Experiment Guide

Hello Participant, This experiment will be conducted on our self-developed **VR Driving Simulation System**. You will drive a standard passenger car and interact with other vehicles in the **highway scenario** you just experienced. We will record your driving data. There will be a total of **2 pre-experiments (training) and 16 sub-experiments**. Each trial lasts 2-3 minutes, and the total duration will be **within one hour**. Thank you very much for your participation; compensation will be issued immediately after the experiment ends!

The following introduces the experimental scenarios:

You will encounter **two scenarios**, as shown in Figure 1: one is a **three-lane flat road**, and the other is a **three-lane construction road** (due to the construction zone, a section of the road narrows from three lanes to one lane).

Figure 1

You will encounter **different vehicles**, including **Normal Vehicles** that replicate human driving habits, and **Autonomous Vehicle (AV) Platoons**. They will react according to your driving behavior. You are free to interact with them, including car-following, lane changing, and overtaking.

Normal vehicles vary in color and model (see Figure 2, Left). The Autonomous Vehicle Platoon consists uniformly of **Lincoln sedans, black in color** (see Figure 2, Right), and they maintain a more compact formation.

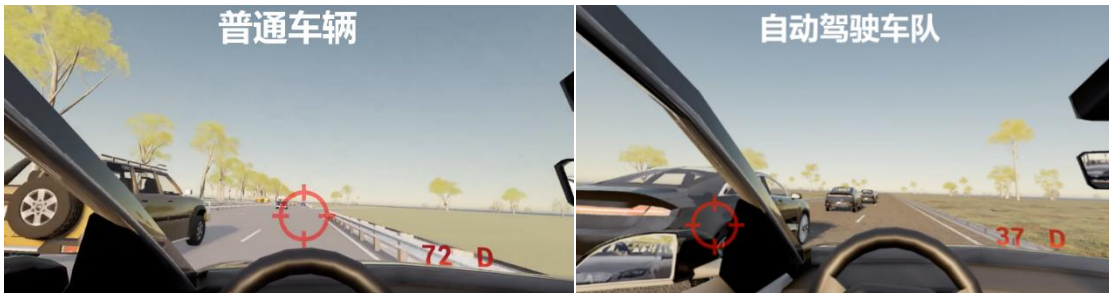

Figure 2

When encountering an Autonomous Driving Platoon in the left lane, you may wish to move into the left lane due to slow vehicles in your current lane or obstruction by the construction zone. You may choose according to your own preference:

1. Cut into the Autonomous Driving Platoon: They are capable of automatically reacting to your lane-changing behavior.

2. Do not cut into the Autonomous Driving Platoon: Change lanes either in front of or behind their queue.

Experimental Procedures and Norms:

1. Please confirm you have filled out the **"Demographic Questionnaire"** and the **"Baseline Adverse Reaction Questionnaire"**.

2. Before each experiment begins, staff will **introduce the driving environment, the required speed, and driving norms**. Please read and listen carefully.

3. The equipment you are using is the Logitech G923 series simulated steering wheel and pedals, which will provide a driving experience similar to a real car. You only need to **operate the steering wheel and throttle according to your usual driving habits**. Additionally, if you need to perform a **reverse operation** during the experiment, simply press the **Circle Button** on the steering wheel (as shown in the figure below) to switch to reverse mode.

Figure 3: Illustration of the Reverse Toggle Button

4. During the experiment, you need to wear VR glasses to enter the scene. Please **try to maintain the specified speed** (staff will inform you of the specific value). The maximum speed throughout must not exceed this speed by 20%, and **lane changing is not allowed in the first 5 seconds of the experiment**. If you encounter a collision, rollover, or wish to try again, please communicate with the staff at any time.

5. At the end of each 2-3 minute sub-experiment, you need to fill out a brief **"Lane Change Experience and Adverse Reaction Assessment Questionnaire"**.

6. After all experiments are completed, you also need to fill out the **"Driving Simulation Realism Evaluation Questionnaire"**.

Pre-experiment (Training) Details: The pre-experiment allows you to familiarize yourself with the surrounding diverse vehicles and understand how to take over a moving vehicle.

Pre-experiment 1 Introduction: The speed limit for this pre-experiment is **72 km/h**. You need to try to maintain this speed. If you need to change lanes or overtake, the maximum speed must not exceed this speed by 20%. Other vehicles in the scene **are ordinary vehicles that reproduce human driver habits**. After the staff starts the program, please **straighten the steering wheel and half-press the accelerator**. After the program loads, the **vehicle will have an initial speed of about 30 km/h**. You need to immediately take over and stabilize the vehicle. **Lane changing is not allowed in the first 5 seconds of the experiment.** Afterward, you need to try to **maintain the specified speed** and follow, change lanes, and overtake freely according to your wishes, but **you can change lanes at most once**. If you encounter a collision, rollover, or wish to try again, please communicate with the staff at any time.

Pre-experiment 2 Introduction: The speed limit for this pre-experiment is **72 km/h**. You need to maintain this speed. If you need to change lanes or overtake, the maximum speed must not exceed this speed by 20%. In the scene, **your left side will have both an autonomous driving fleet and ordinary vehicles**. After the staff starts the program, please **straighten the steering wheel and half-press the accelerator**. After the program loads, the **vehicle will have an initial speed of about 30 km/h**. You need to immediately take over and stabilize the vehicle. **Lane changing is not allowed in the first 5 seconds of the experiment.** Afterward, you need to try to **maintain the specified speed** and follow, change lanes, and overtake freely according to your wishes, but **you can change lanes at most once**. If you encounter a collision, rollover, or wish to try again, please communicate with the staff at any time.

Note: The autonomous driving fleet can react quickly to your driving behavior. You are free to interact with them, including following and changing lanes. They have a more compact formation. **If you want to change lanes, you can choose according to your own wishes:**

1. Cut into the autonomous driving fleet: They have the function of opening up vehicle spacing for you.

2. Do not cut into the autonomous driving fleet: Change lanes in front of or at the end of their team.