Kicking against the pricks: vaccine sceptics have a different social orientation

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Background: In any country, part of the population is sceptical about the utility of vaccination. To develop successful vaccination programmes, it is important to study and understand the defining characteristics of vaccine sceptics. Research till now mainly focused either on the underlying motives of vaccine refusal, or on socio-demographic differences between vaccine sceptics and non-sceptics. It remained till now unexplored whether both groups differ in terms of basic psychological dispositions. Methods: We held a population survey in a representative sample of the population in Flanders, Belgium (N = 1050), in which we investigated whether respondents’ attitude to vaccination was associated with their basic disposition toward other community members or society in general, as measured by the Triandis and Gelfand social orientation scale. Results: We found that sceptics and non-sceptics have a different social orientation, even when several variables are controlled for. More specifically, vaccine sceptics scored significantly lower on both horizontal individualism and horizontal collectivism, indicating a lower disposition to see others as equals. Conclusion: These findings need confirmation in the context of different countries. Such insights can be valuable to optimize the design of effective communication strategies on vaccination programmes.

Introduction

A central mission of public health policy is to ensure sufficiently high vaccination coverage in the population.\textsuperscript{1,2} Two goals motivate this objective.\textsuperscript{3} First, to maximally prevent infections from occurring: either directly in those being vaccinated or indirectly in unprotected individuals through herd immunity (which is a consequence of reduced circulation of pathogens in a largely vaccinated population).\textsuperscript{4} Second, to eradicate pathogens, as was the case for smallpox, and is the intention for polio through continued high coverage polio vaccination around the world.\textsuperscript{5}

Several countries, however, experience difficulties in reaching optimal participation in vaccination programmes because increasing numbers of individuals hesitate or refuse to become vaccinated.\textsuperscript{6–8} Often precipitated by misinformation spread by anti-vaccination lobbies. Therefore, an essential policy challenge consists of establishing an effective dialogue between scientists, policy makers and the public at large, with the aim to sustain public trust in public health policies and to convey the need for continued vaccination efforts.\textsuperscript{9–14} Such a strategy requires a thoroughgoing understanding of who refuses vaccination, and for which reasons.\textsuperscript{12,13}

Research so far has placed opposition to vaccination in four general motivational categories.\textsuperscript{15–21} (I) General distrust of vaccination: those who are not convinced by the ratio of risks vs. benefits of vaccines because of a lack of confidence in science, the pharmaceutical industry or public policy. (II) Free rider motives: those who trust vaccination but who consider it an unnecessary intervention for themselves as long as enough others choose to become vaccinated. (III) Cognitive biases: omission bias (the tendency to consider a similar risk worse when it results from action rather than from omission) or hyperbolic discounting (undervaluing the benefits of future disease protection as compared with the present in which adverse effects may occur). (IV) Fundamental objections: those who hold religious or philosophical worldviews that are irreconcilable with vaccination. Socio-demographic factors have also been shown to differ between vaccine refusers and non-refusers, including household income,\textsuperscript{22–24} level of education,\textsuperscript{23–26} marital status,\textsuperscript{6} race\textsuperscript{15} and family size,\textsuperscript{24} with refusal often being more prevalent in relatively higher educated, wealthier groups.\textsuperscript{6,26}

To our knowledge, little is known about the more general cognitive profile of vaccine sceptics. Nonetheless, such information could be essential for the design of social marketing strategies for vaccines.\textsuperscript{12} As vaccination is—at least partly—a matter of being solidaristic with others or not, we hypothesized that differences in social orientation, i.e. in one’s basic attitude toward other community members and society in general, may translate into a different valuation of vaccines.

Singelis \textit{et al.}\textsuperscript{27} and Triandis \textit{et al.}\textsuperscript{28} developed an influential framework to study social orientation. This framework distinguishes two basic relational dimensions: a collectivism/individualism axis that reflects someone’s sense of social cohesion and his/her willingness to prioritize common goals over personal ones, and a horizontal/vertical axis that indicates to what degree an individual expects equality or accepts inequality in social relationships.\textsuperscript{26,28} This generates the 4-way typology horizontal and vertical individualism and collectivism (HI, VI, HC and VC) represented in figure 1.

Typically, an HI orientation promotes individuality and autonomy on a basis of equality in interpersonal interaction. A VI orientation encourages personal achievement through competitions,
in which others are predominantly seen as competitors in a hierarchy. An HC orientation emphasizes interdependency, cooperation with others and communal sharing, on a basis of equality. Finally, VC is an orientation that also promotes subordination of personal under group goals while differences in social status and hierarchy are acknowledged. In this article, we report on a survey in which we explored whether vaccine sceptics are different from non-sceptics in terms of these four dimensions of social orientation.

2. Methods

Sample selection

Between March and July 2011, 3740 people were contacted by professional telephone operators using random digit dialing of fixed and mobile telephone numbers (during weekdays from 10 am to 9 pm, on Saturdays from 11 am to 7 pm). Every number was called once, except when respondents asked to call back at a more convenient time. Contacted persons were greeted and asked if they were willing to participate in a scientific survey concerning health policy (without knowing that the subject was vaccination). The 1540 respondents willing to cooperate (41% of those contacted) were consequently asked for their age, gender, educational attainment and location over the five Flemish provinces and were selected when they fulfilled the predetermined quota for these criteria. Consequently, participants were asked whether they wanted to receive the survey either on paper or through an Internet-link, and whether they wanted to return their responses by post (using a prepaid envelope) or online. The sample size of this survey was determined in function of the initial purpose of the survey (a study published elsewhere).

The survey

In our survey, we presented the Triandis and Gelfand scale to determine an individual's position on the four dimensions of social orientation. It consists of 16 value judgements on which every respondent is asked to express his/her agreement on a 5-point Likert scale ranging from 'strongly disagree' to 'strongly agree' (figure 2). All four types of social orientation are characterized by four statements a priori designated to reflect one specific type. For example, 'Winning is everything' is held to be a typical VI statement, whereas 'I feel good when I cooperate with others' is held to be typically HC. For every respondent, a score is obtained for all four dimensions (HI, VI, HC and VC) through calculating the average score attributed to the statements belonging to that dimension. The scale has proven to be a valid instrument to indicate how individuals see themselves in relation to other individuals and society as a whole and has been used and validated in numerous studies (for reviews see). As the original scale was in English and the respondents are native Dutch (Flemish) speakers, translation and back-translation were conducted to ensure that all items contained equivalent meaning to the original.

To determine the respondents’ general attitude toward vaccination, we asked them to indicate their agreement with the following statement on a 5-point Likert range from 'strongly disagree' to 'strongly agree' (Table 2):

- If a vaccine exists for a certain disease, then vaccination is usually a good way to protect someone against this disease.

In addition, we asked for respondents' age, sex, level of education, profession, ethnic origin of mother and father, family size, age of family members, experience as health care worker, height, weight, smoking status (smoker/non-smoker), experience with travel vaccination, experience with severe illness (personal or within the family) and province, and subjected them to the EQ-5D-3L health survey, including the Visual Analogue Scale. The EQ-5D-3L is a standardized health measurement questionnaire consisting of five health dimensions (mobility, self-care, usual activities, pain/discomfort and anxiety/depression). Respondents can indicate their position on each dimension according to three levels. It allows valuing a patient’s present health state in a single score. The Visual Analogue Scale is a rating scale on which respondents can indicate their current health state, ranging from 0, the worst imaginable health state, to 100, the best imaginable health state.

Analysis

For the statistical analysis, we used SAS and SPSS. We conducted a confirmatory factor analysis of the 16 items of the scale and found the original 4-factor structure replicated. In our sample, all items, except two (VC13 and VC16), highly loaded on the intended dimension. Therefore, in line with the methodology followed in other studies, we excluded these two items from the main analysis. The response measuring respondents’ attitude toward vaccination was dichotomized, giving 0 to those who indicated ‘Agree’ and ‘strongly Agree’ (a positive attitude toward vaccination) and 1 otherwise (a non-positive attitude). First, a univariate regression was performed between every variable in the data set and attitude toward vaccination. Then, a logistic regression model was built through forward and backward stepwise selection of all covariates to determine for the 1050 respondents, which variables were significantly associated with attitude to vaccination. The sensitivity of the results was explored by repeating the analyses using different categorizations of the dependent variable, and inclusion of the two previously excluded statements from the scale. Additionally, a mean response model was used to evaluate the impact on the results when the response is treated as continuous (i.e. without dichotomizing the dependent variable).

Results

We reached a sample of 1050 respondents (Table 1), considered representative for the population in Flanders (6 208 877 inhabitants,
about 60% of Belgium). Forty-one percent of the 3740 contacted persons (1540 individuals) consented to participate. Sixty-eight percent of these 1540 candidates were effectively recruited, i.e. 28% of those who were initially contacted. Fifty-one percent of the sample was female, 50% received higher education (university or non-university degree) and the mean age was 43 years.

Five percent of the respondents stated explicitly to be against vaccination, 15% stated to be neutral and 80% considered vaccination a good way to prevent disease (Table 2). The multiple regression results indicated that individuals who indicated a sceptical (i.e. a non-positive) attitude scored significantly lower on the dimensions HC and HI and were less likely to smoke. Per unit increase in their score on HI and HC, respondents had a 28 and 25% lower odds of being vaccine-sceptic, respectively. The odds of non-smokers being vaccine-sceptic were 40% bigger than those of smokers. None of the other variables, including educational attainment, age, current health state, profession or experience with severe illness, had a significant predictive value in the model. On a univariate level, ‘vertical collectivism’ was the only additional variable with a significant (negative) association. This was no longer significant in the multiple regression model, in which we adjusted for the influence of other variables. The results using the mean response model confirmed a positive association between a more equally oriented profile and a more positive attitude toward vaccination. Furthermore, a second logistic regression model was fitted after reclassifying the neutral responses. However, moving neutral responders from the negative to the positive attitude category resulted in a very small number being classified as having a negative attitude (n = 51, or 5%), such that this approach could not produce interpretable estimates. Inclusion of the hitherto omitted Triandis and Gelfand statements (items 13 and 16 in figure 2) did not alter these results.

**Discussion**

This study identified social orientation as an important determinant of attitude toward vaccination. Our results show that the values of horizontal individualism and horizontal collectivism are associated with whether people take a positive stand toward vaccines. These findings are notable for two reasons. First, given that social orientation was identified as a more important determinant than other more commonly reported socio-demographic variables (such as e.g. education or professional group), our findings underscore the value of investigating the psychological determinants of vaccine scepticism. Second, vaccination is a solidaristic intervention that benefits both the vaccinated individual and the wider community, whereas the risks associated with vaccination remain strictly private. Therefore, one might intuitively expect that people’s attitude toward vaccination will be determined by the individualistic vs. collectivistic social orientation of individuals. However, our findings demonstrate that it is not so much individualism or collectivism that is of importance, but particularly the degree to which people value equality in their social relations. The more people see others as equals, the more positive they stand toward vaccination.

Findings like ours may help to improve the design of effective communication strategies for vaccines. In several countries, marketing research has shown that advertisements are more persuasive when their appeal is matched to the social orientation of their targeted audience. Individuals who scored high on HI, VI, HC or VC were found to be more susceptible for messages that emphasized self-direction, power, universalism and tradition, respectively. For instance, the higher the HC orientation of participants, the more they were in favour of a brand selling a shopping bag with which ‘you’re doing your part to save the environment’. The higher the HI orientation, the more participants liked a brand selling T-shirts for which you could ‘pick your color, pick your message, and pick your

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**Table 1** Characteristics of the surveyed population (N = 1050)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Classes</th>
<th>Count (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>18–25</td>
<td>202 (19)</td>
</tr>
<tr>
<td></td>
<td>26–35</td>
<td>222 (21)</td>
</tr>
<tr>
<td></td>
<td>36–50</td>
<td>241 (23)</td>
</tr>
<tr>
<td></td>
<td>51–60</td>
<td>194 (18)</td>
</tr>
<tr>
<td></td>
<td>61–76</td>
<td>191 (18)</td>
</tr>
<tr>
<td>Sex</td>
<td>Male</td>
<td>517 (49)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>533 (51)</td>
</tr>
<tr>
<td>Education</td>
<td>None or primary education</td>
<td>28 (3)</td>
</tr>
<tr>
<td></td>
<td>Professional secondary education</td>
<td>76 (7)</td>
</tr>
<tr>
<td></td>
<td>Technical or general secondary education</td>
<td>426 (40)</td>
</tr>
<tr>
<td></td>
<td>Higher non-university education</td>
<td>374 (36)</td>
</tr>
<tr>
<td>Profession*</td>
<td>University</td>
<td>146 (14)</td>
</tr>
<tr>
<td></td>
<td>Self-employed</td>
<td>125 (12)</td>
</tr>
<tr>
<td></td>
<td>Office worker</td>
<td>540 (53)</td>
</tr>
<tr>
<td></td>
<td>Manual worker</td>
<td>111 (11)</td>
</tr>
<tr>
<td></td>
<td>Houseman/housewife</td>
<td>82 (8)</td>
</tr>
<tr>
<td></td>
<td>Disabled</td>
<td>47 (5)</td>
</tr>
<tr>
<td></td>
<td>Unemployed</td>
<td>28 (3)</td>
</tr>
<tr>
<td></td>
<td>Student</td>
<td>53 (5)</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>37 (4)</td>
</tr>
</tbody>
</table>

*For 27 respondents, profession was missing.

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**Table 2** Overview of the sample’s attitude to vaccination and logistic regression results of the significant covariates of a sceptical attitude toward vaccines

<table>
<thead>
<tr>
<th>Attitude to vaccination</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Vaccination is a good way to prevent disease…’</td>
<td>16 (2)</td>
<td>35 (3)</td>
<td>159 (15)</td>
<td>514 (49)</td>
<td>326 (31)</td>
</tr>
</tbody>
</table>

**Logistic regression**

<table>
<thead>
<tr>
<th>Effect</th>
<th>Crude odds ratio</th>
<th>Adjusted odds ratio*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Point estimate</td>
<td>95% confidence interval</td>
</tr>
<tr>
<td>Smoking status (yes vs. no)</td>
<td>0.640</td>
<td>0.467-0.882</td>
</tr>
<tr>
<td>Horizontal collectivism</td>
<td>0.711</td>
<td>0.611-0.825</td>
</tr>
<tr>
<td>Horizontal individualism</td>
<td>0.791</td>
<td>0.681-0.917</td>
</tr>
</tbody>
</table>

*List of non-significant parameters: age, gender, educational attainment, professional group, EQ-5D score, Visual Analogue Scale score, personal experience with severe illness, experience with severe illness in the family, origin mother, origin father, experience with travel vaccination, experience as health care worker, family size, age family members, province, height, weight, vertical individualism and vertical collectivism.
style’. Vaccination could be promoted by appealing to HC values like solidary and interdependence (e.g. ‘vaccination is a matter of taking care of each other’) or HI values such as individual freedom and self-expression (e.g. ‘vaccines enable you to safely explore the world by travelling’ or ‘vaccines enable your children to play safely with other children’). Our findings suggest that such marketing strategies are less likely to be persuasive in vaccine-sceptical groups because these groups have a significantly lower HC and HI orientation. However, as we also found a positive association between valuing equality and having a more pro-vaccination attitude, our findings also project that vaccine scepticism may diminish through more structural strategies aimed at stimulating HI and HC orientations. One could speculate that large events that speak to HI or HC values such as music festivals or election days present an opportunity to embed pro-vaccine messages.

Some limitations of our study should be mentioned. First, our study may be influenced by the Flemish context (culture, education, experience with vaccination, etc.). It is noteworthy that most (but not all) childhood vaccination vaccines are given free of charge in Belgium. Although only polio vaccination is compulsory, uptake is high for most vaccines, and has remained largely unscathed by general and scepticism presents an opportunity to conduct further research in the nature of the study. Third, this was an exploratory study. Further research in this area could expand the methodology we used with alternative and/or more specific instruments to capture attitude to vaccination and social orientation. Certainly it would be interesting to validate our study in other countries and to investigate the influence of other psychological attributes, perhaps also on other forms of health care refusal. As the success of infectious disease prevention largely depends on collective cooperation, all knowledge about what differentiates sceptics from non-sceptics allows more successful anticipation, communication and education. The identification of social orientation as an explanatory factor for vaccine scepticism presents an opportunity to conduct further research in this direction.

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Conflicts of interest: None declared.

Key points

- Anti-vaccination attitudes are a rising public health concern.
- In this study, vaccine sceptics were found to have a different social orientation.
- Our research helps understanding what drives vaccine sceptics.
- This insight can help improve the effectiveness of communication about vaccination.

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Examining self-rated health of young Central and Eastern Europeans in the context of other world regions

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Background: Poor health is more prevalent in the East of Europe as compared with the West. This variation is often attributed to Soviet communism. Few studies investigate this health discrepancy within young adults who were children during this period. We studied the health of young adults by examining variations between world regions in general health between generations (18–65+). The individual and contextual mechanisms that might influence their health were also investigated. Methods: World Health Survey data were analysed on young adults aged 18–34 (n = 91 823) and their elders aged 35+ (n = 132 362) from 59 countries. Main outcome was self-reported general health. Multi-level logistic regression was used to assess associations between general health and regions, while accounting for individual- and country-level socio-economic factors across age ranges. Results: The prevalence of poor health was much higher for young adults in the Former Soviet Union region than in Western Europe, with the Central European region being in-between. This pattern remained even after full adjustments, for the Former Soviet Union population as a whole, without specifically excluding young adults, rather than Central Europeans. It appears as though young adults from Central Europe might have been somewhat insulated from the ill-health effects of communism.

Introduction

Research studies on countries within Central Europe and the Former Soviet Union tend to find that people within these regions have poorer health as compared with people within other countries.²⁻³ It is usually concluded that poor health prevalence in people within Central Europe and the Former Soviet Union, as compared with Western Europeans, is attributed to the historical phenomenon related to their communist past.²⁻³ Many studies, however, have only examined the Central European and the Former Soviet Union population as a whole, without specifically investigating the health of the younger generations.

Not much is known about health differences between generations within these regions, although it can be argued that, in general, young adults are usually healthier as compared with their elders. However, given the unique history, there might be stark differences in prevalence of poor health between generations. For example, the health of young people (i.e. those aged 18–34) within Central

References


