European Population Conference 2024
12-15 June, 2024, Edinburgh Scotland, UK

The role of family influence in shaping individuals' vaccine attitude

Keywords: Family, Vaccines, Vaccine hesitancy, Intergenerational transmission

Background & aim of the study

Social influence is a fundamental driver of behaviour change and norms' acceptance [1]. The process of socialization within families constitutes a specific example of social influence, due to its fundamental importance in shaping children's beliefs [2]. The existence of an intergenerational transfer of values is demonstrated by the consistent similarity in attitudes between parents and their offspring; scholars have found intergenerational concordance for habits such as smoking behaviour [3], and values such as gender norms [4] and political leaning [5]. The level of success in parental socialization varies across different domains, and strongest parent-child agreement has been found for issues rooted in family culture and identity, with respect to more concrete matters [6]. Additionally, siblings' example has a significant impact on individuals' behaviours [7]. When entering late adolescence and young adulthood, children start to exert an influence on their parents as well. In the same developmental phase, they begin to emancipate from the domestic sphere, and to be increasingly exposed to other socialization agents (e.g., peers, media) [8], that might drift their opinions from those of their family. While the family of origin may no longer constitute an exclusive cultural reference at later life stages, the similarity in viewpoints among family members endures into adulthood[6].

Despite the recognised successes of vaccination campaigns in the past, today increasing portions of the world's population are sceptical about the usefulness and safety of vaccines [9]. The phenomenon of delayed acceptance or complete refusal of vaccination, known as *vaccine hesitancy*, has further raised concerns following the outbreak of the COVID-19 pandemic, reaffirming the relevance of the topic for public health. The decision to accept a vaccine is driven by numerous interrelated factors and considerations, involving individuals' subjective norms, moral, political and religious values [10]. Importantly, social influence is proven to be an important determinant of vaccine acceptance in different settings [11]. Indeed, as the decision to take up a vaccine is considered as risky and costly by some individuals, perceiving that trusted peers support this choice is fundamental for acceptance [12].

Despite the proven impact of family members on individual beliefs, few efforts to date have been directed to disentangle the within-family dynamic of opinion formation about vaccination. The aim of my research is to fill this gap, in order to get a better understanding of the mechanisms that play out within the complex social system of the family in relation to health-related decisions.

Research questions

To my knowledge, only one study to date has focused on the within-family influences on the uptake of the health-protective norms emerged due to the COVID-19 pandemic, specifically

focusing on the social-distancing measures [11]. Building on this work, the objective of my research is to disentangle the within-family influences with respect to the COVID-19 vaccination decision. Based on the relevant literature, my research questions are:

- Does parents' vaccination intention influence children's vaccination intention? Does children's vaccination intention influence that of their parents?
- Do siblings influence each others' vaccination intentions?
- Are individuals who have a larger outside-family social network influenced less strongly by their family members' opinions about vaccination than those who have less outside-family contacts?

Data & methods

To answer my research questions, I have identified data from the UK Household Longitudinal Study (UKHLS). From November 2020 to September 2021, members of the study cohort were asked to periodically answer a short questionnaire concerning their attitudes related to the COVID-19 pandemic. Members of the same households and familial ties can be identified thanks to the information provided in the main UKHLS.

In the last four waves of the UKHLS COVID-19 questionnaire (November 2020, January 2021, March 2021, September 2021), respondents were asked about their COVID-19 vaccination status and their vaccination intention. These questions combined constitute the outcome of my study.

For the statistical analysis, I aim to use Structural Equation Modelling (SEM) to disentangle the within-family influences on the COVID-19 vaccination decision trough the different time points, as in Aksoy 2022[11]. Indeed, SEM is a convenient tool to test simultaneous regression equations including hypothesizes moderators, as in the case of my analysis [13]. To avoid confounding effects of potential omitted variables, household fixed effects will be added to the model as latent variables. The same SEM model would be tested including the size of the children's outside-family network as moderator. Additionally, I plan to test the moderating effect of children's age, to investigate how the impact of family members varies across different life stages.

Preliminary descriptive results

Unique respondents answering in all the last four wave of the UKHLS COVID-19, and in the main UKHLS 2019 (latest released wave before the pandemic outbreak) are 8831. In the November 2020 COVID-19 survey wave, participants were asked how likely they would have been to accept a COVID-19 vaccine if available (1 = very likely, ..., 4 = very unlikely). In the subsequent waves (January 2021, March 2021, September 2021), respondents were first asked about their COVID-19 vaccination status. Those who were not yet vaccinated were then again asked about their likelihood to take up the vaccine, as in the November 2020 survey wave. Combining this information, I build a measure of vaccine hesitancy going from 1 (= already had the vaccine) to 6 (= not vaccinated, and very unlikely to get the vaccine). As shown in

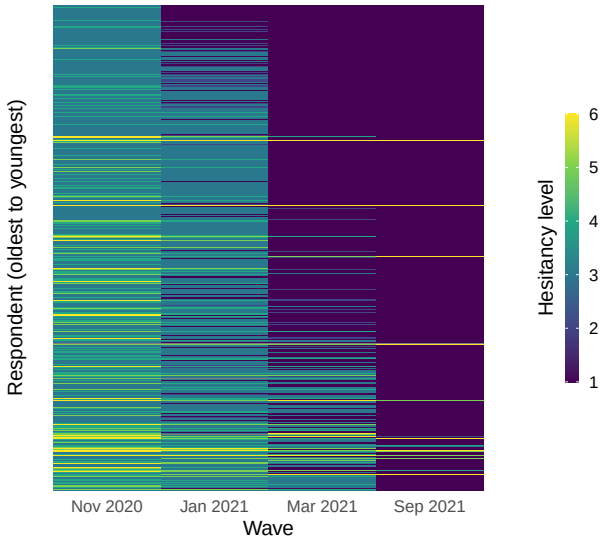

Figure 1: Heatmap of vaccine hesitancy level in the UKHLS COVID-19 sample.

Figure 1, the majority of respondents in September 2021 had received their vaccine. As expected, a clear age pattern emerges from the heatmap: older respondents (top of the plot) are the first receiving the vaccine; the level of vaccine uptake increases for the youngest in March and September 2021.

A clearer interpretation of the data comes from Figure 2; the barplots show how vaccine hesitant respondents in November 2020 (i.e., those unlikely or very unlikely to get vaccinated) acted in the subsequent periods (left panel) versus how respondents keen to get vaccinated in November 2020 (i.e., likely or very likely to get vaccinated) acted (right panel). Evidently, the majority of hesitant individuals change their behaviour with respect to what initially stated.

Based on the *household identifiers*, the sample of respondents in the four UKHLS COVID-19 surveys includes 2125 households with more than one member. Among those, 794 households have members with different initial (November 2020) likelihood to take up the COVID-19 vaccine.

Discussion & future work

As revealed by the preliminary descriptive analysis of the dataset, the majority of participants received the vaccine during the four waves of data collection in the UKHLS COVID-19 study, even if initially reluctant. Most respondents likely adjusted their behaviors in response to the enforcement measures (e.g., vaccine mandates) in place during the pandemic [14]. However, the influence of the family circle might have facilitated or expedited the decision to accept the vaccine (or vice versa, in the case of non-vaccinated respondents).

Before proceeding with the statistical analysis, I plan to conduct a more in-depth exploration of the information collected in the survey. Specifically, I intend to enrich the hesitancy measure by including data from the questions about the reasons for both vaccine uptake and non-uptake. Additionally, while the current analysis is based on observations present in all four waves of data collection, I plan to include all respondents for whom information is available

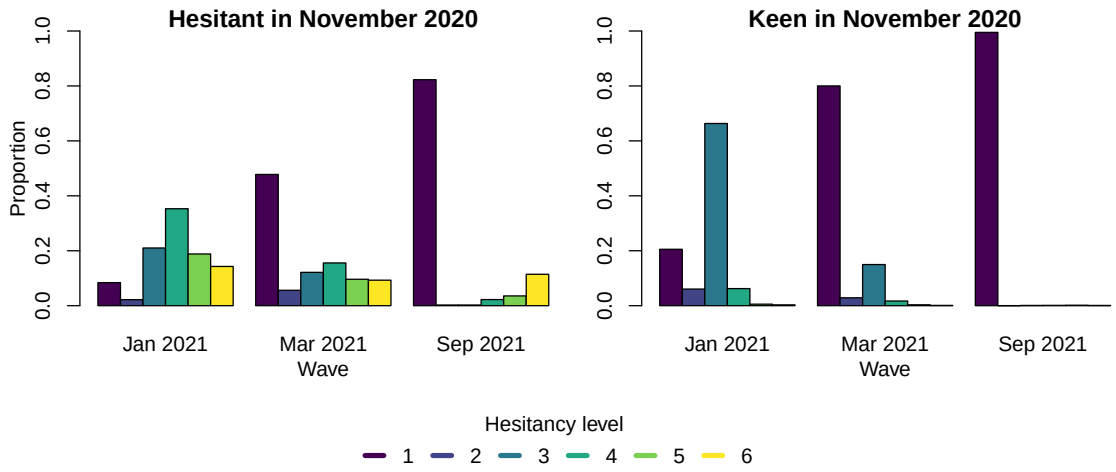

Figure 2: Side-by-side barplots of proportion of respondents in each hesitancy level class by survey wave. Left panel: Vaccine hesitant respondents in November 2020. Right panel: Respondents keen to take up the vaccine in November 2020.

at ≥ 2 points in time. Furthermore, the inclusion of data from other household-level COVID-19 surveys conducted in the UK during the same period, such as the COVID-19 longitudinal survey administered to Millennium Cohort Study participants [15], may further increase the number of available observations, following the necessary harmonization process.

The results of my study aim to contribute to the investigation of how family influences individuals' decisions, behaviors, and opinions, particularly in matters related to public health. The policy implications are wide and relevant. For instance, if adolescent and young adult children's vaccination decisions are strongly influenced by their parents, future vaccination campaigns should target undecided parents rather than adolescents themselves.

Timely and extensive data collections like those conducted by UKHLS during the pandemic hold the potential to help answer such questions, and guide policy making in the future. However, the data collected remains under-explored and warrants further investigation.

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