

# COVID-19 Vaccines Relative Attribute Importance: Insights on Preference Heterogeneity Identified through Latent Class Modeling

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## BACKGROUND AND OBJECTIVES

- To mitigate "COVID-19 fatigue," vaccine misinformation, and vaccine hesitancy, the WHO Emergency Committee emphasized the need for social media listening and community engagement to help tailor public communications on disease risk and contextualizing evolving health policies.<sup>1</sup>
- Despite medical evidence of the importance and safety of COVID-19 vaccines, some of the public is hesitant and/or opposed to COVID-19 vaccination.
- Understanding the public's preferences for COVID-19 vaccines and drivers of vaccine hesitancy is critical for implementing effective strategies to increase vaccine uptake within the context of a dynamic viral and regulatory landscape.<sup>2</sup>
- This study aimed to explore COVID-19 vaccine preferences in Canada, Germany, the UK, and the United States using a Discrete Choice Experiment (DCE).

## Sample

- An online survey of 500 adults in each of the four countries was conducted in July and August 2023.
- Sample was stratified by country, vaccination status, and disease risk status.

## Survey Contained a Questionnaire & the Discrete Choice Experiment

### Survey Questions:

- Covered vaccine preference, previous COVID-19 experiences, and demographics.
- Data were summarized with descriptive statistics.

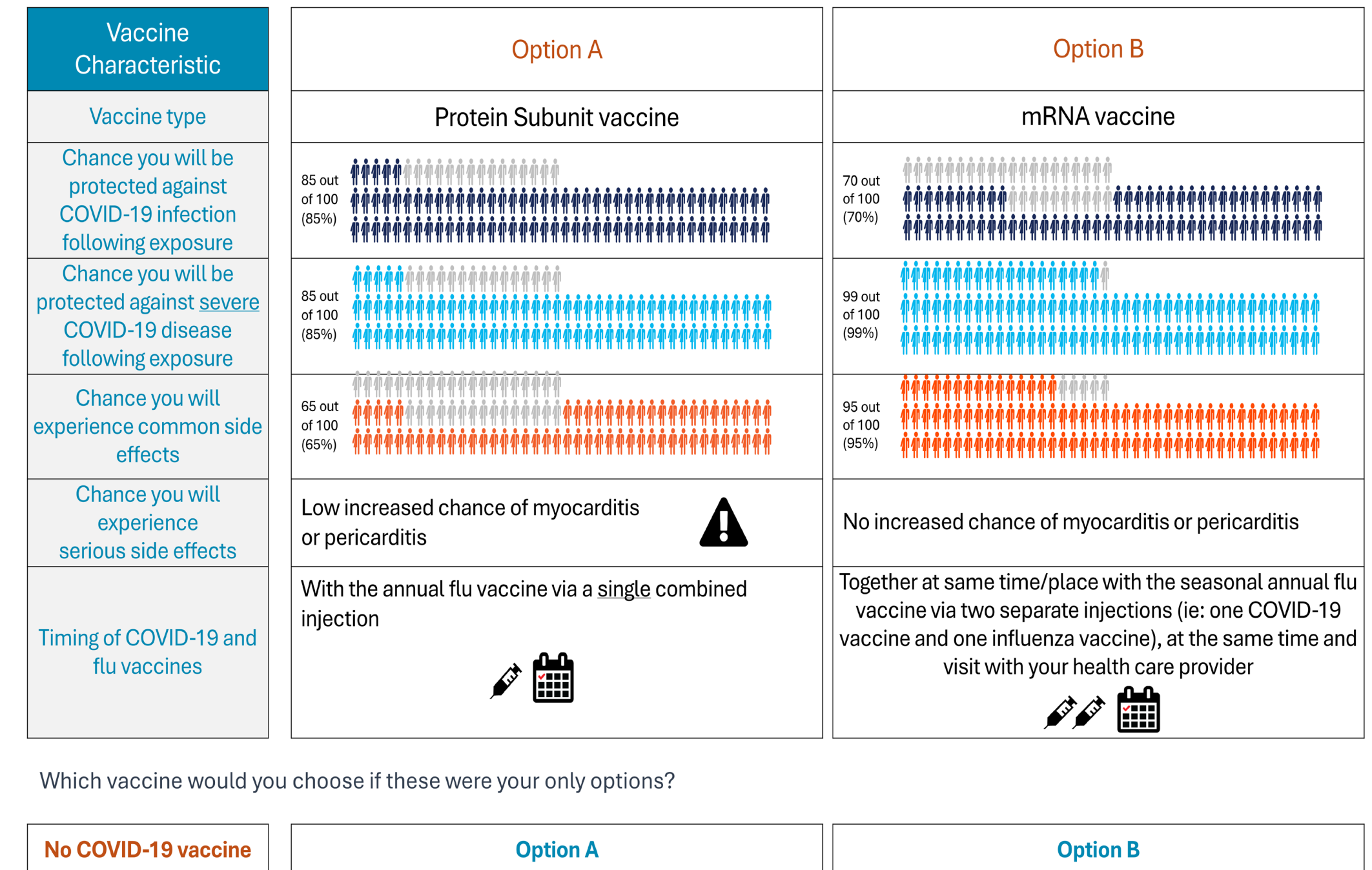
### Discrete Choice Experiment:

- Developed and fielded according to best practices.
- Participants were provided choice pairs, each card showing two hypothetical vaccine profiles and an 'opt-out' option.
- Each participant viewed 11 unique vaccine profiles with the combination of attributes and levels as determined by an experimental design.<sup>3,4</sup>
- Six attributes were tested: (1) vaccine type, (2) protection against COVID-19 infection, (3) protection against severe COVID-19 disease, (4) chances of experiencing common side-effects (i.e., reactogenicity events), (5) serious side-effects (e.g., myocarditis/pericarditis), and (6) timing of COVID-19 vaccines with influenza vaccine. (see **Figure 1**)
- Relative attribute importance (RAI) and trade-offs were calculated. Heterogeneity was investigated using a latent class model.

## METHODS

### Figure 1. Illustrative Choice Task

Please imagine that these were your **only** options.



## RESULTS

### Demographics

- Mean age: 47.6 years
- 51.3% identified as Male
- General demographics were comparable among participants in the unvaccinated or partially and fully vaccinated subgroups

### Survey Findings

- 66.1% in the total population, as well as in the fully (65.7%) and unvaccinated/partially (66.4%) vaccinated subgroups, considered the choice of vaccine to be very or extremely important (see **Table 1**).
- The type of COVID-19 vaccine (i.e., protein subunit or mRNA) was considered moderately-to-extremely important by 70.7% total participants, with similar proportions occurring in the subgroups (fully vaccinated, 72.7%; unvaccinated/partially vaccinated, 68.7%).
- Over half (55.1%) of the participants responded that they were moderately, quite, or extremely worried about serious vaccine side effects, with people in the unvaccinated or partially vaccinated subgroup (65.9%) being more concerned than fully vaccinated people (44.2%).

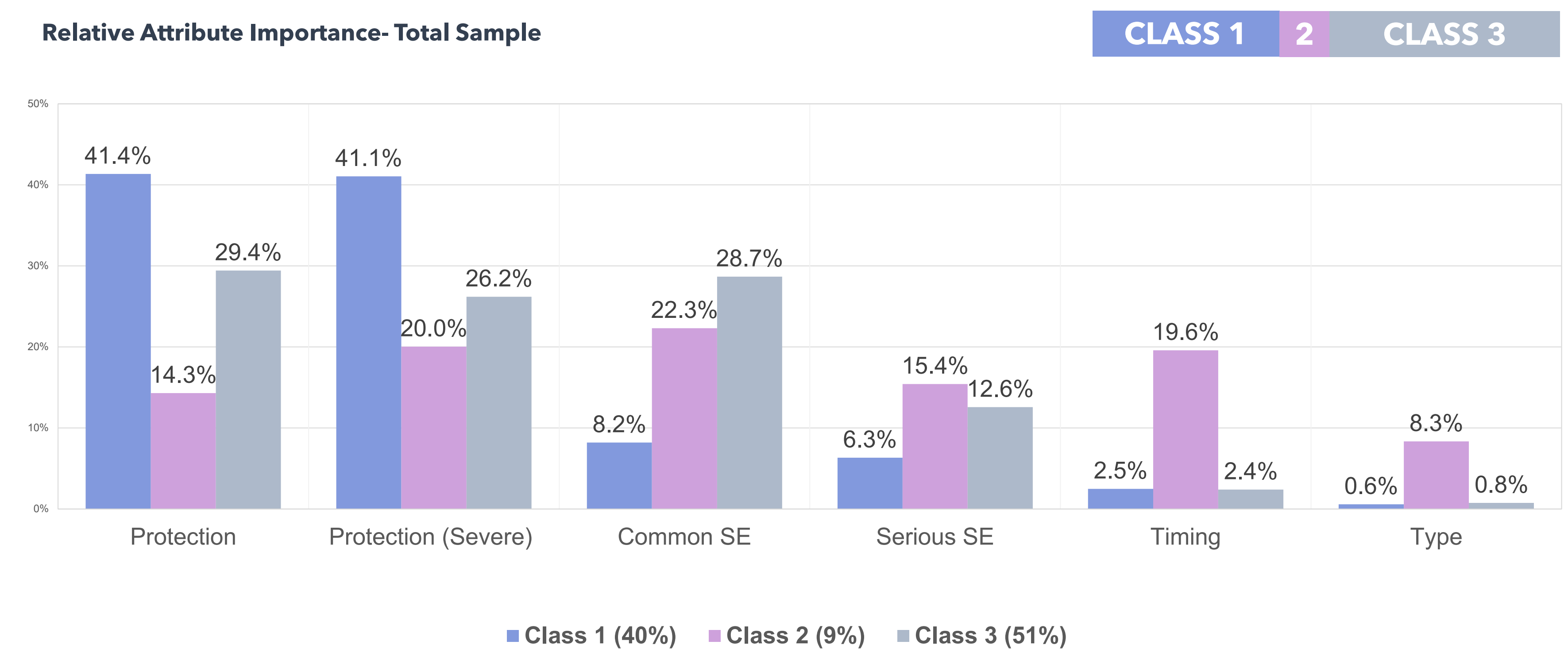
**Table 1. Survey Outcomes for Perception of COVID-19 Vaccine Preferences**

Participant preference	Unvaccinated or partially vaccinated (n=1000), n (%)	Fully vaccinated (n=1000), n (%)	Total population (N=2000), n (%)
<b>Concern about COVID-19</b>			
Not at all	252 (25)	140 (14)	392 (20)
Slightly worried	217 (22)	235 (24)	452 (23)
Moderately worried	279 (28)	320 (32)	599 (30)
Very worried	170 (17)	168 (17)	338 (17)
Extremely worried	82 (8)	137 (14)	219 (11)
<b>Importance of obtaining a choice of COVID-19 vaccines</b>			
Not at all important	41 (4)	43 (4)	84 (4)
Slightly important	64 (6)	77 (8)	141 (7)
Moderately important	231 (23)	223 (22)	454 (23)
Very important	370 (37)	317 (32)	687 (34)
Extremely important	294 (29)	340 (34)	634 (32)
<b>Importance of vaccine type (eg, protein-based or mRNA<sup>a</sup>)</b>			
Not important at all	120 (12)	145 (15)	265 (13)
A little important	193 (19)	128 (13)	321 (16)
Moderately important	261 (26)	204 (20)	465 (23)
Quite important	270 (27)	274 (27)	544 (27)
Extremely important	156 (16)	249 (25)	405 (20)
<b>Worry about serious vaccine side effects</b>			
Not at all worried	90 (9)	212 (21)	302 (15)
A little worried	251 (25)	346 (35)	597 (30)
Moderately worried	253 (25)	236 (24)	489 (24)
Quite worried	245 (25)	120 (12)	365 (18)
Extremely worried	161 (16)	86 (9)	247 (12)
<b>Preferred timing of a COVID-19 vaccine with an influenza vaccine</b>			
Different injections at same time or place	232 (23)	277 (28)	509 (25)
Single combined injection	200 (20)	350 (35)	550 (28)
Separate injections at different time	337 (34)	202 (20)	539 (27)
Indifferent	231 (23)	171 (17)	402 (20)

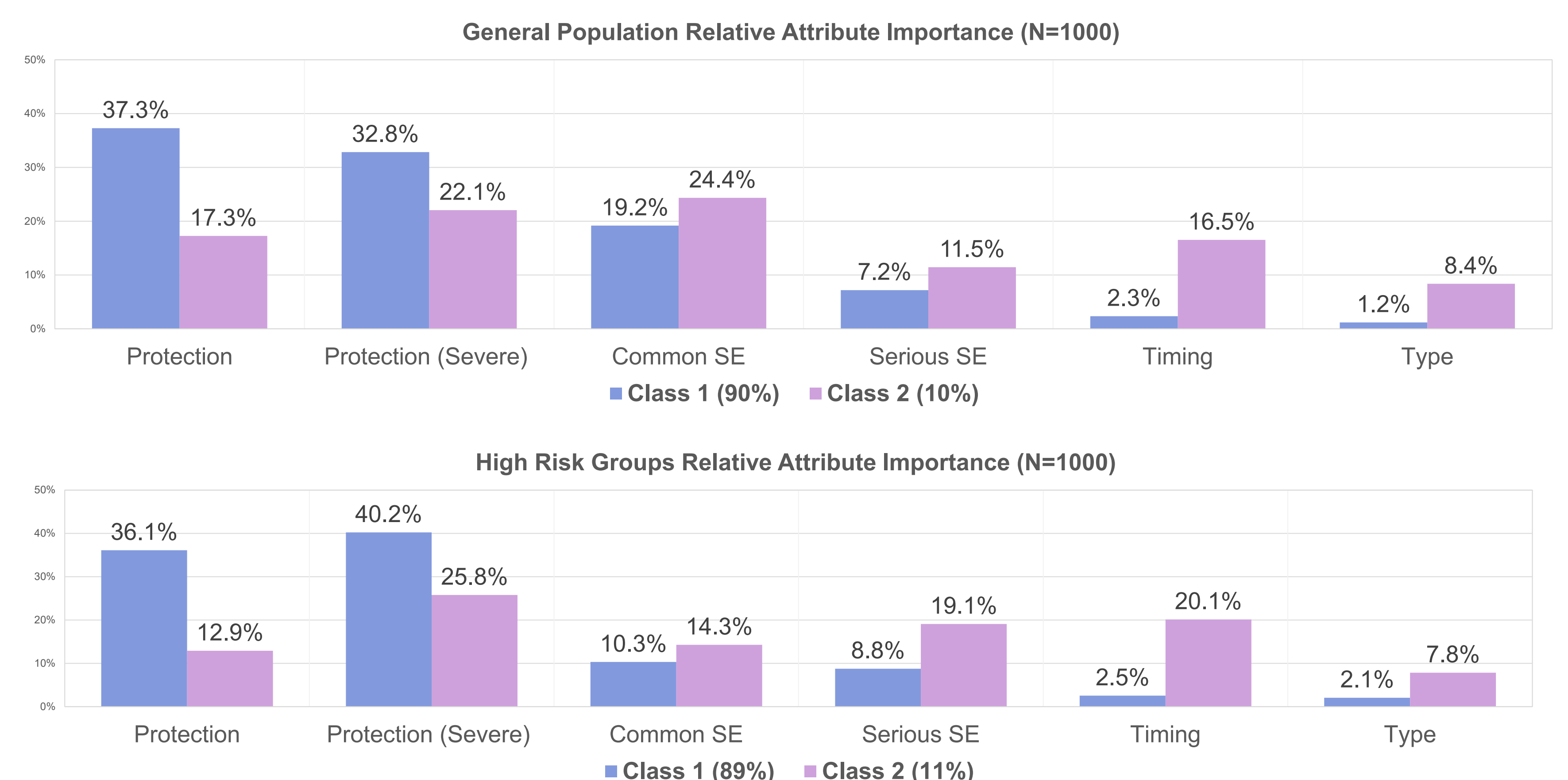
### DCE Latent Class Model Findings

- Latent class analyses of the total sample created three classes (see **Figure 2**).
  - Class 1, which comprised 40.0% of the study sample, were heavily driven by efficacy (protection from COVID-19 and protection from severe COVID-19 disease). Timing of vaccine and vaccine type were not important.
  - A minor Class 2 (9.0%) was also efficacy driven, with a higher RAI on avoiding severe COVID-19 disease:
    - In addition, Class 2 was relatively more concerned by common side effects compared to Class 1 and more preoccupied with serious side effects compared to the other classes.
    - Timing of vaccines and vaccine type were more important to this class compared to other classes; they generally preferred getting separate COVID-19 and influenza injections, potentially to avoid risk of side effects.
  - Class 3, which comprised most of the sample at 51.0%, were driven primarily by attributes related to efficacy as well as common side effects. Like Class 1, timing of vaccine and vaccine type were of lesser importance to this class.
  - Further analysis was conducted by risk stratification (see **Figure 3**):
    - Both subgroups (general population and high-risk groups) were divided into two classes where a similar pattern was observed, though we note different magnitudes in attributes in the two subgroups.

**Figure 2. Latent Class Modeling (Total Sample, N=2000)**



**Figure 3. General Population vs High-Risk Group**



## REFERENCES

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## STRENGTHS AND LIMITATIONS

### Strengths:

- To ensure high data validity, the survey was pilot tested in two stages by participants and reviewed by in-country KOLs
- The sample size was large to ensure good precision on preference estimates and to explore subgroup variation.

### Limitations:

- This research analyses self-reported/stated preferences and, therefore, these findings may not always match revealed preferences/decision-making in real-world situations.

## CONCLUSIONS

- For a majority of the cohorts surveyed, the importance of a lower chance in experiencing COVID-19 vaccine-related common side effects was equal or greater than the importance of vaccine benefit.
- An improved understanding of the importance of vaccine side-effect perceptions (specifically related to the COVID-19 risk group and to feelings of vaccine hesitancy) can help develop more appropriate messaging to inform the population on various vaccine characteristics.

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