**PARTICIPANT INFORMATION SHEET**

**Exploring the impact of Competition and Cooperation on Performance and Engagement in VR Exergaming**

You are being invited to take part in a research project. Before you decide whether or not to take part, it is important for you to understand why the research is being undertaken and what it will involve. Please take time to read the following information carefully and discuss it with others, if you wish.

Thank you for reading this.

1. **What is the purpose of this research project?**

This research project aims to explore how different social dynamics in virtual reality (VR) cycling experiences affect user performance, engagement, and fitness outcomes. The study will investigate whether competitive scenarios or cooperative scenarios lead to better physical performance and higher engagement compared to a baseline cycling experience.

Additionally, the research will examine potential correlations between personality types and preferences for particular social dynamics, helping to determine if certain personality traits predispose individuals to perform better in competitive or cooperative fitness environments.

The project seeks to develop a VR cycling game that could make fitness activities more enjoyable and sustainable for users with varying fitness levels and motivational preferences. The findings will contribute to our understanding of how social interaction mechanics in VR exergaming can be optimised to enhance user experience and exercise adherence.

1. **Why have I been invited to take part?**

You have been invited to take part as we are seeking participants who are interested in trying VR cycling experiences. This study requires individuals across a wide range of fitness levels, from beginners to experiences athletes. No prior experience with VR or cycling is necessary to participate in this research.

1. **Do I have to take part?**

No, your participation in this research project is entirely voluntary and it is up to you to decide whether or not to take part. If you decide to take part, we will discuss the research project with you and ask you to sign a consent form. If you decide not to take part, you do not have to explain your reasons and it will not affect your legal rights/your medical care/your education/course progression.

You are free to withdraw your consent to participate in the research project at any time, without giving a reason. If you choose to withdraw your consent after you have signed the consent form and/or after you have participated, all data collected, whether it be via forms, or performance logging during the study, shall be deleted and not included in the research study.

1. **What will taking part involve?**

If you agree to take part, you will be asked to:

1. Complete a personality test before beginning the cycling activities.
2. Participate in three different VR cycling scenarios within a virtual velodrome environment.
   * A baseline scenario with no social elements.
   * A cooperative scenario where you work with AI teammates in a team pursuit.
   * A competitive scenario where you compete against AI opponents.
3. During each scenario, we will record performance metrics including your speed, cadence, heartrate, power, and completion time.
4. After completing each scenario, you will be asked to fill out feedback surveys about your experience, focusing on aspects such as motivation, enjoyment, and overall experience.

The study will be spaced across 3 visits, one for each scenario to ensure that you are well rested before your effort. Each visit should take no more than 45 minutes. It is important that you do not engage in any irregular cardiovascular exercise during the space of the study sessions to ensure that you are able to put your best performance forward without the risk of fatigue affecting results. This study will take place in room Abacws/2.63/VR Lab. All scenarios will feature identical visual environments but with different social interaction dynamics. Your participation will help us understand how these different gameplay structures affect exercise performance and engagement.

1. **Will I be paid for taking part?**

No, you will not be paid for taking part in this project. Any data/information/samples you give will be as a gift and you will not benefit financially now or in the future even if this project leads to the development of a new treatment/method/test/assessment.

1. **What are the possible benefits of taking part?**

While there are no direct benefits guaranteed from participating in this study, you may enjoy trying a novel VR cycling experience that combines fitness with immersive gaming elements. The study offers an opportunity to experience different types of VR exergaming scenarios that might be engaging and motivating compared to traditional exercise. You may gain insights into which type of social dynamics is more effective for your personal exercise motivation.

1. **What are the possible risks of taking part?**

The risks associated with participating in this study are minimal, but include:

1. Physical discomfort: As with any exercise activity, you will experience some physical exertion during the VR cycling scenarios. If you have any pre-existing health conditions that might be affected by exercise, please inform us before participating.
2. VR-related discomfort: Some people may experience motion sickness, dizziness, eye strain, or headaches when using VR headsets. These Symptoms are typically mild and temporary. You can stop the session at any time if you experience any VR-related discomfort.
3. **Will my taking part in this research project be kept confidential?**

All information collected from (or about) you during the research project will be kept confidential. Your data will be anonymised, meaning your personal information will be separated from your performance data and survey responses. Performance metrics and feedback will be stored securely and will not be linked to your identity in any publications resulting from this research. Any personal information you provide will be managed in accordance with data protection legislation. Please see ‘What will happen to my Personal Data?’ (below) for further information.

1. **What will happen to my Personal Data?**

By participating in this project, you will be providing us with some Personal Data, including your name, contact details, performance metrics (speed, cadence, heartrate, power, time), personality test results, and feedback on the VR cycling scenarios. This information will be used to analyse the relationship between social dynamics in VR exergaming and performance/engagement outcomes. All data used in the analysis and any publications will be anonymised, meaning that you will not be identifiable in any research outputs.

Cardiff University is the Data Controller for this project and is committed to respecting and protecting your Personal Data in accordance with your expectations and Data Protection legislation. Further information about Data Protection, including:

* your rights
* the University’s Data Protection Policy and broad data management principles; and
* how to contact the University’s Data Protection Officer and/or the Information Commissioner’s Office

can be found at <https://www.cardiff.ac.uk/public-information/policies-and-procedures/data-protection>. The University’s overarching Data Protection Notice for research participants is available at <https://www.cardiff.ac.uk/public-information/policies-and-procedures/data-protection/research-participants-data-protection-notice>. If you do not have access to the internet and/or otherwise require this information in another format, please let us know.

In accordance with Data Protection legislation, we are required to inform you of our lawful basis for collecting and processing your Personal Data. The lawful basis we are relying on as part of the research project is article 6(1)(e) of the UK GDPR, namely that the processing of your Personal Data is necessary for the performance of our public task.

This project also involves the collection and processing of some sensitive (‘special category’) data, namely health-related information such as heart rate measurements. Our condition for processing your special category data is article 9(2)(j), namely that this is necessary for archiving purposes in the public interest, scientific or statistical purposes.

After completion of the project, the research team will de-identify the Personal Data it has collected from, or about, you in connection with this research project, with the exception of your consent form. Your consent form will be retained securely for the duration of the project and may be accessed by members of the research team and, where necessary, by members of the University’s governance and audit teams or by regulatory authorities.

As referenced in Section 3 above. If you choose to withdraw from this project, all personal and performance data will be deleted and will not be included in the research study results.

1. **What happens to the data and results at the end of the research project?**

All de-identified data and information will be kept for a minimum of the duration of the research project but may be published in support of the research project and/or retained indefinitely, where it is likely to have continuing value for research purposes.

The data collected will include your performance metrics (speed, cadence, heart rate, time), personality test results, and feedback on the VR cycling scenarios. This data will be analysed to determine the impact of different social dynamics (competitive vs. cooperative) on exercise performance and engagement, and to investigate possible correlations with personality types.

The data and results of this project will be used as part of my dissertation/write-up and available to specific members of teaching staff within Cardiff University and examiners. The data and results may also be published in academic journals or presented at conferences in the future.

Participants will not be identified in any write-up, report, publication or presentation arising from this project. If verbatim quotes from your feedback surveys are used in the dissertation or any publications, these will be completely anonymised to ensure your identity is protected.

If you are interested in receiving a summary of the research findings once the project is complete, please indicate this on your consent form and provide an email address where the summary can be sent.

1. **What if there is a problem?**

If you have any concerns about how you have been approached or treated during this research or if you otherwise wish to make a complaint, please contact George Lynch, LynchG8@cardiff.ac.uk in the first instance. If your concern or complaint is not managed to your satisfaction, please contact SREC, [comsc-ethics@cardiff.ac.uk](mailto:comsc-ethics@cardiff.ac.uk).

If you are harmed by taking part in this research project, there are no special compensation arrangements. If you are harmed due to someone's negligence, you may have grounds for legal action, but you may have to pay for it.

1. **Who is leading and funding this research project?**

The research is being led by George Lynch ([LynchG8@cardiff.ac.uk](mailto:LynchG8@cardiff.ac.uk)), Dr Soumya Barathi ([BarathiS@cardiff.ac.uk](mailto:BarathiS@cardiff.ac.uk)) in Cardiff University.

Cardiff University is committed to protecting the safety, rights and dignity of research participants and insists that all research conducted by its staff and students is underpinned by the highest ethical standards. Further information about Research Ethics and Research Integrity (good research practice) at Cardiff University can be found at <https://www.cardiff.ac.uk/research/our-research-environment/integrity-and-ethics>.

1. **Who has reviewed this research project?**

This research project has been reviewed by the School of Computer Science and Informatics School Research Ethics Committee (SREC) and has been granted a favourable ethical opinion.

1. **Further information and contact details**

Should you have any questions relating to this research project, you may contact us using the details below:

George Lynch

[LynchG8@cardiff.ac.uk](mailto:LynchG8@cardiff.ac.uk)

**Thank you for considering taking part in this research project. If you decide to participate, you will be given a copy of the Participant Information Sheet and a signed consent form to keep for your records.**