

A survey on commuters' travel decision preferences under heavy rain warning

Thank you for participating in this survey during your busy schedule. This survey aims to understand the travel decision characteristics of commuters under the background of heavy rain warning (whether to travel, travel mode and departure time) . Your participation has a positive significance for promoting the research and practice of urban traffic emergency management. This questionnaire consists of four parts, including a survey on personal travel characteristics and attitudes towards weather information, a survey on travel decision preferences under blue and yellow heavy rain warning scenarios, and a survey on basic personal and family information . This questionnaire is only used in the research field, and your answers will be anonymous. **Please read and fill in the form carefully** .

Part I: Personal travel characteristics and attitudes toward weather information

1. Your approximate commuting distance is:

Note: Commuting refers to using some form of transportation to go to work, school or for business trips within the city on weekdays.

*

2. What is the main mode of transportation you usually use for commuting? *

- ☐ Electric bicycle
- ☐ Private car
- ☐ Subway
- ☐ Public bus
- ☐ Taxi/online ride-hailing

3. In previous rainstorm warnings or rainstorm scenarios, the main travel decision you made when commuting was: *

- ☐ Never travel
- ☐ Rarely travel
- ☐ Sometimes travel
- ☐ Most of the time
- ☐ Always travel

4. In previous rainstorm warnings or rainstorm scenarios, your main mode of travel for commuting was: *

- ☐ Electric bicycle
- ☐ Private car
- ☐ Subway
- ☐ Public bus
- ☐ Taxi/online ride-hailing

5. In previous rainstorm warnings or rainstorm scenarios, your main departure time for commuting was: *

- ☐ Not sure
- ☐ Cancel travel
- ☐ Travel early
- ☐ Travel as usual
- ☐ Delay travel

6. In the past, during rainstorm warnings or rainstorm scenarios, have you had any experience of being forced to interrupt your commute? *



- ☐ Never experienced
- ☐ Rarely experienced
- ☐ Sometimes experienced
- ☐ Often experienced
- ☐ Always experienced

7. The approximate walking time from home to the nearest bus stop is: *

8. The approximate walking time from home to the nearest subway station is: *

9. The estimated waiting time for a taxi/online ride-hailing vehicle near home is: *

10. The average walking time from the workplace to the nearest bus stop is approximately : *

11. The average walking time from the workplace to the nearest subway station is approximately : *

12. The approximate waiting time for taking a taxi/online ride-hailing vehicle near the workplace is : *

13. In the case of a rainstorm warning or a rainstorm scenario, what do you think the average travel time to work by public transportation is:

Note: Travel time refers to the time it takes to reach the destination from the departure point

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14. In the case of a rainstorm warning or heavy rain, what do you think the average travel time to work by subway is:

Note: Travel time refers to the time it takes to reach the destination from the departure point

.*

15. In the event of a rainstorm warning or heavy rain, what do you think the average travel time to work by car or taxi/online ride-hailing service is:

Note: Travel time refers to the time it takes to reach the destination from the departure point

.*

16. Do you pay attention to weather information before traveling: *

- ☐ Always follow
- ☐ Most of the time
- ☐ Sometimes follow
- ☐ Rarely follow
- ☐ Never follow

17. The main way you usually get weather information: *

- ☐ Traffic navigation software
- ☐ Weather forecast software/webpage
- ☐ Friends circle/online news



- ☐ SMS and push notifications
- ☐ Other channels

18. Do you think the official rainstorm warning information is usually accurate and reliable? *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

19. Do you think the official rainstorm warning information is usually very timely? *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

20. Do you think the official rainstorm warning information is usually clear and easy to understand? *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

21. Do you think the government will take adequate measures to ensure the reliability of early warning information: *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

22. Do you think that rainstorm warning information is the main basis for planning a reasonable travel plan: *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

Part II: Scenario Survey - Encountering a Blue Warning for Heavy Rain before the Morning Peak (Rainfall Has Not Started or Has Not Been Observed by the Naked Eye)

The Shanghai Meteorological Bureau stipulates that the rainstorm warning signal is divided into four levels, which are represented by blue, yellow, orange and red from low to high severity. The blue rainstorm warning standard is that the rainfall in the next hour may reach more than 35 mm. The defense guide given is: 1) Citizens need to prepare rain gear to ensure safety when traveling; 2) Drivers should pay attention to road water accumulation. Assuming that you know about the blue rainstorm warning before the morning rush hour, but the rain has not started or the naked eye has not observed the rain, please answer the following questions related to travel decisions and behavioral tendencies for this scenario.

23. Do you think it is very likely that the blue warning rainstorm will cause the suspension of ground buses and subways? *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree

- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

24. Do you think it is very likely that a blue warning rainstorm will cause serious road flooding and congestion: *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

25. Do you think the probability of serious traffic accidents and injuries caused by blue warning rainstorms is high? *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

26. Do you think there is a high probability that a blue warning rainstorm will cause damage to vehicles or other property: *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

27. You think it is very likely that you will not be able to complete your trip due to the blue warning rainstorm: *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

28. During a blue warning rainstorm, you are able to obtain timely and accurate weather and traffic information during your travel: *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

29. Are you confident that you can pay close attention to your surroundings and avoid potential dangers when traveling during a blue warning rainstorm? *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

30. Are you confident that you can find an alternative route if your trip is interrupted or the route is impassable during a blue warning rainstorm? *



- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

31. In case of blue warning rainstorm, you are confident that you can get emergency rescue services when the rainstorm causes the trip to be interrupted: *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

32. In a blue warning rainstorm, you are confident that you can make appropriate decisions quickly when the rainstorm causes other unexpected situations: *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

33. When traveling during a blue warning rainstorm, do you think it is more convenient to use the travel plan you usually use for commuting?

Note: Travel plan in this survey refers to the travel plan adopted from the departure point to the destination, including whether to travel, travel mode and departure time .

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

34. When traveling during a blue warning rainstorm, do you think it is more comfortable to use the travel plan you usually use for commuting: *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

35. When traveling during a blue warning rainstorm, do you think it is safer to use the travel plan you usually use for commuting: *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

36. When traveling during a blue warning rainstorm, do you think it is more reliable to use the travel plan you usually use for commuting: *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure



- ☐ Somewhat Agree
- ☐ Strongly Agree

37. If there is a blue rainstorm warning before your next trip, are you more likely to choose to travel? *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

38. If you travel during the next blue rainstorm warning, would you prefer to choose an electric bicycle?

Note: Regarding the travel mode selection intention, the "Strongly Agree" option can only be selected once

*

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

39. If you travel during the next blue rainstorm warning, are you more inclined to choose private car?

Note: Regarding the travel mode selection intention, the "Strongly Agree" option can only be selected once

*

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

40. If you travel during the next blue rainstorm warning, which mode of travel would you prefer, taxi or online ride-hailing?

Note: Regarding the travel mode selection intention, the "Strongly Agree" option can only be selected once

*

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

41. If you travel during the next blue rainstorm warning, which mode of transportation would you prefer?

Note: Regarding the travel mode selection intention, the "Strongly Agree" option can only be selected once

*

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

42. If you travel during the next blue rainstorm warning, would you prefer to take the subway?

Note: Regarding the travel mode selection intention, the "Strongly Agree" option can only be selected once

*

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure



- ☐ Somewhat Agree
- ☐ Strongly Agree

43. If you were to travel during the next blue rainstorm warning, which departure time would you prefer? *

- ☐ Departure at a later time
- ☐ Departure at a later time

time

44. If most of your colleagues, friends or family members cancel their travel, will you follow their lead and cancel your travel? *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

45. If most of your coworkers, friends, or family members choose a different method of travel than you originally planned, will you follow their lead and choose the same method of travel? *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

46. If most of your colleagues, friends or family choose to postpone their trip, what departure time would you prefer? *

- ☐ Departure at a later time
- ☐ Departure at a later time

time

Part III: Scenario Survey - Encountering a Yellow Rainstorm Warning Before the Morning Peak (Rainfall Has Not Started or Rainfall Has Not Been Observed by the Naked Eye)

The Shanghai Meteorological Bureau stipulates that the rainstorm warning signal is divided into four levels, which are represented by blue, yellow, orange and red from low to high severity. The standard for yellow rainstorm warning is that **the rainfall in the next hour may reach more than 50 mm**. The defense guidelines given are: 1) Citizens try to reduce going out; 2) Drivers pay attention to road water accumulation; 3) Cut off dangerous outdoor power supplies in low-lying areas; 4) Suspend outdoor work in open areas; 5) People in dangerous areas and residents of dangerous houses move to safe places to avoid rain. **Assuming that you learn about the yellow rainstorm warning before the morning rush hour, but the rain has not started or the rain has not been observed by the naked eye, please answer the following questions related to travel decisions and behavioral tendencies for this scenario.**

47. Do you think it is very likely that yellow warning rainstorm will cause the suspension of ground buses and subways? *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

48. Do you think it is very likely that a yellow warning rainstorm will cause serious road flooding and congestion? *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree



49. Do you think that the possibility of serious traffic accidents and injuries caused by yellow warning rainstorms is very high: *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

50. Do you think that the possibility of damage to vehicles or other property caused by yellow warning rainstorm is high? *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

51. You think it is very likely that you will not be able to complete your trip due to the yellow warning rainstorm: *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

52. During a yellow rainstorm warning, you are able to obtain timely and accurate weather and traffic information during your travel: *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

53. Are you confident that you can pay close attention to your surroundings and avoid potential dangers when traveling during a yellow warning rainstorm? *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

54. You are confident that you can find an alternative route if your trip is interrupted or the route is impassable during a yellow rainstorm: *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

55. During the Yellow Warning Rainstorm, you are confident that you will be able to obtain emergency rescue services if the rainstorm causes the trip to be interrupted: *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure



- ☐ Somewhat Agree
- ☐ Strongly Agree

56. During a yellow rainstorm warning, you are confident that you can make appropriate decisions quickly if the rainstorm causes other unexpected situations: *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

57. Under the yellow warning rainstorm, you think it is more convenient to use the travel plan you usually use for commuting: *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

58. When traveling during a yellow warning rainstorm, do you think it is more comfortable to use the travel plan you usually use for commuting: *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

59. When traveling during a yellow warning rainstorm, do you think it is safer to use the travel plan you usually use for commuting: *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

60. When traveling during a yellow warning rainstorm, do you think it is more reliable to use the travel plan you usually use for commuting: *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

61. If there is a yellow rainstorm warning before your next trip, are you more likely to choose to travel? *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

62. If you travel during the next yellow rainstorm warning, would you prefer to choose an electric bicycle?

Note: Regarding the travel mode selection intention, the "Strongly Agree" option can only be selected once
*



- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

63. If you travel during the next yellow rainstorm warning, are you more inclined to choose private car?

Note: Regarding the travel mode selection intention, the "Strongly Agree" option can only be selected once

*

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

64. If you travel during the next yellow rainstorm warning, which mode of travel would you prefer, taxi or online ride-hailing?

Note: Regarding the travel mode selection intention, the "Strongly Agree" option can only be selected once

*

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

65. If you travel during the next yellow rainstorm warning, which mode of transportation would you prefer?

Note: Regarding the travel mode selection intention, the "Strongly Agree" option can only be selected once

*

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

66. If you travel during the next yellow rainstorm warning, would you prefer to take the subway?

Note: Regarding the travel mode selection intention, the "Strongly Agree" option can only be selected once

*

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

67. If you travel during the next yellow rainstorm warning, which departure time would you prefer? *

- ☐ Departure at a later time
- ☐ Departure at a later

time

68. If most of your colleagues, friends or family members cancel their travel, will you follow their lead and cancel your travel? *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure



- ☐ Somewhat Agree
- ☐ Strongly Agree

69. If most of your coworkers, friends, or family members choose a different method of travel than you originally planned, will you follow their lead and choose the same method of travel? *

- ☐ Strongly Disagree
- ☐ Somewhat Disagree
- ☐ Unsure
- ☐ Somewhat Agree
- ☐ Strongly Agree

70. If your colleagues, friends or family choose to postpone their trip, which departure time would you prefer? *

- ☐ Departure at a later time
- ☐ Departure at a later

time

Part 4: Basic Personal and Family Information

71. Gender: *

- ☐ Male
- ☐ Female

72. Age: *

73. Education (currently studying or graduated): *

- ☐ PhD
- ☐ Master
- ☐ Bachelor
- ☐ College
- ☐ High School
- ☐ Other

74. Occupation: *

- ☐ Private enterprise staff
- ☐ Foreign enterprise staff
- ☐ State-owned enterprise staff
- ☐ Government/institutions
- ☐ Self-employed
- ☐ Freelance
- ☐ Sales/service
- ☐ Other

75. Personal annual income (ten thousand yuan): *

76. Number of cars owned by the family (units): *

77. How long have you lived/reside in the local area (years): *



