQIAO	3	28	11%

Station→HEPINGBEIJIE Station Station→YONGHEGONG Lama Temple Station	4	27	15%
YONGHEGONG Lama Temple Station→BEIXINQIAO Station	4	24	17%
BEIXINQIAO Station→ZHANGZIZHONGLU Station	5	23	22%
ZHANGZIZHONGLU Station→DONGSI Station	5	23	22%
DONGSI Station→DENGSHIKOU Station	3	20	15%
DENGSHIKOU Station→DONGDAN Station	3	16	19%
DONGDAN Station→CHONGWENMEN Station	3	15	20%
CHONGWENMEN Station→CIQIKOU Station	3	14	21%
CIQIKOU Station→Temple of Heaven east gate Station	2	12	25%
Temple of Heaven east gate Station→PUHUANGYU Station	3	11	27%

Based on the above statistical results, the proportion of individuals exhibiting daydreaming behavior is not insignificant. One notable observation during the study was a man sitting next to the observer, estimated to be between 40 and 50 years old. In the first half of the journey, his behavior fell into the category of mobile phone usage, while in the latter half, it transitioned into daydreaming. Additionally, certain external characteristics of this individual were observed: he had a rough complexion, dark skin, and hands with noticeable calluses, resembling a weathered elderly person. However, an analysis of his wrinkles and physical condition suggested that he was not an elderly individual, leading to the tentative conclusion that his age did not correspond to his appearance.

3.4 Reading

In this observational study, reading was operationally defined as maintaining direct eye contact with the book's content, displaying full concentration, and engaging in page-turning actions, while not using a mobile phone or engaging in conversation. Based on this definition, the total number of individuals observed reading is summarized in Table 4.

Table 4. Descriptive Statistics of People Reading on the Subway

Travel Interval	Number of People Reading	Total Number of Passengers in the Carriage	Percentage of the Current Travel Interval and Carriage Population
HUIXINXIJIEBEIKOU Station→HUIXINXIJIENANKOU Station	1	28	4%
HUIXINXIJIENANKOU Station→HEPINGXIQIAO Station	1	26	4%
HEPINGXIQIAO Station→HEPINGBEIJIE Station	1	28	4%
Station→YONGHEGONG Lama Temple Station	1	27	4%
YONGHEGONG Lama Temple Station→BEIXINQIAO Station	1	24	4%
BEIXINQIAO Station→ZHANGZIZHONGLU Station	1	23	4%
ZHANGZIZHONGLU Station→DONGSI Station	1	23	4%
DONGSI Station→DENGSHIKOU Station	0	20	0%
DENGSHIKOU Station→DONGDAN Station	0	16	0%
DONGDAN Station→CHONGWENMEN Station	0	15	0%
CHONGWENMEN Station→CIQIKOU Station	0	14	0%
CIQIKOU Station→Temple of Heaven east gate Station	0	12	0%
Temple of Heaven east gate Station→PUHUANGYU Station	0	11	0%

According to the statistical results, the number of people reading on the subway was extremely low, with only a few isolated instances. Based on the actual observation, all the individuals recorded as

reading in the table were, in fact, the same person (a female, approximately 40 years old). Compared to the previously mentioned groups—those using mobile phones, sleeping, and daydreaming—the number of people reading was notably scarce.

3.5 Interaction

In this observational study, interaction was operationally defined as verbal communication involving two or more individuals, without any simultaneous use of mobile phones, reading, or similar activities. Based on this definition, the total number of interactions observed is summarized in Table 5. The number of interacting individuals is recorded in pairs, with each pair indicating that the interaction involved at least two people, and the exact number of participants is specified in the table.

Table 5. Descriptive Statistics of People Engaged in Interaction on the Subway

Travel Interval	Number of People Engaged in Interaction	Total Number of Passengers in the Carriage	Percentage of the Current Travel Interval and Carriage Population
HUIXINXIJIEBEIKOU Station→HUIXINXIJIENANKOU Station	0	28	0%
HUIXINXIJIENANKOU Station→HEPINGXIQIAO Station	0	26	0%
HEPINGXIQIAO Station→HEPINGBEIJIE Station	0	28	0%
Station→YONGHEGONG Lama Temple Station	2	27	7%
YONGHEGONG Lama Temple Station→BEIXINQIAO Station	2	24	8%
BEIXINQIAO Station→ZHANGZIZHONGLU Station	0	23	0%
ZHANGZIZHONGLU Station→DONGSI Station	0	23	0%
DONGSI Station→DENGSHIKOU Station	0	20	0%
DENGSHIKOU Station→DONGDAN Station	0	16	0%
DONGDAN Station→CHONGWENMEN Station	0	15	0%

CHONGWENMEN Station→CIQIKOU Station	0	14	0%
CIQIKOU Station→Temple of Heaven east gate Station	0	12	0%
Temple of Heaven east gate Station→PUHUANGYU Station	0	11	0%

4. Discussion

4.1 Utilization of Fragmented Time

With the rise and development of the internet era, time has become an increasingly scarce and valuable resource, and the influx of information continuously fragments our time. Fragmented time refers to the scattered and idle periods outside of daily work and life, such as waiting, queuing, commuting, playing games, browsing social media, and engaging in mobile phone reading. This type of time is characterized by its variability, individuality, randomness, fragmentation, and spontaneity (Zhang, 2013). In this observation, riding the subway itself represents a form of fragmented time. When we discuss the concept of time, we are essentially examining how time is perceived in relation to human existence and how individuals manage its rhythm, which involves lifestyle choices and self-exploration (Yuan, 2021). The primary behaviors of subway passengers fundamentally reflect how individuals handle their fragmented time. Due to the impact of network technology, contemporary work content and styles have changed, making the desire for substantial personal leisure time increasingly unattainable. This also explains the disparity in the statistics between mobile phone use and reading.

4.2 Prevalence of Mobile Phones

With continuous technological advancement, mobile phone usage has become exceedingly common. According to research data, as of April 2022, the number of mobile phone users worldwide reached 5.32 billion, accounting for approximately 67% of the global population. The 50th "Statistical Report on Internet Development in China" also indicated that as of June 2022, more than 1 billion people in China were using mobile phones, with 99.7% of internet users accessing the internet via mobile devices (Lu, 2023), marking the arrival of a fully networked era. The number of mobile phone users in China is already vast, and today, the various applications available on smartphones can meet a wide range of user needs. As a result, using mobile phones has become an essential and frequent activity in daily life. In enclosed spaces such as subways, mobile phone usage remains the primary choice for many individuals.

4.3 Emergence of Interpersonal Apathy

In modern society, the term stranger society has become a relatively common academic concept (Peng, 2023), signifying the substantial changes in human interaction in the internet age. However, due to the global, distanced, and virtual nature of online communication networks, people increasingly prefer to

interact using virtual identities. Although this mode of communication significantly reduces the sense of spatial and temporal distance between individuals, it also diminishes the depth of interpersonal connections. People are more inclined to engage through virtual identities rather than face-to-face interactions, leading to increased interpersonal apathy in the real world. Moreover, since individuals spend much of their time communicating in virtual spaces, they have less time for real-life social interactions (Yao, 2016). In contemporary society, many people commonly experience interpersonal indifference, and the profound underlying cause of this interpersonal apathy is the negative effect of shifts in social ethics and morality during the process of societal transformation (Huang, 2013). The disenchantment or deterioration of morality in modern society places individuals in a state of isolation and loneliness. This isolation is not only superficial but also signifies a disconnection from the moral sources necessary for a fulfilling existence (Liu, 2012).

5. Conclusion

This study, using Beijing Subway Line 5 as a case, employed an observational research method combined with data analysis to examine the primary behaviors of subway passengers and the influencing factors.

The study of passenger behaviors on Beijing Subway Line 5 revealed that in the internet era, a large number of people use their mobile phones while on the subway. The various applications available on smartphones cater to diverse user needs, providing richer entertainment options during fragmented travel time. In this context, the findings support the earlier assertion that mobile phone usage has become an important and frequent activity in daily life. This also validates the concept that digital life is an indispensable component of the lives of digital natives, who remain in a state of continuous digital connectivity and are increasingly dependent on digital products such as mobile phones (Wang et al., 2023).

The rapid development of the digital age has not necessarily enhanced real-world interpersonal communication. People's social interactions have become entangled with the vast amount of information in virtual spaces, affecting the depth of human interactions in the real world. Communication between individuals tends to occur more through virtual identities, while genuine, face-to-face interactions in real spaces have become increasingly rare.

There were several limitations in this observational study that could be addressed in future research. The observation was conducted in the last car of Beijing Subway Line 5, heading toward Songjiazhuang. Objectively, this car's location at the rear means that it is narrower compared to other central cars, which resulted in a limited total sample size for this study. Subjectively, the observer's limited energy and attention might have led to some oversight or omissions, potentially affecting the accuracy of the observations. Additionally, the observation was conducted on a Friday morning from 7:00 to 7:30 a.m., a peak weekday commuting time. As such, the findings may not be fully

representative. These limitations highlight areas for improvement in future observational studies and offer insights for other researchers conducting similar studies.

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