Yuhao Sun[1,2], John Vines[2], & Albert Tenesa[1,3]

[1] The Roslin Institute, The University of Edinburgh, UK
[2] The Institute for Design Informatics, The University of Edinburgh, UK
[3] MRC Human Genetics Unit, The University of Edinburgh, UK

{yuhao.sun, john.vines, albert.tenesa}@ed.ac.uk

Understanding The Public Attitude to Polygenic Risk Scores

Abstract

- **Polygenic Risk Score (PRS)** indicates an individual's relative risk of developing a certain disease by comparing huge amounts of genotypes from cohorts with and without the condition.
- Currently, due to the lack of adequate official practice guidelines, PRS is **not regarded as a standard technique** in healthcare organisations. Alternatively, general cohorts can upload the genotype to **a third-party portal or software** developed specifically for PRS analysis and receive PRS reports.
- **Not everyone** is willing to seek out a PRS analysis. Some people are unaware of PRS analysis's existence, and some opt not to do it, subjectively.
- Our research will strive to ascertain the reasons behind these individuals' reluctance to seek additional PRS analysis.

Objectives

The research aims to find out the reasons why some people do **not** seek out the analysis of PRS after they have received the Direct-to-Consumer Genetic Testing (DTC-GT) reports. Three main parts to cover during the whole PhD lifetime:

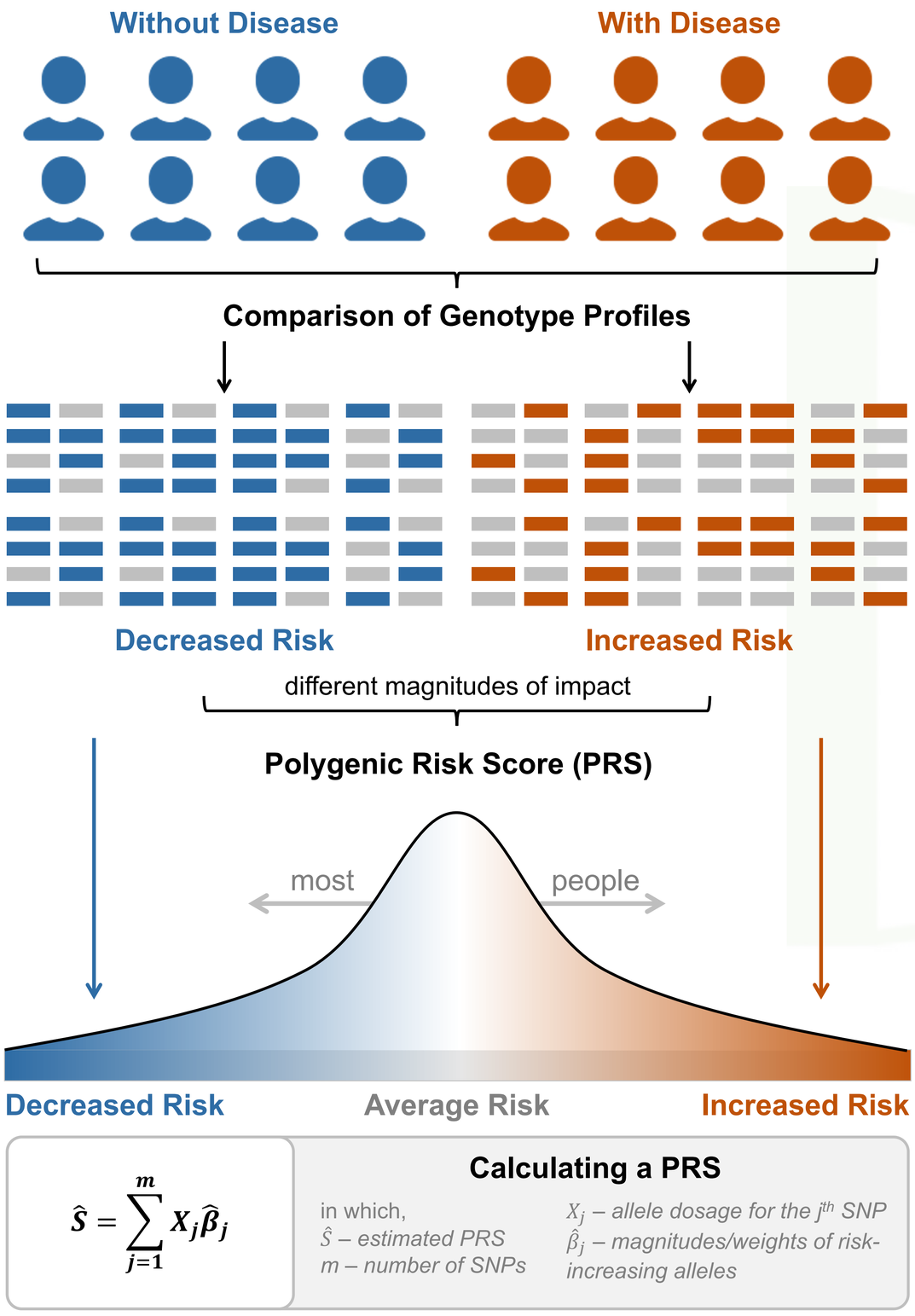
Phase 1
Recruitment
→ looking for eligible participants by filling in a pre-research questionnaire
→ communicating science about PRS

Phase 2
Data Collection & Analysis
collecting participants' demographics, motivations to not seek out PRS, understanding & interpretation of PRS, and their reactions

Phase 3
Landing & Targeting
→ improving the system of PRS theoretically or computationally
→ aiding in the translation of PRS from theory to clinical application
→ integrating the enhanced PRS structure into a specific disease model

Introduction

What is Polygenic Risk Score (PRS)?



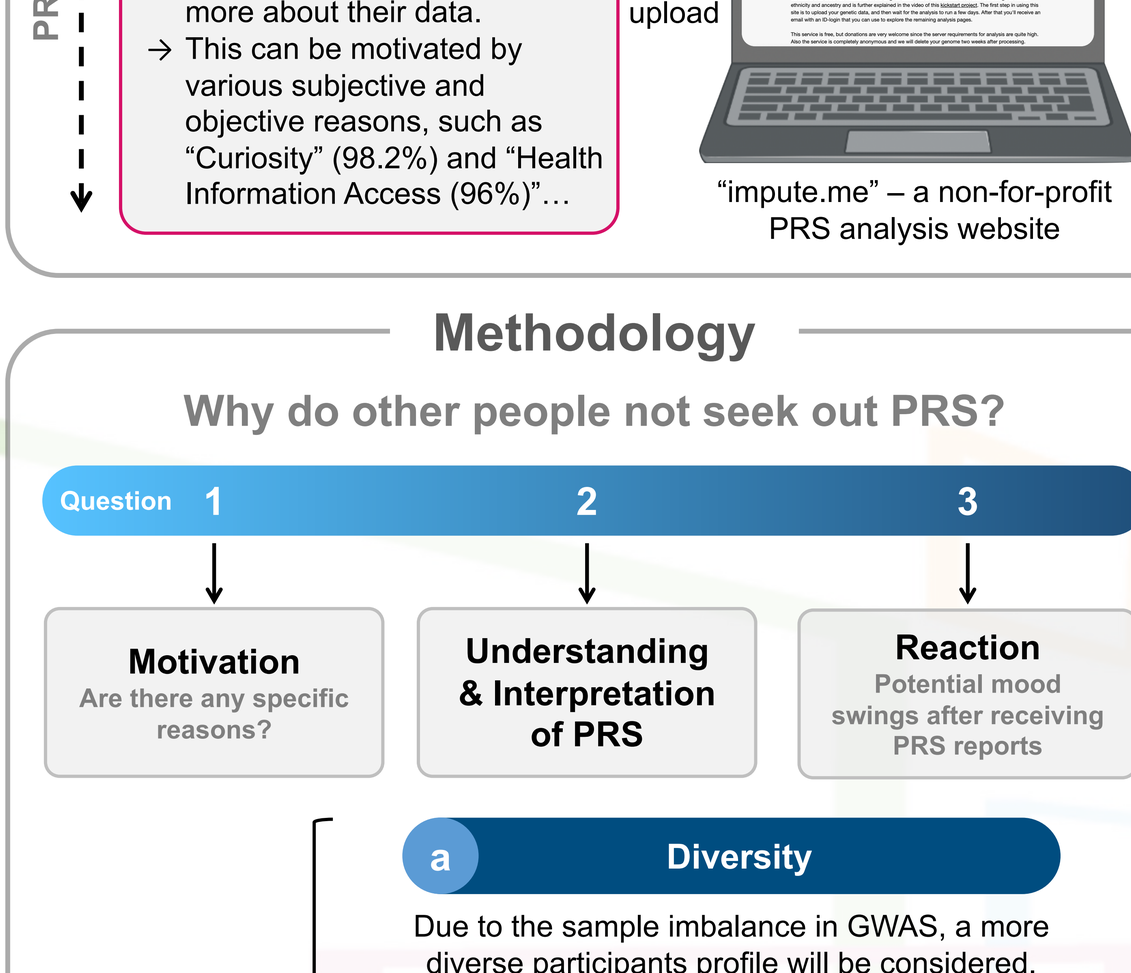
Calculating a PRS

$$\hat{S} = \sum_{j=1}^{m} X_j \hat{\beta}_j$$

in which,
$\hat{S}$ – *estimated PRS*
m – *number of SNPs*
X_j – *allele dosage for the j^{th} SNP*
$\hat{\beta}_j$ – *magnitudes/weights of risk-increasing alleles*

Background

How can we access PRS?



Motivation
→ With their genotype profiles, people can choose to know more about their data.
→ This can be motivated by various subjective and objective reasons, such as "Curiosity" (98.2%) and "Health Information Access (96%)"…

Methodology

Why do other people not seek out PRS?

Question 1 → **Motivation**
Are there any specific reasons?

Question 2 → **Understanding & Interpretation of PRS**

Question 3 → **Reaction**
Potential mood swings after receiving PRS reports

Research Features

a Diversity
Due to the sample imbalance in GWAS, a more diverse participants profile will be considered.

b Multi-morbidity
People suffering from multi-morbidity may have a lower socio-economy status.

c Inconsistent Opinions
Participants may change their interests in PRS during the research process.

Our results may…

- evaluate **the potential** of adopting PRS in the general cohort
- assist **the translation** from theory to clinical area, including drafting the official guidance for practitioners
- improve **the system** of PRS, conceptually or computationally

Research Page
riskscore.github.io

Reference: Peck, L., Borle, K., Folkersen, L., & Austin, J. (2022). Why do people seek out polygenic risk scores for complex disorders, and how do they understand and react to results?. *European Journal of Human Genetics*, *30*(1), 81-87.

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