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Right-wing ideological constraint and vaccine refusal: The case of the COVID-19 vaccine in Norway

Dag Wollebæk[1] (ID) | **Audun Fladmoe**[1] (ID) |
Kari Steen-Johnsen[1] (ID) | **Øyvind Ihlen**[2] (ID)

[1]Institute for Social Research, Oslo, Norway

[2]Department of Media and Communication, University of Oslo, Norway

Correspondence: Dag Wollebæk, Institute for Social Research, Postboks 3233 Elisenberg, 0208 Oslo, Norway.
Email: dag.wollebak@samfunnsforskning.no

Abstract

Research has shown a correlation between votes for populist parties and the belief that vaccines are not important or effective. More recent investigations in the United States and France have similarly shown that attitudes toward the COVID-19 vaccine have been politicized. In this article, we show a similar pattern analyzing survey data from Norway, a country relatively mildly hit by the pandemic and characterized by high trust and a consensual political culture. We find that refusal to vaccinate is associated with right-wing ideological constraint, even when considering a wide array of control variables (e.g., lack of confidence, complacency), and sociodemographic characteristics. The results imply that vaccine refusal latch onto established political cleavages, particularly among the most ideologically consistent. Thus, polarization in the form of increasing ideological constraint may represent a mounting challenge for vaccine uptake, suggesting that vaccine communication should go beyond "explaining the science" and factor in ideology.

INTRODUCTION

Vaccine hesitancy and refusal has been a challenge in the COVID-19 pandemic (e.g., Chou & Budenz, 2020; Peretti-Watel et al., 2020; Sun et al., 2020). In order to improve vaccine communication also for future pandemics, there is a

need to investigate whether the antecedents of COVID-19 vaccine hesitancy and refusal conform to the patterns identified by studies of other vaccination programs.

Pre-COVID 19 studies in Western Europe, including Denmark and Sweden, have demonstrated "a highly significant positive association between the percentage of people in a country who voted for populist parties and who believe that vaccines are not important … or effective" (KENNEDY, 2019, 512). In the United States, skepticism toward science in general and vaccines specifically have been shown to be associated with right-wing partisanship and self-reported conservative political ideology (i.e., Baumgaertner et al., 2018; Broniatowski et al., 2020; Rabinowitz et al., 2016). In other words, there are indications that the vaccine issue in general is *politicized*.

Nevertheless, in order to fully understand the nature of this politicization, there is a need to unpack the conception of politics in this regard. This paper contributes to such understanding by introducing a comprehensive measure of ideological constraint, which is separated from both partisanship and single-item measures of political orientation. Understanding the extent to which vaccine refusal stems from partisanship and ideological orientation respectively, is of importance for understanding the dynamics of vaccine refusal, which is a prerequisite for effective vaccine communication. Coherent ideological views are more stable traits than party preference, which entails that vaccine views may be deeper entrenched and less malleable if linked to ideology than partisanship. By focusing on coherent views on several issues our composite measure also deviates from left-right or conservative-liberal scales used in past studies (e.g. Lindholt et al., 2021). Such scales are correlate with partisanship, as voters' self-placement reflects cues from political elites (Barber & Pope, 2019; Zaller, 1992). This study, by contrast, relies on a more exogenous, composite measure of political ideology; an index of survey responses to issues that are not directly related to either COVID-19 or partisanship, and measured in a separate survey. Arguably, this measure of ideology is less affected by elite cues, and therefore proved a more reliable measure of deeper ideological positions.

To disentangle the role of partisanship and ideology, Norway lends itself well as a case. First, ideological polarization of vaccine attitudes appears less likely as the country is characterized by high trust (Torcal, 2017), and a relatively consensual political culture (Knudsen, 2020) and has high prior support for vaccination (Steens et al., 2020) with little polarized political debate surrounding the general vaccination issue.

Second, elite cues that could drive vaccine skepticism during the pandemic have been absent, which opens up for a study of the separate importance of ideology. Vaccine resistance has been organized bottom-up, through social media groups and public protests with modest attendance. Only marginal voices have voiced resistance in the mainstream media. A review of anti-vaccination activity in social media identified eight Facebook groups with a modest

combined following of 40,000 (Rasmussen et al., 2020). Some discussion also emerged in "anti-globalist" groups that had previously been little concerned with vaccines, but that were characterized by strong distrust in established institutions.[1] These groups push conspiracy theories, attack leading politicians, and claim that the pandemic is exaggerated (Rasmussen et al., 2020). However, the political parties, including the populist right-wing party (the Progress Party), has encouraged vaccination. The latter party has in fact proposed that children's admission to day care facilities should depend on vaccination.[2]

Thus, this study explores whether vaccine attitudes in Norway could be partly explained not by partisanship, but by a stacking of right-wing political attitudes, which we refer to as *right-wing ideological constraint* (RIC). In Converse's (1964, p. 3) terms, constraint is the binding together of a configuration of ideas and attitudes in a belief system. In practical terms, constraint signifies "[…] the success we would have in predicting, given initial knowledge that an individual holds a specified attitude, that he [sic] holds certain further ideas and attitudes." High constraint is an indicator of attitude polarization (Dimaggio et al., 1996). An apolitical act such as getting a vaccine can be attributed a political interpretation when political opinions are constrained, since ideological alternatives are clearer compared to a situation with cross-cutting political cleavages. Some studies have shown increasing ideological constraint at the individual level even in Norway (Aardal et al., 2019). Thus, we hypothesize that such patterns may emerge related to the COVID-19 vaccine as well. For reasons expounded on below, however, we expect this to occur only with regard to consistent right-wing beliefs.

In the following, we discuss the politicization of vaccine attitudes in light of the literature on vaccine hesitancy and political polarization. We then examine empirically the extent to which ideological constraint is associated with vaccine hesitancy and refusal. We show that strong and consistent right-wing ideological attitudes—and not left-wing ideological attitudes—do indeed predict refusal, even when accounting for related factors such as lack of confidence and complacency. The relationship holds even when controlling for party preference, which further suggests that ideological consistency is related to vaccine refusal independently of partisanship. This implies that ideological polarization may have detrimental effects on vaccine uptake, even in the absence of elite polarization in the context of the COVID-19 pandemic. Going forward, these findings suggest that attitudes toward vaccines, and perhaps science more generally, latch onto established political cleavages even in consensual democracies. A possible implication for vaccine communication is that pro-vaccine messages from opinion leaders trusted by ideological vaccine refusers could be more efficient than messages from public authorities and "mainstream" opinion leaders.

THEORETICAL PERSPECTIVES ON THE POLITICS OF VACCINE HESITANCY AND REFUSAL

In this section, we first provide a starting point for our analysis by presenting established knowledge on drivers of vaccine hesitancy and refusal. We address the role of polarization in relation to vaccines, before substantiating why we expect a stronger relationship between right-wing ideology and vaccine refusal than with left-wing ideologies. Finally, we point to factors that might enhance the importance of ideological polarization within the COVID-19 pandemic in particular.

Drivers of vaccine hesitancy and refusal

In a central contribution, the SAGE Working Group on Vaccine Hesitancy (2015) defined vaccine hesitancy as "delay in acceptance or refusal of vaccination" (p. 4163), implying that refusal is a form of strong hesitancy representing one end on a continuum where acceptance of all vaccines is placed on the other. The group reviewed the so-called "Three Cs" model of vaccine hesitancy, placing the drivers in three categories: confidence, complacency, and convenience. The former is defined as "trust in (i) the effectiveness and safety of vaccines; (ii) the system that delivers them, including the reliability and competence of the health services and health professionals and (iii) the motivations of policy-makers who decide on the needed vaccines" (Macdonald & The SAGE Working Group on Vaccine Hesitancy, 2015). Empirical studies confirm the crucial role played by trust in vaccine uptake (Yaqub et al., 2014). The second driver, complacency, implies, for instance, the belief that little risk is associated with the diseases against which the vaccine is designed to protect. The third driver, convenience, groups factors such as physical availability as well as affordability. As COVID-19 vaccines are generally available and provided for free in Norway, we deem convenience to be of lesser importance than complacency and confidence in this context.

The SAGE group also introduced a more elaborate model including three sets of additional factors; contextual (historic, socio-cultural, political, etc.), individual and group (personal perception, etc.), as well as vaccine/vaccination specific influences (mode of delivery, costs, etc.), but omitted these in their final model. Similarly, other researchers have introduced other models, pointing, for instance to the influence of confidence, constraints (like convenience), complacency, calculation ("individual's engagement in extensive information search") and feelings of collective responsibility ("willingness to protect others by one's own vaccination" (Betsch et al., 2018).

Our survey instrument was primarily informed by the original SAGE classification, with particular emphasis on confidence and complacency, limiting the range of hesitancy drivers available for empirical examination. This reflects

our prime interest in exploring factors of political and socio-cultural relevance, rather than psychological ones. We will thus rely on the original framework of the SAGE group, with an emphasis on confidence and complacency, while adding literature on political and ideological constraints.

We do, however, depart from the SAGE model and previous studies (e.g., Baumgaertner et al., 2018; Lindholt et al., 2021; Ward et al., 2020) by treating hesitancy and outright refusal as phenomena with possibly different antecedents rather than two degrees on a continuum. Expressing hesitation to accept vaccines based on uncertainty regarding adverse effects is of a different nature than outright refusing, implying that individuals will not change their mind no matter what information comes to light. While the former may be primarily a matter of personal safety, the latter is more likely to be an expression of protest. Thus, we maintain that hesitating is not the same as refusing (Yaqub et al., 2014) and see refusal as a more defiant action (Reich, 2018). To the extent that there is a political dimension in negative vaccine attitudes, we are more likely to find it among those refusing than those hesitating.

Political polarization and vaccines

Much attention has been given to the increased polarization along partisan lines especially in the United States (Iyengar et al., 2019; Klein, 2020). The origins of polarization may lie in different issue preferences or ideological views (Abramowitz & Saunders, 2006; Huddy et al., 2018), or social identity and social group attachment (Huddy et al., 2018; Rothschild et al., 2019). One may think of polarization simply as increasing distance between two policy positions or between social groups, but another important aspect of polarization is that ideological attitudes are increasingly "constrained"; attitudes cluster more strongly in ideological dimensions, which in turn are more strongly correlated with each other (Dimaggio et al., 1996; Lupton et al., 2017).

The clustering of political positions is arguably more relevant to the politicization of seemingly non-political actions than a wide and/or bimodal dispersion of views. When political attitudes are constrained rather than cross-cutting, we argue, people are more likely to observe and follow cues from politically aligned individuals even in the absence of direct mobilization from political leaders. Thus, an ostensibly apolitical act such as getting a vaccine is likely to be given a political interpretation and latch onto the main political cleavage in society, broadly defined as left versus right. For this reason, we use ideological consistency as our main independent variable instead of political extremity.

Right-wing political ideology and vaccines

Ideological consistency is likely to matter for anti-vaccine attitudes among those leaning right, but not the left, because of the emphasis placed in right-wing

ideology on individual liberty and aversion to manufactured risks. With regard to the former, the vaccination question activates attitudes that the state should not be able to tell individuals what to do. With regard to the latter, vaccine refusal is consistent with higher sensitivity to risk among conservatives, especially potentially risky technologies (Baumgaertner et al., 2018, p. 2). Baumgaertner and colleagues argue that this association explains the relationship between ideology and vaccine resistance, even in the absence of the issue being adopted by a political party or camp. A vaccine represents a "manufactured risk," created by government, science and industry (Peretti-Watel et al., 2014). As right-wing attitudes are associated with lower trust in science, medical expertise and institutions (Baumgaertner et al., 2018; Larson, 2020), perceptions of risk thus are likely to be amplified among citizens distrusting these systems. Kennedy (2019) specifically linked the raise of right wing populism with anti-vaccine attitudes across 14 Western European countries. A "profound distrust in elites and experts" (p. 512) was singled out as the most important driver for both phenomena. Whenever the issue of vaccination gets politicized, and an object of political polarization, this might serve to strengthen such convictions. This would then be a situation of RIC encapsulating vaccine refusal.

Indeed, pre-pandemic empirical research on politicization of vaccine attitudes has, with some exceptions (Kahan, 2014; Smith et al., 2020), uniformly found that (right wing) conservatives hold more negative attitudes than (left wing) liberals. Baumgaertner et al. (2018) found that conservatives expressed less support for pro-vaccination statements, even when controlling for trust in institutions. Featherstone et al. (2019) showed that conservatives were more likely to believe vaccine conspiracies. Hornsey, Finlayson, et al. (2020) demonstrated higher concern about vaccines among conservatives, a relationship fully mediated by greater belief in conspiracies and conservative ideology. Another study found that liberals were more supportive of vaccination statements and tended to regard them as "facts" rather than "beliefs" (Rabinowitz et al., 2016). Joslyn and Sylvester (2019) found liberals to hold more accurate beliefs about vaccines, which in turn affected policy preferences.

Polarization in the context of the COVID-19 pandemic

The COVID-19 pandemic represents a more acute challenge to public health than other transmittable diseases have done in the past decades. It has entailed wide ranging limitations on everyday life and the economy and has periodically suspended democratic rights such as the right to assembly. As a consequence, it is surrounded by more controversy than past transmittable diseases (Ward et al., 2020). Individual compliance with guidelines such as wearing a mask or not has become symbolic acts of acquiescence or resistance. Refusing to

vaccinate appears to be a logical continuation to objecting to other government-imposed infringements of individual liberty.

The pandemic activates both concerns about individual liberty infringements, in the form of lockdowns and other mitigation efforts, and the acceptance of a manufactured risk in the form of vaccines. Thus, ideological aspects are likely to be more salient with regard to COVID-19 vaccination than was the case for previous diseases. It is therefore not surprising that both polls and academic research have found that attitudes toward COVID-19 responses, including vaccination willingness (Callaghan et al., 2020; Lin et al., 2021) are highly polarized, particularly in the United States (Druckman et al., 2020). Partisan divides in adherence to social distancing have also been documented (Rothgerber et al., 2020).

Results from multi-party systems are more mixed. One French study found a partially deviating pattern: Those supporting far left parties were equally unwilling to accept COVID-vaccination as those supporting far right parties, while those supporting more moderate (both left and right) parties were the most positive, echoing opposition to political elites on the left and the right alike (Ward et al., 2020). To our knowledge, only one study has examined the relationship between political attitudes and vaccine hesitancy in Scandinavia. Lindholt et al. (2021) found no relationship between COVID vaccine acceptance and left-right self-placement in Sweden and Denmark as well as six other countries in Western Europe when controlling for institutional trust and other factors. However, this study used an ordinal scale (1–5) to measure vaccine hesitancy, while we expect political ideology to be related to refusal, not hesitancy.

HYPOTHESES

Based on the literature on political behavior and polarization, and findings from past research on vaccine attitudes, we expect RIC to be associated with vaccine refusal, while we do not expect to find the same association for left-wing ideological constraint. We expect part of the relationship to be mediated by confidence (lower trust in the institutions, believe more in conspiracies), complacency (less concern about the consequences of the virus), and other related factors (alternative media consumption and political attitudes toward COVID-19 containment efforts). However, we expect a direct link between RIC and vaccine refusal to remain, as an expression of political ideology and protest. Thus, we propose the following hypotheses:

H1: Ideological constraint is associated with vaccine refusal among those with right-wing attitudes, but not among those with left-wing attitudes.

H2: RIC is more strongly related to vaccine refusal than to vaccine hesitancy.

H3: The relationship between RIC and vaccine refusal holds even when accounting for confidence, complacency, and party preference.

Our main independent variable is thus *constraint*. We first examine whether such ideological consistency is more strongly related to vaccine attitudes among those with right-attitudes than among those with left-wing attitudes. We then focus on RIC specifically.

DATA AND METHODS

We rely on a web-based panel survey on citizens' trust in, and reactions to, public policies during the COVID-19 pandemic in Norway, carried out in October/November 2020 and May 2021, referred to as the "Covid survey" in the following. The survey was administered by Kantar Norway, and the sample was drawn from Kantar's access panel, stratified on gender, age and education. The panel consists of approximately 50,000 internet users and is probability based; respondents are not self-recruited, but invited to join by means of random samples of the Norwegian adult population. Due to varying response rates in the stratified groups, respondents under 30 and without higher education were somewhat underrepresented in the final sample. In addition, people of immigrant descent are generally underrepresented in Kantar's access panel, making it impossible to generate a net sample representative of the immigrant population. In descriptive and bivariate analyses, these biases are remedied through the use of post-stratification weights, while in regression models sociodemographic variables are included as controls.

The main dependent variable is based on the item: "How likely or unlikely is it that you will take a corona vaccine if it is recommended by Norwegian public authorities?," with possible responses ranging from (1) Very likely to (4) Very unlikely, in addition to Don't know. The main analysis is based on multinomial regression, where we distinguish between those responding (1) very or somewhat likely (reference group), (2) don't know, (3) somewhat unlikely, and (4) very unlikely. Response alternative 4 is interpreted as vaccine refusal, while 2 and 3 are considered degrees of vaccine hesitancy. Given the cross-sectional nature of our analyses, we emphasize that we can only identify correlational patterns and make no causal claims.

The Covid-vaccine was developed and rolled out at an unprecedented speed. Consequently, survey research on vaccine attitudes may be highly time-sensitive. The survey was fielded before the vaccine was recommended by Norwegian authorities, and 73% said they were very or somewhat likely to vaccinate. Shortly after the survey was fielded, different polls showed an increase in willingness to vaccinate toward the end of 2020 and in early 2021, reaching a level above 90% (willing + vaccinated) during the spring (see Figure 1). This shift in public opinion is important to bear in mind when interpreting the results.
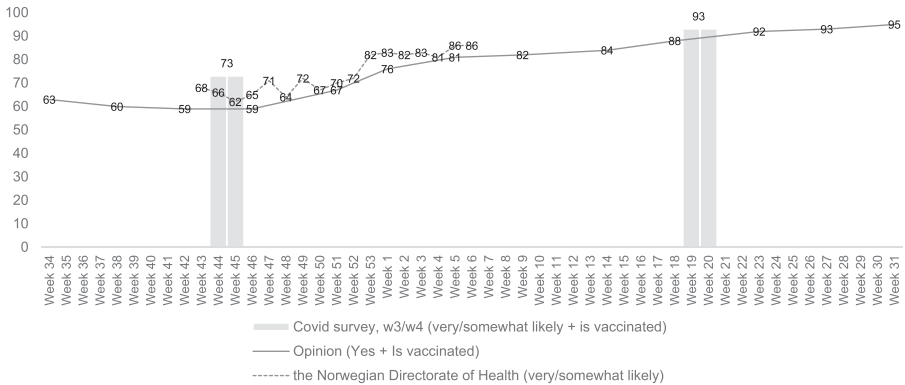
FIGURE 1 Willingness to vaccinate against COVID-19 in Norway, 2020/2021 (percent). Question wordings: Covid survey: "How likely or unlikely is it that you will take a corona vaccine if it is recommended by Norwegian public authorities?" (1—Very unlikely to 5—Very likely, Don't know) + "Have you taken a corona vaccine?" (Yes, No, Don't know/not relevant); Opinion: "Do you want to get vaccinated against the coronavirus when the vaccine arrives?" + "Have you taken a corona vaccine?" (Yes, No, Don't know/not relevant); the Norwegian Directorate of Health: "Based on the information you now have about the corona vaccine. How likely is it that you will take the vaccine when it is ready?" (1—Very unlikely to 5—Very likely, Don't know)

In order to check whether the patterns we observe in unwillingness to vaccinate was reproduced when it came to actual refusal, we also use data from a wave of the survey fielded in May 2021. At this time, vaccination was underway and more than half of the population, mostly those aged above 45, had been offered the vaccine. For this analysis, we examine the 736 respondents who remained from the previous wave and had been offered the vaccine (average age 62.5 years).

Independent variable: Ideological constraint

To measure right- and left-wing ideological constraint, we follow the approach suggested by Lupton and colleagues (2017) in measuring "vertical constraint," and create additive indices based on the number of right-wing and left-wing attitudes a person holds, that is, the number of times the respondent agreed (either strongly or somewhat) with a right-wing/left-wing statement. The indices are based on six political statements pertaining to various issues unrelated to vaccination (public vs. private sector, immigration, taxation, developing countries, and car traffic in cities). Although not exhaustive, the six items represent a wide array of issues. The questions were included in an annually updated screening survey of all members in Kantar's online panel. Thus, these questions were asked in a separate survey prior to the questions pertaining to

TABLE 1   Indices of right- and left-wing ideological constraint (principal component factor analysis)

	Factor loadings
The public sector interferes too much with people's private lives	.752
We have enough immigrants and asylum seekers in this country	.731
A high tax level secures the common goods	−0.717
The problems of developing countries concern us all	−0.690
More public tasks should be carried out by private actors	0.677
There must be restrictions on car traffic in the big cities	−0.642

Note: Eigenvalue: 2.89, explained variance: 49.2%.

vaccination willingness, and responses are therefore not affected by the vaccine items or other COVID-19-related questions. Agreement with the statements was indicated on a five-point agree-disagree Likert scale. Table 1 shows that a factor analysis of the six statements results in one coherent dimension accounting for 49% of the variance. The individual statements correlated with vaccine hesitancy and refusal (scale 1–4) at similar levels, ranging from 0.12 (public-private division of tasks) to 0.20 (immigrants and asylum seekers), with no tendency of either economic or cultural variables showing stronger correlations. Responses to the statements had a left-wing "bias": On average, respondents held 1.28 right-wing positions (SD = 1.47) and 2.88 left-wing positions (SD = 1.86). 43% rejected all right-wing positions, while 10% agreed with four or more. 15% rejected all left-wing positions, and 23% agreed with four or more.

Control variables

As control variables in multivariate regression, we included several variables that are likely to be related to both ideological constraint and vaccine hesitancy.

We include three measures of confidence. *Institutional trust* is an index (Cronbach's $\alpha = 0.88$) consisting of trust in the competency of the Ministry of Health, public hospitals, the National Institute of Public Health and the Health Directorate; trust in parliament, the Ministry of Health and the executive branch. Responses were given on Likert scales. All items load on one dimension in an exploratory factor analysis. *Trust in medical research* is based on the item "How much or little trust do you have in medical research," with a 4-point Likert scale.

As a measure of complacency, we included an index of *anxiety/concern* regarding the consequences of the pandemic. The index (Cronbach's $\alpha = 0.83$) is

based on the items: feeling of anxiety when thinking about the virus, concern that many elderly and sick people will die, concern that the respondent or a loved person would die (0–10) and agreement with the statement "I am concerned about the consequences the corona virus will have for me and my family (Likert scale),

We included two additional mediators that are likely to correlate with both right-wing ideology and willingness to vaccinate. *Alternative media use* (Holt, 2018) is based on the item "How much time do you spend daily on keeping yourself updated on the corona situation through the following sources? … Alternative media (e.g., Document.no, Resett.no)." The examples refer to two well-known Norwegian based right-wing outlets on the internet. Those who used these media at all were given the value 1, others 0. *Opposition to COVID-19 policies* (Cronbach's $\alpha = 0.70$) consist of four items: Concern that the authorities will use the corona situation to weaken democracy, that excessive corona measures should inflict unnecessary damage on the economy (0–10), agreement that "People should be able to choose for themselves whether to follow the authorities' corona advice" and "Containment measures go too far in relation to the threat posed by the corona" (Likert scales), and agreement that two much emphasis is placed on containing the virus (vs. protecting the economy).

In order to give each single item equal weight, all indices where constructed by first recoding single items to run from 0 to 1, before calculating the mean score across items.

Control variables in the analyses included gender, age, and education.

In the multivariate analyses, missing values are replaced with means. Utilizing the Missing Indicator Method (Choi et al., 2019), we control for dummy variables representing each item for which data is missing (not shown in figures). As a robustness check, we reran the analyses with (1) listwise deletion of cases with missing data and (2) with imputation with means without the missing values dummies. These alternative specifications did not alter the magnitude of the relationship or significance level for RIC and vaccine refusal.

RESULTS

A total of 73% said they were either "very likely" (46%) or "somewhat likely" (27%) to take the vaccine. 18% said they were unlikely to vaccinate, including 8% responding "very unlikely." An additional 9% responded don't know. The percentage saying "likely" is close to the average in a European seven-country survey published in June 2020 (74%) (Neumann-Böhme et al., 2020), a 19-country international survey (72%) (Lazarus et al., 2020), but significantly higher than proportions reported at the same time in the United States (Lin et al., 2021).

All respondents not responding "very likely" were asked why they were unsure (not shown). The most frequent concerns were associated with confidence, namely "I am afraid of side effects of the vaccine" (79%), "I am

concerned that the vaccine has not been properly developed" (43%) and "It is uncertain whether the vaccine provides adequate protection against COVID-19" (43%). Complacency was a far less common reason. "There is not enough infection in society for vaccination to be necessary" was selected by 10% and "One should rather get natural immunity by going through the disease" by 8%.[3] Preference for complementary and alternative medicine, a central topic in the literature on vaccine hesitancy (Attwell et al., 2018, Hornsey, Lobera, et al., 2020), was not a common cause for hesitancy or refusal. The option "I have more confidence in alternative forms of treatment outside the health care system than school medicine" was chosen by only 2%.

In the following, we examine more closely those expressing hesitancy or refusal. We first present the relationship between ideological consistency and refusal and hesitancy, splitting the sample between those leaning right and left (H1). Second, analyzing the whole sample, we examine the relationship between RIC, and its relationship to vaccine hesitancy and refusal (H2) controlling for complacency, confidence, and other pandemic-related variables (H3). This is done by means of a multinomial regression analysis.

Figure 2 shows the relationship between RIC and left-wing ideological constraint and vaccine attitudes. The percentages show the share of respondents expressing hesitancy or refusal by number of consistent positions held among leftists and rightists, respectively.
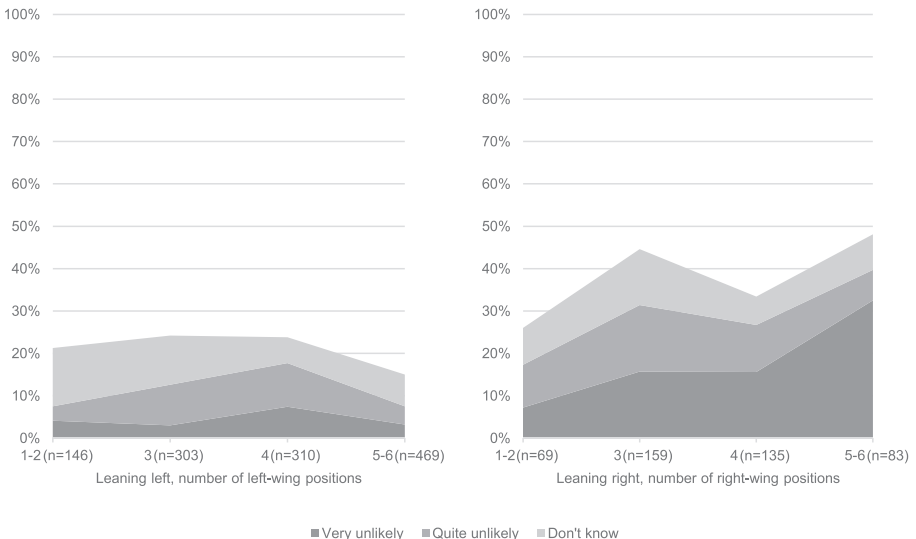
FIGURE 2   Ideological constraint and vaccine hesitancy and refusal. Percent expressing vaccine refusal and vaccine hesitancy by number of left- and right-wing positions

The proportion refusing vaccination (saying "very unlikely") increases with higher number of right-wing attitudes. The small, highly ideologically consistent group (supporting 5 or 6 right-wing positions) stand out with a particularly high refusal rate (33% very unlikely). Highly ideologically consistent rightists (holding 4–6 conservative positions) constitute 29% of vaccine refusers, but 9% in the rest of the population. However, even support for fewer right-wing positions is associated with a higher propensity to refuse the vaccine. Among those leaning left, we find no consistent variation between ideological consistency and vaccine hesitancy/refusal. Finally, the proportion expressing doubt ("don't know" or "quite unlikely") is unrelated to ideological consistency.

Thus, the figure confirms that vaccine refusal is more strongly related to RIC than to left-wing ideological constraint. The bivariate correlation between consistency and refusal is 0.20 ($p = 0.000$) among rightists and -0.02 ($p = 0.611$) among leftists. Vaccine refusal is associated with RIC, not constraint as such. In the following, we examine RIC only, using the number of right-wing positions held in the sample as a whole.

Table 2 shows pairwise Pearson's correlations between vaccine refusal, vaccine hesitancy, RIC, and the control variables described above. RIC is more closely correlated with vaccine refusal than with vaccine hesitancy, supporting H2. The magnitude of the correlation between RIC and refusal is comparable to the ones with trust in medicine and opposition to COVID-19 policies, but

TABLE 2 Correlates of vaccine hesitancy, vaccine refusal and right-wing ideological constraint (RIC)

	Vaccine hesitancy	Vaccine refusal	RIC
RIC	0.09***	0.22***	
Confidence			
Trust in institutions	−0.21***	−0.34***	−0.25***
Trust medical research	−0.19***	−0.24***	−0.19***
Complacency			
Anxiety/concern consequences COVID-19	−0.05*	−0.12***	−0.06**
Other control variables			
Use alternative media	0.12***	0.12***	0.23***
Opposition to COVID-19 policies	0.12***	0.22***	0.18***
n	1894	1859	2056

Note: For analysis of hesitancy, refusal is excluded. For analysis of refusal, hesitancy is excluded.

somewhat weaker than the relationship between refusal and its closest correlate, trust in institutions.

All indicators of complacency and confidence are correlated with negative vaccine attitudes, and all more closely related to refusal than to hesitancy.

Further, RIC is significantly associated with low confidence and complacency, albeit weakly. Consistent rightists believe more in conspiracy theories, and they distrust institutions and medical research. In addition, RIC is correlated with other mediators connected to low confidence, namely use of alternative media and opposition to COVID-19 policies. These factors form a nexus of distrust, consisting of characteristics all internally related (not all correlations shown in table), and all related to vaccine hesitancy and refusal.

We further hypothesized (H3) that there is a direct relationship between RIC and vaccine refusal, even when accounting for related factors such as confidence (distrust, alternative media use and belief in conspiracy theories), complacency (lack of concern), and other mediators (alternative media use and opposition to COVID-19 measures).

Figure 3 shows the results of a multinomial logistic regression with demographic controls (full regression table in Appendix A). The analysis shows,
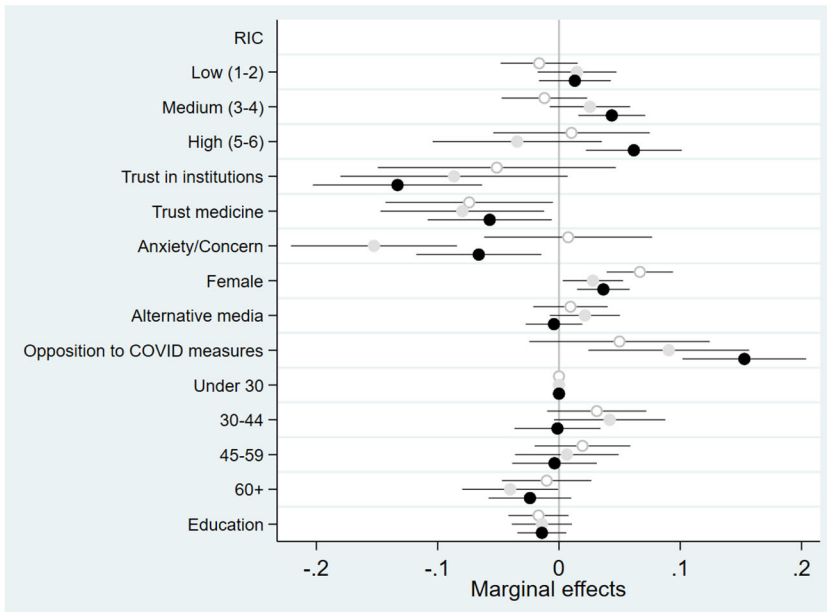
FIGURE 3   Antecedents of Vaccine hesitancy and refusal, multinomial regression. —O—, do not know; —●—, hesitancy ("Quite unlikely"); —●—, refusal ("Very unlikely") (n = 2055)

firstly, that ideological constraint is more closely associated with refusal than hesitancy. The strength of the relationship increases with the number of right-wing positions with which the respondent agrees. There is no significant relationship between RIC and doubt.

Setting "very unlikely" as reference category confirms that medium ($p = -0.02$) or high ($p = 0.07$) level of RIC is significantly and negatively associated with being in doubt ("quite unlikely" or "don't know")) compared to refusing.

Secondly, ideological constraint is independently related with vaccine refusal controlling for lack of confidence, complacency, and other mediators (alternative media use and opposition to COVID-19 policies). With regard to the latter, the stronger relationship with refusal compared to hesitancy further underlines the political aspect of vaccine refusal.

To check whether ideological constraint is simply an artifact of partisanship, a separate regression analysis was carried out controlling for party preference (see Appendix A). The analysis showed that RIC emerged with a significant relationship while party preference generally did not, except for an over-representation of refusal among voters for the small Christian Democrat Party (2.2% of sample, $p = 0.020$ compared to baseline of Progress Party voting). The voters of the populist right Progress Party [FrP] have twice as many refusers than in the population at large, but FrP voting is not a significant predictor of refusal in the model, when controlling for RIC. Thus, the importance of consistent ideological attitudes is greater than that of partisanship.

These results clearly suggest that there is a direct relationship between RIC and vaccine refusal, supporting H3. We do not see the same direct relationship when it comes to vaccine hesitancy, which gives further support to H2.

It is also worth noting that female gender significantly predicts both vaccine hesitancy and refusal. This is so even though women to a greater extent than men hold attitudes predicting vaccine willingness: They have higher confidence, lower complacency, and they support government containment policies more than men do. The correlation between gender and vaccine resistance increases as more factors are controlled for. This suggests an independent effect of gender, possibly associated with risk aversion (Borghans et al., 2009). Controlling for other factors, education is not significantly related to vaccine hesitancy or refusal. Young middle age is associated with hesitancy.

Analysis of actual refusal

So far, the analyses have been based on respondents' intentions to refuse the vaccine in November 2020. However, the official statistics indicate that at the end of the day, vaccine uptake was much higher than the intentions expressed in the survey would indicate. At the time of writing (October 2021), 90% of the population aged 18 and above had accepted the vaccine. This entails that many

of those expressing hesitancy, and even refusal in the survey responses above, ended up being convinced to take the vaccine when faced with the actual decision.

In the May 2021 wave of the survey, vaccination was already well underway and 59 per cent of the respondents analyzed above had been offered the vaccine. This group was not representative of the population as a whole; their average age was 62.5 years. Among these, only 3.7% reported that they had refused the vaccine.

Although the data is incomplete, an analysis of the select group who had been offered the vaccine in May 2021 could provide an indication of whether the patterns we observe above regarding *intentions* is reflected in actual *behavior*. The results are summarized in Figure 4, showing the bivariate relationship with RIC and results from a logistic regression. The bivariate relationship shows that refusal was almost exclusively confined to the third of the respondents holding two or more right-wing beliefs (36% of respondents). Among the small group holding five or more such beliefs, 14% refused.

The regression results to the right show that distrust in institutions was the closest correlate to actual refusal, as it was for intentions to abstain. By contrast, another correlate of intention to refuse, opposition to COVID-policies, did not result in refusal in the end. This indicates that some of those critical toward the government may have reported an unwillingness to vaccinate in the survey as a means of voicing protest. However, RIC emerges with a significant, independent relationship ($p = 0.034$) even in the multivariate analysis, confirming that ideological orientation matters for the choice to get vaccinated even controlling for distrust.

In sum, the findings in Figures 3 and 4 support both H3 and H2, in that there is a direct relationship between RIC and attitudes toward COVID-19-vaccines,
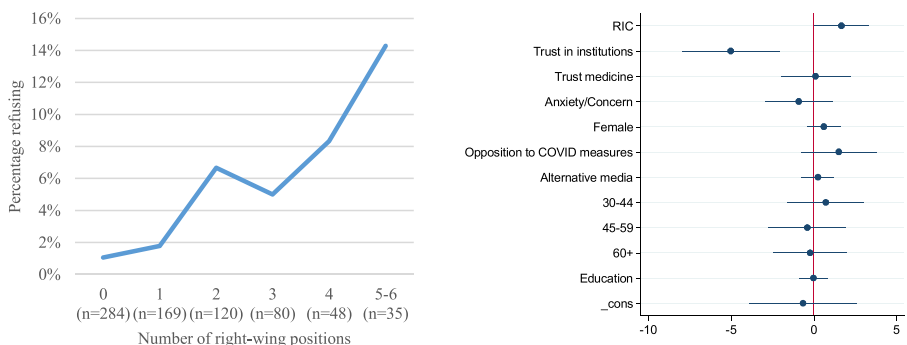
FIGURE 4 Actual refusal of vaccine. Bivariate relationship with RIC and logistic regression ($n = 736$). RIC, right-wing ideological constraint [Color figure can be viewed at wileyonlinelibrary.com]

but only when considering vaccine refusal. In sum, the results suggest that vaccine refusal is partly an act of political protest and defiance which attaches itself to consistent right-wing attitudes.

CONCLUDING DISCUSSION

The results have shown that COVID-19 vaccine refusal can be interpreted partly as a political act, even in a consensual multiparty system where vaccination has not been politicized at the elite level. The relationship between ideological constraint and vaccine refusal was only found among those with right-wing constraint, not among those with left-wing constraint. RIC was more strongly associated with vaccine refusal than hesitancy, giving credence to the interpretation of refusal as an act of political defiance.

Tendencies of increased polarization in Western democracies, and the clear link between ideology and vaccination attitudes, indicate that political factors are playing a substantial, and possibly increasing, role in the decision to vaccinate. The direct relationship between political ideology and refusal, even when controlling for complacency and confidence, strengthens the case for reintroducing socio-cultural and political factors into the paradigmatic model of core drivers of vaccine hesitancy (i.e., Macdonald and The SAGE Working Group on Vaccine Hesitancy, 2015).

The analyses showed that RIC was connected to a nexus of low confidence (distrust in government and medical research), complacency (lack of concern for the consequences of the virus), relying on alternative media for information on the pandemic, and opposition to the government's COVID-19 mitigation efforts. All these factors were in turn connected to vaccine hesitancy and refusal. However, while the relationship between ideology and hesitancy was mediated by low confidence and high complacency, refusal cannot exclusively be understood as a product of these two drivers. Neither can it solely be understood as political partisanship, as the relationship held even when controlling for party preference, nor following cues from political leaders, as no leading politicians have encouraged refusal. This seems to happen despite no political actors in Norway publicly questioning the vaccine. Even though we do not find an association between the use of alternative media and vaccine refusal/hesitancy controlling for other factors, it may still be the case that protests launched through social media groups can provide fuel to such attitudes.

It is interesting that the populist right party, the Progress Party, is advocating policies that are strongly pro-vaccine, yet their voters go in the opposite direction. One possible explanation for this puzzle is that this party generally attracts voters with low levels of trust in politics (Bélanger, 2017; Haugsgjerd, 2019), and that they are therefore less likely to be affected by elite cues. Our survey also shows that Progress Party voters are less likely to trust medical research and somewhat less likely to agree to a statement about the

safety of vaccines in general, suggesting that vaccine hesitancy is a larger issue in this group.

Thus, we interpret the relationship between RIC and anti-vaccination attitudes as adding another layer to already stacked political identities and attitudes. Increased constraint of political positions, an indicator of polarization, facilitates the amalgamation of new, ostensibly apolitical activities into established political cleavages. In a situation with high ideological constraint, positions are more crystallized, group membership more perceptible and cues about the behavior of others more available. Even though highly ideologically consistent rightists are a minority, they still form a substantial part of vaccine refusers. Thus, further polarization of political attitudes in the public may represent an additional obstacle for vaccine uptake, particularly in the highly politicized context of the COVID-19 pandemic.

One implication of our findings is that vaccine hesitancy is not necessarily linked to *lack* of information or ignorance, which more information can do away with (Blume, 2006). Instead, the ideological dimension our results have revealed suggests that vaccine communication necessitates a comprehensive understanding of not only local contexts and individual needs, but also the political values and the ideology driving vaccine refusal. Efforts to build trust may not be sufficient. First, the ideology-refusal link holds even when controlling for trust, indicating a direct effect of ideological orientation independent of confidence. Second, for ideologically motivated refusers, risk information is considered as driven by the strategic purposes of the authorities, and hence, the information is not believable. This group would instead perceive themselves as free-thinking individuals making informed decisions and "practicing good biological citizenship" when refusing vaccines (Hausman, 2019; Hobson-West, 2007, p. 174). As the issue is less polarized at the elite level, one possible route to explore would be to dialogue with opinion leaders with greater *ethos* among ideological vaccine refusers, such as religious leaders, right-wing political leaders and pundits, and other actors trusted by vaccine sceptics. Pro-vaccine messages from such opinion leaders could be more efficient than messages from public authorities and "mainstream" opinion leaders (Pink et al., 2021).

The politicization of vaccines should probably be seen against larger, underlying issues of political marginalization. Larson (2020) has, for instance brought up "the sense of having no voice, feeling controlled by elites who are insensitive to the felt needs and the concerns of the public" (p. 59). This is reflected in the nexus of attitudes and behaviors attached to ideologically motivated refusal: the authorities and science cannot be trusted, conspiracy theories may be true, the threat of the virus is exaggerated, alternative rather than mainstream media outlets are telling the truth.

Further research on ideological origins of vaccine hesitancy could relate to people's different ethical, ideological, political beliefs that lead to different

historical interpretations and competing visions for the future (Hulme, 2009). One empirical avenue would be to use vignette experiments to study the effects of ideologically-based vaccine communication targeting different political segments of the population.

The present study has some limitations. It is a snapshot of the situation before vaccination started in earnest. Attitudes are likely to have been affected by new information emerging about vaccine safety and efficacy. Further, our main dependent variable was intention to abstain from vaccination. We expect an analysis of refusal to be more robust than hesitancy as fewer of those saying it was "very unlikely" are likely to budge from their position than those just expressing doubt based on new information. Further research should none-theless examine the ideological antecedents of actual refusal.

In summary, even in a context thus far mildly hit by the pandemic, characterized by high trust and less polarization found in the countries in which previous research has taken place, vaccine refusal is tied to right-wing ideology. This suggests that politicization of the refusal of the COVID-19 vaccines could be a ubiquitous phenomenon in Western democracies, thus supporting previous studies on vaccine skepticism in general (e.g., Kennedy, 2019).

ACKNOWLEDGMENTS

ENDNOTES
[1] https://www.faktisk.no/artikler/o8K/konspirasjonsteorier-dominerer-vaksinediskusjonen-pa-facebook

[2] https://www.frp.no/aktuelt/2019/05/vaksiner-angaar-ogsaa-dine-barn

[3] Other less frequent responses were "use of vaccines is not compatible with my values" (2%) and "it hurts/I'm afraid of syringes" (3%). A maximum number of three reasons could be selected.

ORCID
Dag Wollebæk https://orcid.org/0000-0003-1186-9230
Audun Fladmoe https://orcid.org/0000-0001-9668-7203
Kari Steen-Johnsen https://orcid.org/0000-0002-6893-7655
Øyvind Ihlen https://orcid.org/0000-0002-5001-3796

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APPENDIX A
See Tables A1 and A2.

TABLE A1 Vaccine hesitancy and refusal, multinomial logistic regression (Reference category: Quite likely or Very likely)

	Without party preference			With party preference		
	Don't know	Probably not	Definitely not	Don't know	Probably not	Definitely not
RIC	0.119	0.382	1.701***	0.128	0.298	1.333**
	(0.388)	(0.360)	(0.414)	(0.462)	(0.428)	(0.505)
Trust in institutions	−1.309	−1.686*	−3.283***	−0.923	−1.724*	−3.267***
	(0.723)	(0.682)	(0.763)	(0.790)	(0.746)	(0.840)
Trust medicine	−1.357**	−1.480**	−1.640**	−1.269*	−1.297*	−1.233*
	(0.507)	(0.488)	(0.561)	(0.534)	(0.518)	(0.604)
Anxiety/concern	−0.359	−2.385***	−1.902**	−0.262	−2.421***	−1.784**
	(0.514)	(0.492)	(0.570)	(0.548)	(0.522)	(0.597)
Female	1.101***	0.664***	1.073***	1.043**	0.622***	1.031***
	(0.195)	(0.183)	(0.236)	(0.207)	(0.193)	(0.250)
Alternative media	0.176	0.296	−0.019	0.178	0.308	0.024
	(0.225)	(0.210)	(0.255)	(0.241)	(0.224)	(0.269)
Opposition to COVID policies	1.295*	1.843***	3.691***	1.362*	1.954***	3.776***
	(0.558)	(0.497)	(0.557)	(0.583)	(0.519)	(0.587)

(Continues)

TABLE A1 (Continued)

	Without party preference			With party preference		
	Don't know	Probably not	Definitely not	Don't know	Probably not	Definitely not
Under 30	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
30–44	0.493	0.559	0.167	0.481	0.482	0.062
	(0.293)	(0.281)	(0.341)	(0.309)	(0.293)	(0.361)
45–59	0.266	0.111	−0.028	0.301	0.037	−0.122
	(0.296)	(0.288)	(0.340)	(0.316)	(0.302)	(0.365)
60+	−0.304	−0.806**	−0.700	−0.320	−0.906**	−0.857*
	(0.305)	(0.313)	(0.366)	(0.333)	(0.331)	(0.395)
Education	−0.290	−0.177	−0.379	−0.050	−0.379*	−0.401
	(0.180)	(0.177)	(0.218)	(0.196)	(0.186)	(0.230)
Party preference						
Socialist/communist				−0.431	−0.204	−0.206
				(0.466)	(0.450)	(0.535)
Labor				−0.373	0.047	−0.450
				(0.431)	(0.408)	(0.496)
Center				0.044	0.376	−0.169

TABLE A1 (Continued)

	Without party preference			With party preference		
	Don't know	Probably not	Definitely not	Don't know	Probably not	Definitely not
				(0.406)	(0.382)	(0.436)
Greens/Liberal				0.187	−0.310	−0.601
				(0.480)	(0.535)	(0.678)
Christian Democrat				0.041	0.937	1.420*
				(0.725)	(0.580)	(0.433)
Conservative				−0.689	0.226	−0.381
				(0.421)	(0.388)	(0.433)
Progress Party				0	0	0
				(.)	(.)	(.)
Other				0.052	−0.758	0.601
				(0.702)	(0.819)	(0.559)
Would not vote/Don't know				0.229	0.334	−0.152
				(0.392)	(0.382)	(0.429)
Observations	2057	2057	2057	1936	1936	1936
Pseudo r^2	0.162			0.177		

Note: Standard errors are given in parentheses.

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

TABLE A2   Descriptive statistics

Nominal/ordinal variables		
	n	**Percent**
Right-wing ideological constraint		
0	888	43.15
1	427	20.75
2	318	15.45
3	229	11.13
4	120	5.83
5	54	2.62
6	22	1.07
Age		
Under 30	237	11.52
30–44	480	23.32
45–59	579	28.13
60+	762	37.03
Education		
Lower and secondary	793	38.53
Tertiary	1265	61.47
Gender		
Male	1016	49.37
Female	1042	50.63

Continuous variables	*n*	**Mean**	**Std. dev.**	**Min**	**Max**
Trust in institutions	2058	0.750	0.163	0	1
Trust medicine	2058	0.774	0.205	0	1
Anxiety/concern	2058	0.567	0.176	0	1
Opposition COVID measures	2058	0.240	0.177	0	1
Alternative media use	2058	0.176	0.381	0	1