

The influence of COVID-19 risk perceptions and vaccination status on the number of social contacts across Europe: insights from the CoMix study

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Introduction

Human behaviour is crucial for the transmission dynamics of infectious diseases. Following the emergence of COVID-19 pandemic, global efforts to curb the spread of the disease focused on implementing both Non-Pharmaceutical Interventions (NPIs, e.g. lockdowns) and Pharmaceutical Interventions (e.g. vaccination). Since NPIs mainly encompass social distancing measures, adherence to these measures could be modulated by attitudinal determinants. Furthermore, COVID-19 vaccination could play an integral role in altering social contact behaviour.

In this work, we explore the **relation between risk perception, vaccination status and social contact behaviour**.

Data and Methods

Data

- **Social contact data:** We used data from the CoMix study [1], an online multi-country longitudinal social and behavioural contact survey conducted during the pandemic.
- **Countries:** Austria, Croatia, Denmark, Estonia, Finland, France, Greece, Hungary, Italy, Lithuania, Poland, Portugal, Slovakia, Slovenia, Spain & Switzerland.
- **Survey period:** December 2020 - September 2021.
- **Stringency data:** Oxford COVID-19 Government Response Tracker [2].

Risk perceptions

Perceived severity → "Coronavirus would be a serious illness for me"

Perceived susceptibility → "I am likely to catch coronavirus"

Perceived risk to vulnerable → "I am worried that I might spread coronavirus to someone who is vulnerable"

Statistical methodology

We modelled the number of contacts for each participant using:

- Multilevel Generalized Linear Mixed effects Model (GLMM).
- Negative binomial distribution allowing for overdispersion.
- Zero-inflation to account for the excess of zeroes.

Results

- 29,292 participants completed 111,103 surveys.
- Vaccinated participants made on average 1.31 (95% CI 1.23 – 1.39) times more contacts than the non-vaccinated (Figure 1).
- Participants with low and neutral levels of perceived severity reported 1.25 (95% CI 1.13 – 1.39) and 1.10 (95% CI 1.00 – 1.21) times more contacts than participants with high levels of perceived severity, respectively.
- Inter-country differential impact of vaccination and perceived severity on social contact behaviour (Figure 2 & Figure 3).

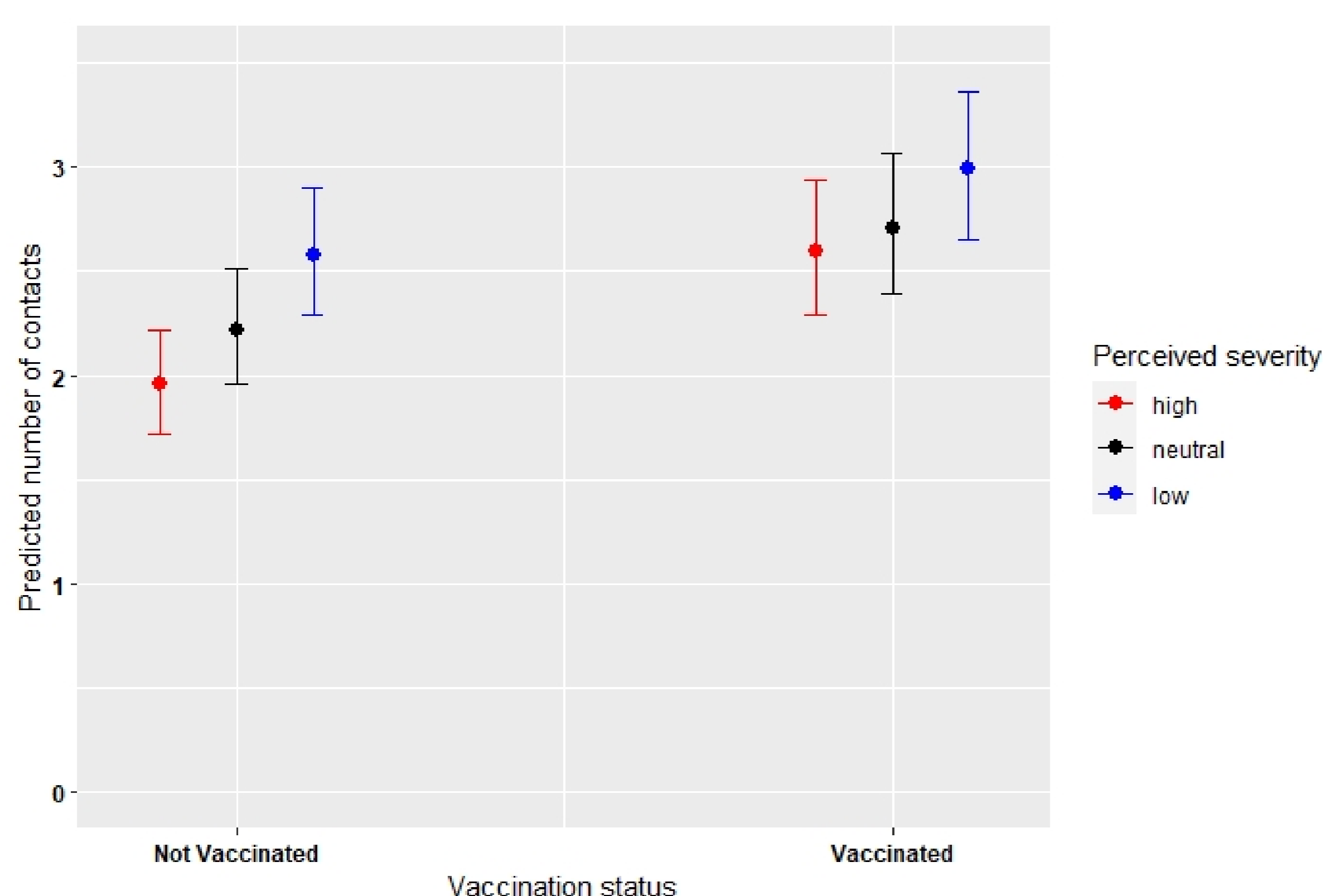


Figure 1: Predicted number of contacts from the marginal effects of interaction between perceived severity and vaccination status with 95% confidence interval (CI).

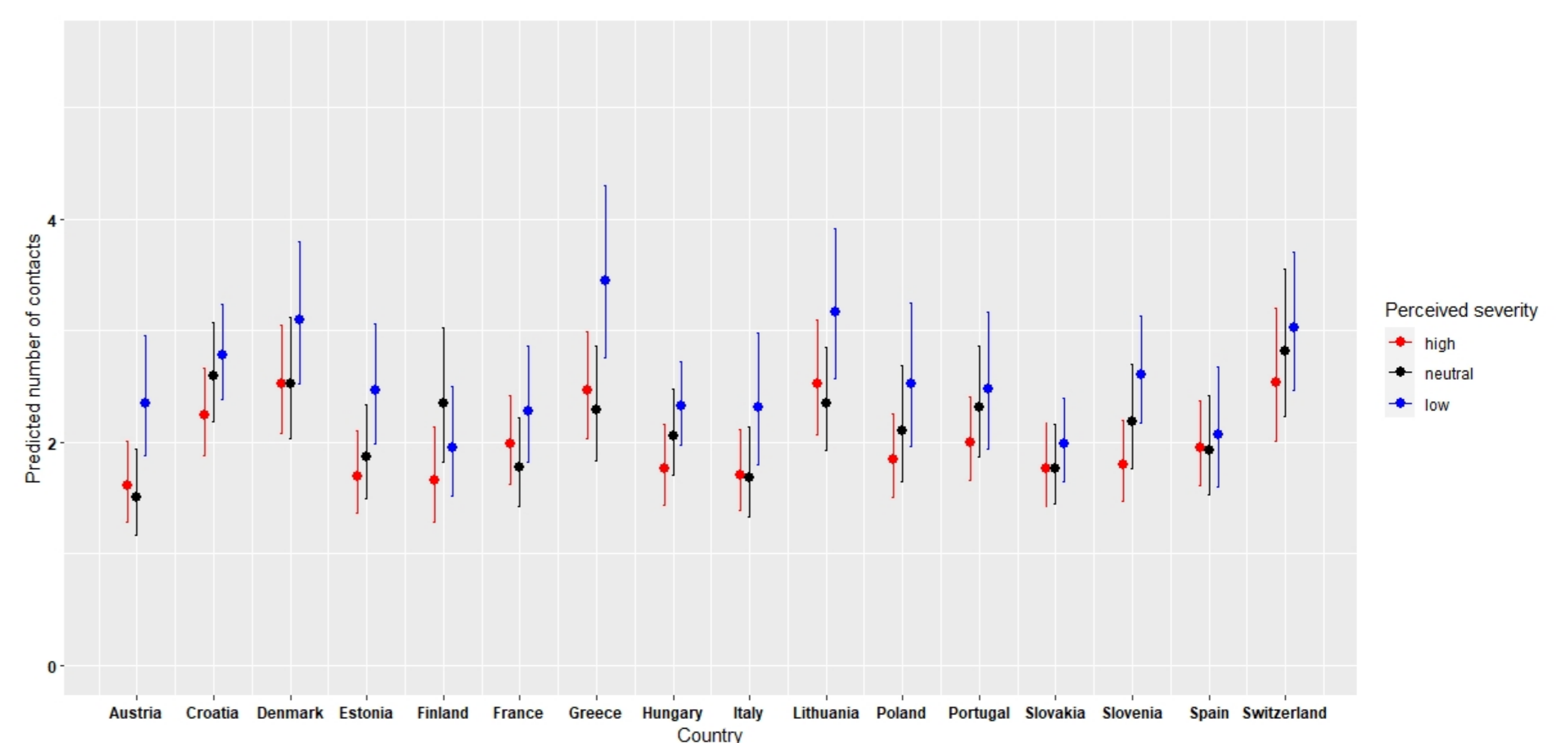


Figure 2: Predicted number of contacts from the marginal effects of interaction between perceived severity and country with 95% CI.

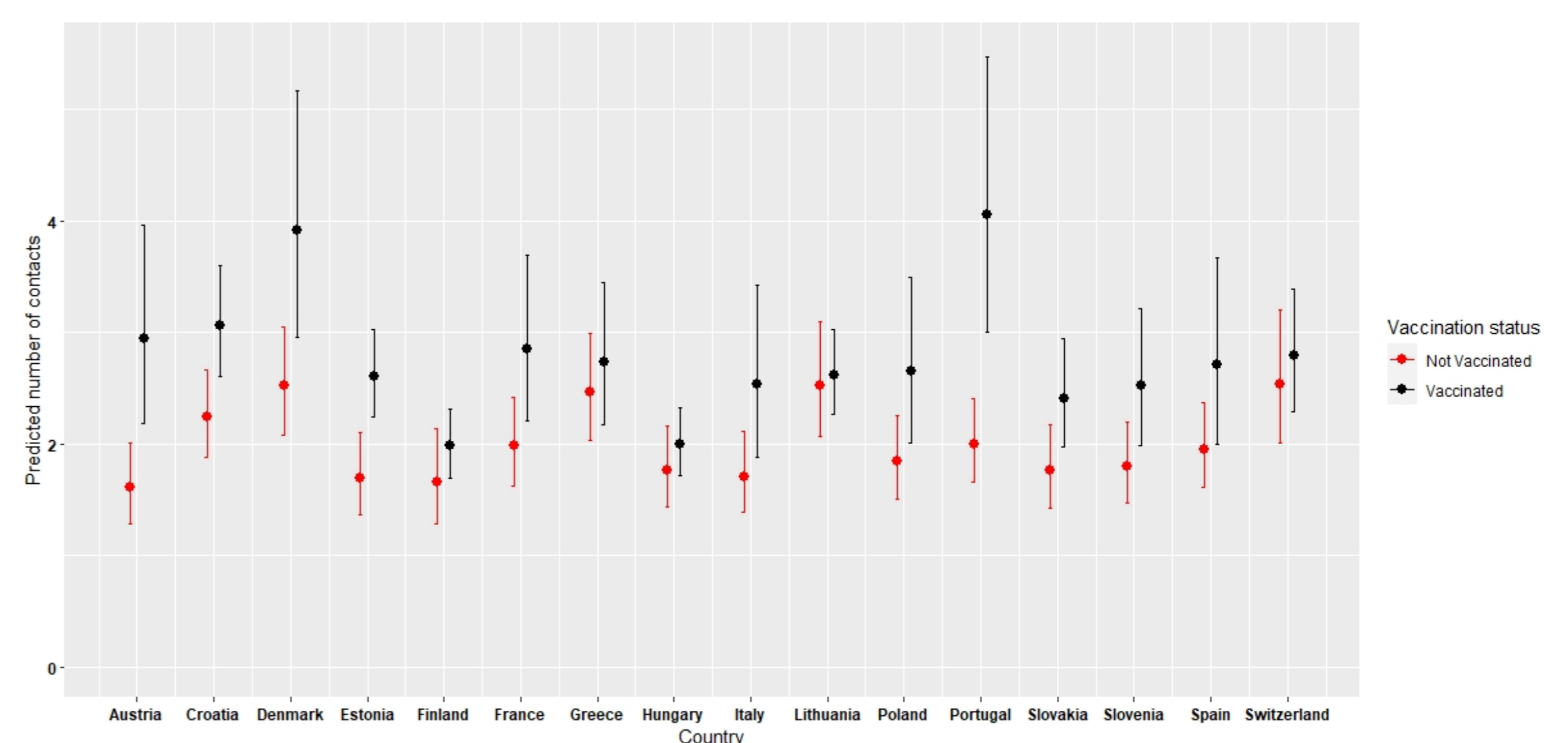


Figure 3: Predicted number of contacts from the marginal effects of interaction between vaccination status and country with 95% CI.

Summary

- Vaccination against COVID-19 increased the number of social contacts.
- Perceived severity played a significant role in social contact behaviour.
- Strong country-specific effects of perceived severity and vaccination status on the number of social contacts.
- Future mathematical models should incorporate behavioural changes due to the interplay between vaccination and contact behaviour.

Acknowledgments

This project has received funding from the European Union's Horizon 2020 research and innovation programme - project EpiPose (Grant agreement number 101003688). This work reflects only the authors' view. The European Commission is not responsible for any use that may be made of the information it contains. The work also received funding from the European Centre for Disease Prevention and Control (ECDC - contract "Analysis of European social contact data in the COVID-19 era -REOP/2020/SMS/12257").

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