

MARKET SEGMENTATION STRATEGIES CAN BE USED TO OVERCOME COVID-19 VACCINE HESITANCY AND OTHER HEALTH CRISES

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ABSTRACT

Given the COVID-19 pandemic has impacted everyone to some degree, it has become clear that experts from many disparate fields must work together to overcome such public health crises. Even now, a significant portion of United States residents remain hesitant to receive a vaccine. In the quest to safely return to a fully open economy, time is of the essence, as many lives and livelihoods can be saved by even marginal improvements in vaccination rates. To reach widespread immunization sooner, science stands to benefit by using market segmentation strategies with vaccine holdouts, much like brands do with customers. As evidence, we present results from a national survey segmented into four groups of COVID-19 vaccine holdouts. When described and viewed as separate segments, important distinctions regarding the nature and strength of reasons behind COVID-19 vaccine aversion, and the solutions to which people are most open, become clearer.

Keywords: COVID-19; pandemic; vaccine hesitancy; segmentation strategies.

INTRODUCTION

Throughout the COVID-19 pandemic, an oft-repeated mantra to rally United States residents through this public health crisis has been “we are all in this together” (Moplaisir 2020). While the phrase focuses on mutual support among civilians, we argue it has also become abundantly clear that experts from disparate fields need to work together to overcome this acute, long-lasting challenge. Given our background, we see a clear role for Marketers to play in this and other public health crises. In the context of the COVID-19 pandemic, we use this article to illustrate how market segmentation strategies can be deployed to address the challenge of widespread vaccine hesitancy.

Indeed, the battle against COVID-19 has already overcome many different ‘hard parts’ – challenges that were unprecedented and seemingly insurmountable at the time. Multiple effective vaccines were developed and deployed within a year and, as of writing, about 184 million U.S. residents, or roughly 55% of the population (CDC 2021a), are considered fully vaccinated (i.e., two weeks after the second dose of either the Pfizer-BioNTech or Moderna vaccines, or the single Johnson & Johnson vaccine). Although initially deployed under the Food and Drug Administration’s (FDA) Emergency Use Authorization (EUA), which facilitates rapid availability and use of medications during public health emergencies, such as during the H1N1 swine flu pandemic of 2009 (FDA 2021a), the Pfizer-BioNTech COVID-19 vaccine (marketed as Comirnaty) has since been given full approval (FDA 2021b). COVID-19 vaccines from Moderna and Johnson & Johnson are still available to the general public through the EUA. Currently, any U.S. resident age 12 and over who wants a vaccine is able to receive one.

Despite this progress, vaccination rates are in decline as those who were eager to receive a vaccine have already done so (e.g., Wood and Schulman 2021). The path to widespread immunity is now meeting resistance from those who do not intend to fully vaccinate themselves against COVID-19, which is a challenge shared across countries who initially led the world in vaccination rates (Balicer and Ohana 2021). After the seven-day vaccination average in the U.S. peaked on April 11, 2021 with a daily average of 3,465,181 doses administered, the seven-day average plummeted to a seven-month low of 436,511 on July 8, 2021 (a nearly 90% drop; CDC 2021b). Despite a resurgence in COVID-19 cases across the U.S., the seven-day average has only marginally rebounded (seven-day average of 609,339 daily doses as of September 21, 2021). To avoid wasting vaccine doses, many U.S. states are opting to accept only a portion of their weekly allotments (Willingham, Hollingsworth, and Smith 2021).

The decline in vaccination rates in the U.S. is occurring as highly contagious variants of SARS-CoV-2 further the depth and breadth of their spread throughout the U.S. and beyond, with a number of “breakthrough” cases documented (e.g., fully vaccinated individuals are being infected with the “delta” variant; CDC 2021c). Further, approximately 8% of Americans who received their first vaccine dose do not intend to get the critical second dose (Robbins 2021) – a dose which significantly increases vaccine effectiveness. Ensuring as many individuals as possible are fully vaccinated is considered the best chance we have at lifting societal and economic restrictions in an effective and sustainable manner. Achieving so-called “herd immunity” will occur when a large enough portion of a community becomes protected against COVID-19, either through vaccination (at least 80% of the population; Corse 2021; Mayo Clinic 2021) or infection, where the spread of the disease becomes more unlikely and it enables a population to safely return to pre-pandemic activities and behaviors. The COVID-19 pandemic

has emerged as the deadliest in recent U.S. history, accounting for more deaths than the 1918 flu (Lovelace 2021). Thus, time is of the essence, as many lives and livelihoods can be saved by even marginal improvements in the time it takes to achieve widespread immunization (Castillo et al. 2021).

Although many historical vaccination drives were not as seamless as believed (e.g., the U.S. government failed to anticipate consumer demand for the polio vaccine, the manufacturer inadvertently distributed a vaccine batch containing living poliovirus resulting in paralysis and death; Arnold-Forster 2021), there are also societal challenges unique to the COVID-19 pandemic: hyper-partisan politics, ubiquitous social media, and pervasive misinformation (Schumaker 2021). Thus, it is even more important to fully understand the similarities and differences among U.S. consumers who continue to voluntarily avoid vaccinating themselves against COVID-19. For future pandemics, and other public health crises, it is important to learn from the current shortcomings, recognize how efforts can improve, and hopefully ameliorate these issues.

Vaccine hesitancy in the U.S. is not isolated to the current pandemic, but is often a major barrier to addressing outbreaks. Even in the 1720s, when the U.S. was attempting to inoculate against smallpox, politicians' lives were threatened and the vaccine was considered "antithetical to God's will" (Ault 2021, np). Therefore, as the U.S. pursues herd immunity as soon as possible, it would be a mistake to treat all vaccine holdouts the same. Indeed, marketers have long recognized that consumers will evaluate the same product differently (Smith 1956). However, similarities in responses can be observed across certain groups, or "segments," of a larger market. Critically, these market segments exhibit a degree of intragroup homogeneity in terms of how they respond to a product (and/or other elements of the "marketing mix" – the 4Ps of

product, price, place, and promotion). At the same time, their responses exhibit intergroup heterogeneity by being meaningfully different from other segments (Ashforth and Mael 1989). Marketers can then increase the acceptance of their product(s) by recognizing these differences and tailoring the other elements of the marketing mix in a way that better resonates with that particular segment. By moving from a “one-size-fits-all” approach to a market segmentation approach that positions a product differently among distinct segments, the product’s acceptance will improve in each of these segments (Onwezen and Bartels 2011). These benefits should be observed whether the product is a type of laundry detergent, a toaster oven, or – as we argue in this article – a vaccine.

Just as marketers use segmentation strategies to understand differences in consumer behavior and the distinct product solutions that will better appeal to various groups, so too will the medical and public health communities find value in segmenting the population that is hesitant to vaccinate themselves against COVID-19. It is imperative to understand who is still unlikely to fully vaccinate themselves, why they are hesitating or refusing to do so, and which of the currently disseminated solutions may resonate most with different segments of vaccine holdouts. We believe marketing researchers, and our foundational strategic frameworks, can add to the larger scientific community’s fight against COVID-19 and society’s quest to finally and fully end the pandemic. In this article, we subsequently demonstrate and discuss how a simple segmentation approach can be used to better understand why different people are resisting the COVID-19 vaccines and the distinct solutions which will resonate most effectively with these different groups of people.

USING SEGMENTATION TO UNDERSTAND COVID-19 VACCINE HESITANCY

Sample Size

Given one-third of the United States adult population have indicated they are unlikely or hesitant to get a COVID-19 vaccine (Ruiz and Bell 2021), despite being eligible, we used this value as our target population (i.e., a third of the ~254,000,000 U.S. adults gave us a population of ~85,000,000). To ensure our sample accurately reflects the attitudes of this population at the 95% level, with a 3% margin of error, our sample size needed to be 1,068. Our final sample used in the subsequent analyses was 1,080, which is also similar to related research (Goldfarb et al. 2021).

Participant Recruitment

The survey was posted to the Lucid online research marketplace between May 1-3, 2021 (the full survey instrument is presented in the Supplementary Appendix), where registered individuals were able to see our post requesting participants. The survey was advertised as being for those who were hesitant to receive a COVID-19 vaccine, and screening questions were included in Lucid (to ensure they were between the ages of 18-99 and located within the U.S. confirmed through zip code) and also at the beginning of the survey. In total, Lucid recruited 4,900 panelists to take the survey, of whom 1,080 accepted and completed the survey, with individuals representing all 50 U.S. states. Sample demographics are shown in Table 1.

[Insert Table 1 about here]

In the survey, created using Qualtrics, participants were told they did not qualify if they indicated that they had either: a) received both doses of a COVID-19 vaccine or the single-dose Johnson & Johnson vaccine, b) had received at least one dose and were likely or definitely going to get the second, or c) had not received any COVID-19 vaccine but were likely or definitely going to get it when it becomes available to them. Thus, only those who had not received any doses and were unlikely or definitely not going to get the COVID-19 vaccine, or those who had received one dose and were unlikely or definitely not going to get the second dose, were able to advance to the survey.

Participants who proceeded answered questions regarding the most important reasons for not receiving a COVID-19 vaccine (1 = Not at all a factor for me, 9 = Very important factor for me), the most likely solutions that would help them overcome this hesitancy (1 = No impact on my decision, 9 = It would definitely encourage me to get the vaccine), and demographics. These reasons and solutions were either adapted from existing research (Rosenbaum 2021; Wood and Schulman 2021) or taken directly from popular press (e.g., Karni and Stolberg 2021; Stolberg and Karni 2021). Thus, the items included were a comprehensive and accurate representation of the predominant reasons and solutions at the time of the survey.

Results

The results are viewed across four distinct segments: 1) those who are refusing to receive a COVID-19 vaccine (hereafter “Unvaccinated Refusers”), 2) those who are merely hesitant to receive a vaccine (“Unvaccinated Hesitants”), 3) those who received the first of two doses but are now refusing the second (“Partial Refusers”), and 4) those who received the first of two doses but are hesitant to receive the second (“Partial Hesitants”). We argue these groups should

be examined separately as the nature and strength of the reasons driving their decisions may differ, as may the solutions used to overcome those reasons (See Figure 1 for a summary of each group, their top three reasons, and the three solutions to which they are most open).

[Insert Figure 1 about here]

Unvaccinated Refusers. The sample's largest group were Unvaccinated Refusers (55% of all respondents). Relative to the other three groups, Unvaccinated Refusers tend to be less educated and have a lower income (this group also includes the greatest proportion of unemployed individuals). They are similar in age, ethnicity (mostly white), conservativeness, and religiousness as the Unvaccinated Hesitants, suggesting many demographic similarities exist between the two groups. However, psychographic differences can be observed in the relative level of importance placed in various reasons and their degree of openness to solutions. This group's strongest reason for not getting a COVID-19 vaccine is their concern about potential side effects. They are also concerned the vaccines were developed too quickly and have low trust in the government. This group is unsurprisingly the hardest to convince, with many of the solutions scoring well below the scale mid-point. However, they are least resistant to mandates from employers and entertainment/travel destinations, and are open to receiving convincing information. That said, information that clearly comes from government officials may be counterproductive.

Unvaccinated Hesitants. The second largest group were the Unvaccinated Hesitants (37%), who differed from the Unvaccinated Refusers on a demographic basis by being slightly more educated and having a greater income (with a greater proportion being employed as well). While the most important reasons and solutions are largely the same as the Unvaccinated Refusers, this group is more open to solutions, as Unvaccinated Hesitants indicated a significantly higher degree of openness to each of the 18 solutions than the Unvaccinated Refusers (all contrast p 's < .05). These significant differences suggest public health officials may be able to convince a greater portion of this segment to receive a COVID-19 vaccine than the Unvaccinated Refusers. For targeting purposes, we recommend prioritizing these individuals because of their prevalence among all vaccine holdouts and their greater openness to the solutions offered. Among the different possible solutions, vaccine mandates from schools and employers may be particularly effective for the Unvaccinated Hesitants. Conversely, encouragement from celebrities and politicians will likely be met with resistance.

Partially Vaccinated Refusers. Examining those who are partially vaccinated but refusing to get the second dose (3% of respondents) revealed some interesting insights. However, given the relatively smaller portion of the population falling into these groups (Robbins 2021), the size of these segments in the survey sample was also much smaller. Relative to the unvaccinated segments, Partial Refusers are younger, more educated, liberal, and less religious. The most important reasons for refusing the second dose, though all below the midpoint, are concerns the vaccines were developed too quickly, fear of being tracked and/or microchipped, and believing one dose is enough. We speculate these individuals may have fallen victim to misinformation after their first dose, which has become a documented problem through social media platforms

such as Facebook (Schechner, Horwitz, and Glazer 2021). Though encouragingly, giving a recovery day off from work or time off specifically to receive the vaccine appear likely to overcome this hesitancy. Unlike other segments, this group is relatively open to encouraging messages from celebrities, thereby indicating an opportunity for social media influencers and their platforms to play a meaningful role in combating the effects of misinformation before and/or after the initial dose of a vaccine.

Partially Vaccinated Hesitants. The fourth segment, Partial Hesitants (5%), are also younger and well-educated, but are the most affluent and have a higher concentration of essential workers and individuals working in the healthcare industry compared to the other segments. The main reasons for their hesitancy appear to be related to side effects, fear of being tracked and/or microchipped, and concern the vaccines were developed too quickly. We speculate they may have experienced adverse reactions to the first dose, which resulted in concerns about side effects from the second dose. Alternatively, they too may have fallen victim to misinformation regarding the vaccine after their first dose. To overcome these reasons, mandates from their work and/or school, reading convincing information, or somebody else simply scheduling the appointment for them appear to have the most potential. Given the conceivable influence from places of work for this segment, employers may be especially effective at moving individuals from partially to fully vaccinated by scheduling vaccine appointments, offering them onsite, and/or arranging transportation to and from external vaccination sites.

GENERAL DISCUSSION

In a pandemic filled with so many uncertainties, we can unfortunately be certain that we as a society have not yet made it through all the ‘hard parts’ that will need to be overcome in the fight against SARS-CoV-2. However, we are confident marketing researchers can help society clear this latest pandemic-related obstacle. Much like consumers of any given product category, many similarities are shared across individuals, but there are also important distinctions related to the optimal solutions for different groups of consumers. Even with the full approval of the Pfizer-BioNTech COVID-19 vaccine resulting in a number of mandates by private U.S. companies (e.g., Delta Air Lines Inc., CVS Health Corp.) and for public workers (Levin, Woodhouse, and Wetzel 2021), there is still likely to be a large number of holdouts who do not fall under these mandates (e.g., the mandate may only apply to those private companies with over 100 employees; Timmons et al. 2021).

By segmenting the population of remaining vaccine holdouts based on their vaccination status (unvaccinated versus partial) and their level of resistance to becoming fully vaccinated (refusing versus hesitant), our survey revealed important distinctions between these groups regarding the nature and strength of the reasons behind their aversion to the vaccine and the solutions to which they are most open (and which solutions are likely to fail). Interestingly, we uncovered that both the reasons and solutions markedly differ for Partial Refusers relative to the other three segments. This alone suggests that a blanket approach is unlikely to convince all individuals to receive the vaccine. We can thus use these insights to uncover which reasons are important for each segment, and which solutions are likely to help overcome this hesitancy. For example, concern regarding how rapid the vaccines were developed was an important reason for all four segments, but the strength of that concern differed as well as its correlation with various solutions. Examining the correlations (see the Supplementary Appendix for correlation tables), it

is encouraging to see that Unvaccinated Hesitants, whose hesitancy stems from this concern, are likely to be persuaded by reading more about the vaccine. For this particular reason and segment, we can then make recommendations regarding consumer educational campaigns. Further, Unvaccinated Hesitants concerned about the vaccine development speed are less likely to get the vaccine if these messages are from politicians or celebrities, so encouraging friends and family members may be more successful in persuading them.

Relatedly, segmenting larger groups also allows marketers, health professionals, public policy makers, and consumer advocacy groups to examine which solutions may be successful across all segments for many of the given reasons. For areas with limited staff and/or funding, this can be a cost-effective mass marketing approach. For example, we uncovered that non-choice-based solutions (i.e., mandates by work or school and/or required to enter restaurants and events) were the most likely to convince individuals in three of the four segments to get the vaccine. However, these mandate-based reasons are likely to backfire for Partial Refusers, so if a community has a higher proportion of these individuals, this approach would not be recommended. Overall, these results underscore the importance of approaching vaccine holdouts with distinct, targeted solutions that are informed by foundational marketing strategies.

This manuscript has additional implications for marketers, health professionals, public policy makers, and consumer advocacy groups. Given vaccine hesitancy has historically followed the release of new vaccines (Ault 2021), it is important that we take lessons learned from both COVID-19 and past pandemics, proactively applying these insights to the inevitable pandemics of the future. For instance, we recommend that public policy makers and health organizations such as the United States' Centers for Disease Control (CDC) utilize the services of marketing strategists and consumer psychologists more heavily at the onset of future public

health crises. The CDC has previously created social marketing “toolkits” to be used by state and local organizations as well as faith leaders (e.g., helping individuals manage their diabetes), and we believe this approach can be further strengthened through more customized communication strategies tailored to different segments. Doing so before vaccines or other solutions are developed will allow policy makers, health professionals, and consumer advocacy groups to better understand a population’s attitudes and behaviors relative to the health crisis early on.

Moreover, the employment of market segmentation strategies from the beginning of a crisis would provide a nuanced view of relevant differences across distinct population segments. When these insights are collected and disseminated across relevant stakeholders (policy makers, health professionals, consumer advocacy groups) at an early stage, it could shape the types of solutions pursued by, for example, pharmaceutical companies and the way they publicly share information during a solution’s (e.g., a vaccine’s) development process. Then, when an eventual solution is deployed into communities, marketers should be an important player during the rollout as their ongoing segmentation studies can inform distinct marketing strategies for different target segments – including advertising campaigns with customized messaging tailored to various segments. The success of these efforts can then be evaluated based on the change, and speed of change, in outcomes such vaccination rates, hospitalization rates, and so on. Given marketing strategists’ experience tracking the success of various marketing interventions (e.g., new products, price changes, specific advertising messages/campaigns) among different population segments over time, it will also be worthwhile for these various stakeholders to continue working together throughout the duration of any particular health crisis.

Although we believe there are many insights gleaned from this approach, it is not without its limitations. First, when creating the survey, we chose to utilize a relatively descriptive design,

as opposed to an exploratory one. We recognize that open-ended responses or exploratory qualitative interviews would have provided additional insight and context behind the reasons for an individual's vaccine hesitancy. A qualitative approach would have also been less likely to expose participants to points they had not previously considered. However, at the time of the survey, many reasons and solutions were already publicly known (e.g., Karni and Stolberg 2021; Rosenbaum 2021; Stolberg and Karni 2021; Wood and Schulman 2021). Moreover, because a primary goal of ours was to provide health care workers and public policy makers with a straightforward example of a segmentation procedure that can be used at scale, we chose to aggregate reasons and solutions that were previously being discussed and/or attempted in isolation into a comprehensive list. In this case, a descriptive approach also allowed for relatively faster data collection and the observance of more objective differences between segments compared to open-ended surveys or qualitative interviews.

Second, respondents were only permitted to choose one response regarding their ethnicity, where the Office of Management and Budget for the collection of ethnicity data recommends that multiple selections be allowed (OMH 2021). When public health officials or policy makers design similar surveys, we recommend they allow multiple ethnicities to be selected. Additional segmentation-related insights may emerge by doing so.

Finally, given the COVID-19 pandemic is a global issue, the explicit insights from our sample of U.S.-based residents may not be generalizable across countries. However, we believe that demonstrating the process of segmentation, and the insights that can be uncovered through it, in the context of a public health crisis can be generalized across nations. Marketers around the world can examine citizens' attitudes toward a health crisis, the underlying reasons behind them, as well as their openness to various solutions being developed or offered in their country.

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TABLE 1
Sample demographics

		Total		Unvac. Refuse		Unvac. Hesit.		Partial Refuse		Partial Hesit	
		<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Sample		1080	100	593	54.9	403	37.3	27	2.5	57	5.3
Age	<i>18-29</i>	294	27.2	154	26.0	96	23.8	11	40.7	33	57.9
	<i>30-44</i>	371	34.4	200	33.7	139	34.5	14	51.9	18	31.6
	<i>45-59</i>	261	24.2	147	24.8	108	26.8	2	7.4	4	7.0
	<i>≥60</i>	154	14.3	92	15.5	60	14.9	0	0	2	3.5
Gender	<i>Male</i>	370	34.3	194	32.7	137	34.0	15	55.6	24	42.1
	<i>Female</i>	706	65.4	397	66.9	264	65.5	12	44.4	33	57.9
	<i>Other</i>	4	.4	2	.3	2	.5	0	0	0	0
Ethnicity	<i>White</i>	793	73.4	440	74.2	313	77.7	12	44.4	28	49.1
	<i>Black</i>	171	15.8	87	14.7	57	14.1	11	40.7	16	28.1
	<i>Hispanic/Latino</i>	56	5.2	36	6.1	15	3.7	0	0	5	8.8
	<i>Asian</i>	14	1.3	3	.5	5	1.2	3	11.1	3	5.3
	<i>Native American/Alaskan</i>	14	1.3	8	1.3	4	1.0	1	3.7	1	1.8
	<i>Pacific Islander</i>	3	.3	1	.2	0	0	0	0	2	3.5
	<i>Other</i>	29	2.7	18	3.0	9	2.2	0	0	2	3.5
Education	<i>Less than HS</i>	70	6.5	37	6.2	30	7.4	3	11.1	0	0
	<i>HS/GED</i>	373	34.5	238	40.1	118	29.3	6	22.2	11	19.3
	<i>Some college</i>	267	24.7	142	23.9	110	27.3	5	18.5	10	17.5
	<i>2-year degree</i>	114	10.6	53	8.9	47	11.7	2	7.4	12	21.1
	<i>4-year degree</i>	168	15.6	79	13.3	70	17.4	4	14.8	15	26.3
	<i>Professional/Master</i>	65	6.0	33	5.6	23	5.7	4	14.8	5	8.8
	<i>Doctorate</i>	23	2.1	11	1.9	5	1.2	3	11.1	4	7.0
Income	<i><\$30,000</i>	517	47.9	307	51.8	170	42.2	16	59.3	24	42.1
	<i>\$30,000 - \$59,999</i>	290	26.9	163	27.5	113	28.0	3	11.1	11	19.3
	<i>\$60,000 - \$99,999</i>	160	14.8	75	12.6	70	17.4	3	11.1	12	21.1
	<i>≥\$100,000</i>	113	10.5	48	8.1	50	12.4	5	18.5	10	17.5
Immuno-comp.	<i>Yes</i>	216	20.0	110	18.5	66	16.4	16	59.3	24	42.1
	<i>No</i>	864	80.0	483	81.5	337	83.6	11	40.7	33	57.9
Political Ideology	<i>Liberal (includes leaners)</i>	416	38.5	217	36.6	146	36.2	20	74.1	33	57.9
	<i>Conservative (includes leaners)</i>	664	61.5	376	63.4	257	63.8	7	25.9	24	42.1
Religiosity	<i>Lower</i>	494	45.7	256	43.2	183	45.4	21	77.8	34	59.6
	<i>Higher</i>	586	54.3	337	56.8	220	54.6	6	22.2	23	40.4
Employ.	<i>Employed</i>	579	53.6	286	48.2	227	56.3	18	66.7	48	84.2
	<i>Unemployed</i>	501	46.4	307	51.8	176	43.7	9	33.3	9	15.8
Essential Worker	<i>Yes</i>	365	33.8	171	28.8	146	36.2	14	51.9	34	59.6
	<i>No</i>	214	19.8	115	19.4	81	20.1	4	14.8	14	24.6
Healthcare Worker	<i>Yes</i>	119	11.0	48	8.1	31	7.7	10	37.0	30	52.6
	<i>No</i>	460	42.6	238	40.1	196	48.6	8	29.6	18	31.6

FIGURE 1

Summary of Four Segments Who Consider Themselves Unlikely to Become Fully Vaccinated Against COVID-19

