Emergence of Curbside Pickup: Consumers' Usage Intention Amid COVID-19 Pandemic

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A B S T R A C T

This study examines how consumers' intention to use a curbside pickup responds to the COVID-19 vaccination rates. With our first survey conducted in March 2021, we find that a low (high) vaccination rate is associated with consumers' high (low) intention to maintain contact avoidance and their high (low) anticipation for shipping delays. Heightened contact avoidance and anticipation for shipping delays may encourage consumers to use a curbside pickup. Our results also show that when a product is needed immediately, and a consumer expects shipping delays, s/he is more likely to use a curbside pickup. However, with our second survey conducted in November 2021, we find heterogeneous consumer responses to the vaccination rates. Specifically, consumers' political affiliation moderates the relationship between the vaccination rates and their intention to maintain contact avoidance. The association between the vaccination rates and the anticipation for shipping delays is also weakened compared to March 2021. Our empirical results illustrate how consumers' intention to use a curbside pickup emerges and changes amid the COVID-19 pandemic.

Keywords: Curbside Pickup, COVID-19, Contact Avoidance, Shipping Delays, Vaccination Rate, Immediacy, Political Affiliation

Ⅰ. Introduction

Consumer shopping behaviors have changed significantly due to the COVID-19 pandemic. When the "stay-at-home order" was issued along with social distancing in March 2020 in the US, consumers were forced to shop for groceries differently. Before the pandemic, 81% of consumers had never shopped for groceries online, but 79% of consumers have tried doing so during the pandemic. Besides that, even when shopping in-store, shoppers try to get in and out of the store as quickly and conveniently as possible (Morgan, 2020). A survey shows that 75% of consumers have tried a new shopping channel,

including curbside pickup and delivery apps (Charm et al., 2020).

Curbside pickup has emerged as a middle ground for businesses to keep their employees safe while meeting consumers' demands. The service allows retailers to keep associates employed, prevent inventory pile-up, and leverage stores as mini warehouse distribution centers without incurring additional shipping costs (Stone, 2020). Curbside pickup is an online-offline hybrid shopping channel, where orders are placed by phone, online, or through a mobile app and packaged up. Consumers then can drive up to a designated parking spot and wait for employees to carry out their orders. Since implementing curbside pickup, Target reported a dramatic increase in sales by more than 700% in the second quarter in 2020, while Walmart added more curbside pickup slots together with expanding more than 160,000 items to its available assortments (Repko, 2020).

Curbside pickup has several advantages over online or brick-and-mortar shopping. Unlike online purchases to be delivered, curbside pickup affords a faster pickup of pre-ordered products. For products with varying quality, such as vegetables or fruits, curbside pickup allows consumers to check their quality at their pickup. Unlike brick-and-mortar shopping, consumers do not have to stand in a line to check out. Furthermore, consumers could confirm the availability of products before they visit the store, preventing a trip for nothing.

With the vaccine programs rolling out, consumers may feel safe to go back to normal activities before the pandemic. Given the sudden popularity of curbside pickups during the pandemic, the following natural questions arise: What drove curbside pickup usages amid the COVID-19 pandemic? Will curbside pickup remain an active shopping channel even after the pandemic?

There are scant studies on Buy-Online Pickup-In-Store (BOPIS), including the BOPIS adoption (Kim et al., 2017), the optimal picking rate for BOPIS order fulfillment (MacCarthy et al., 2019), and the impact of BOPIS usage on subsequent purchase behaviors (Song et al., 2020). However, the studies mentioned above are silent about consumers' BOPIS usages amid the pandemic. As curbside pickup has rapidly become a vital shopping conduit during the pandemic, this study aims to identify drivers of consumers' curbside pickup usage, particularly from pandemic-specific factors.

To identify potential drivers of curbside pickup usages during the pandemic, we first collected newspaper articles related to the surge of curbside pickup. We also conducted an explorative pre-survey from 50 shoppers who switched their preferred shopping channels during the pandemic, from brick-and-mortar to curbside pickup or online delivery to curbside pickup. They suggest the main drivers of curbside pickup usage—1) contact avoidance (those who switched the brick-and-mortar to curbside pickup), 2) delivery delays (those who switched online delivery to curbside pickup), and 3) affordances of curbside pickup to convenience and immediacy of product purchase. Using these factors, we build our research model to reveal such factors as drivers of curbside pickup usages formally.

Regarding delivery delays, as the COVID-19 unfolded at the beginning stage in 2020, retailers were crushed with skyrocketing online order demands for delivery. Amazon Fresh, a service provided by Amazon, had to put grocery-delivery users on the waitlist due to a sudden surge in demand and reduce its Whole Foods Markets store hours so that their employees could prioritize backlogged online orders (Selyukh, 2020). With extensive COVID-19 vacci-

nation programs, the US is bouncing back to normal life. However, Asian countries are being hit with new waves of clusters of COVID-19 cases and are creating stagnancy in the global supply chain. Yantian, an active port in southern China, is only at 30% of its usual capacity as of June 2021. Industry experts claim that such backlog would affect globally goods sold at Walmart and Home Depot in the US (Xie et al., 2021).

Meanwhile, the vaccines were believed to be very effective against COVID-19 infection at their introduction. In March 2021, CDC also announced that Pfizer and Moderna vaccines were 90% effective (Branswell, 2021). However, with succeeding variants and increased breakthrough infections reported, the vaccines might not be perceived as effective as we thought in the early stages of vaccination. A recent study also claims that natural immunity outperforms vaccines in preventing reinfections and breakthrough infections for the Delta variant (Gazit et al., 2021).

Considering the above situational factors, we explore how consumers' intention to use curbside pickup changes amid the COVID-19 pandemic, with their contact avoidance and anticipation for shipping delays responding to the vaccination rates. Specifically, the research questions for this study are:

1. How does the COVID-19 vaccination rate affect consumers' intention to maintain contact avoidance and their anticipation about shipping delays?
2. How do consumers' intention to maintain contact avoidance and their anticipation for shipping delays affect consumers' intention to use a curbside pickup?
3. How does consumers' immediate need to purchase products moderate the relationships between contact avoidance intention (and shipping delays an-

ticipation) and their intention to use a curbside pickup?

With the March survey, we have found that the COVID-19 vaccination rate is negatively associated with consumers' intention to maintain contact avoidance and their anticipation for shipping delays, affecting consumers' intention to use a curbside pickup. Also, when a product is needed immediately, and a consumer expects shipping delays, s/he is more likely to use a curbside pickup due to the nature of the service, enabling consumers to schedule an order pickup to their convenience. However, with the November survey, we have found inconsistent results. Specifically, the relationship between the COVID-19 vaccination rates and the intention to maintain contact avoidance is no longer significant. Also, the relationship between the COVID-19 vaccination rates and anticipation for shipping delays is significantly weakened. Our post hoc analysis reveals that political affiliation largely governs the association. The path from the vaccination rate to consumers' intention to maintain contact avoidance is still significant for democrats, but not for politically neutral and republican consumers. Furthermore, the relationship between the vaccination rate and anticipation for shipping delays is not statistically significant for republicans.

In the following section, we review protection motivation theory, which provides the conceptual background of our research model, and develop a set of our hypotheses. Then, we introduce the data collection process, research methods, and results. Lastly, we conclude and summarize the contents of this study and explore the contributions and limitations along with directions for future research.

Ⅱ. Theoretical Framework and Hypothesis Development

We employ the protection motivation theory as our theoretical framework to explain consumers' shopping channel choices responding to the vaccination rates. Protection motivation theory has been used in prediction for a vast range of health behaviors, including exercise and diet (Plotnikoff and Higginbottom, 2002), smoking (Greening et al., 2001), binge drinking (Murgraff et al., 1999), and outdoor activities avoidance due to air pollution (Neidell, 2009; Zivin and Neidell, 2013).

Protection motivation theory is a framework for understanding the fear appeals developed by Rogers (1975). It was later revised and extended to provide a more well-rounded understanding of the effects of persuasive communications, emphasizing the cognitive processes which mediate our behavior change (Rogers, 1983). Extension of research on protection motivation theory has been vastly in the forms of (1) developing and evaluating persuasive communications; and (2) being used a social cognition model in the prediction of health behavior (Norman et al., 2005). Rogers (1975) developed the Protection Motivation framework based on Hovland et al. (1953) on expectancy-value theories in which it postulates that there are three crucial components to a fear appeal: (a) the magnitude of noxiousness of an event, (b) the conditional probability that the event will occur if no adaptive behavior is performed, and (c) the availability and effectiveness of a coping response. The framework was subsequently revised to include several factors that initiate the cognitive mediating processes (i.e., maladaptive responses, self-efficacy, and response costs), organized into threat appraisal and coping appraisal processes (Norman et al., 2015).

According to CDC, COVID-19 vaccines effectively prevent the spread of the pandemic; the fully vaccinated could resume normal activities. While Western countries were bouncing back to normal life, Asian countries with lower vaccination rates, such as Singapore, Thailand, Taiwan, and Vietnam, saw a rapid rise in COVID-19 cases as experts claimed that these incidents were likely to occur and would continue to happen until vaccines would be rolled out (Mandhana, 2021). Consumers feel unsafe interacting with other people with a lower community vaccination rate as they take preventive health behaviors.

Linking the protection motivation theory, particularly in the early stage of the vaccination programs, we had an extreme fear of the COVID-19 infection, with its reported possible consequences such as brain fogs, difficulties in breathing, or death (*High in the magnitude of noxiousness of an event*). The coronavirus quickly spread through exhaled droplets and particles indoors without a mask (*high event probability*). Lastly, the vaccines effectively protected us against infection (e.g., 90% protection of Pfizer vaccines) and were available nationwide (*Available and effective coping responses*). Thus, we propose that:

H1: The COVID-19 vaccination rate is negatively associated with consumers' intention to maintain contact avoidance.

In March 2020, a lockdown order was issued across the US to prevent the spread of COVID-19, which led to a sudden increase in demand for online delivery. Amazon was bombarded with delivery orders at the beginning of the COVID-19 pandemic, while essential items such as household staples and medical supplies were out of stock, resulting in the company having to prioritize shipments of such products to

allow itself to quickly restock and make shipments to consumers (Emont, 2020). At times, delivery orders were on halt and delayed for weeks, as retailers such as Costco, Target, and even apparel retailers were met with a skyrocketing volume of online orders while shipping companies such as UPS, FedEx, and U.S. Postal Service were tasked with fulfilling the deliveries (Lerman, 2020). According to Statista, 40% of consumers experienced delays in online grocery delivery, 20% experienced no suitable home delivery time slots, and 19% experienced no pickup time slots (Statista, 2021).

Workers are vulnerable to getting infected with a lower vaccination rate (*high event probability*). They would stay inside to avoid physical contact with others (*available and effective coping responses*), leading to worker shortages and possible shipping delays. Thus, we propose that:

H2: The COVID-19 vaccination rate is negatively associated with consumers' anticipation of shipping delays.

The rationale behind H1 and H2 relies on vaccine effectiveness. New variants and an increase in breakthrough infections contrast our early expectations of the COVID vaccines. Based on observations in Israel, a recent empirical study also claims that vaccines were not very effective as natural immunity for the Delta variant (Gazit et al., 2021) (*Lowered effectiveness of a coping response*). Thus, we propose that:

H3(a): The negative association between the COVID-19 vaccination rate and consume' intention to maintain contact avoidance is weakened with less effective vaccines.

H3(b): The negative association between the COVID-19 vaccination rate and consumers' anticipation of shipping delays is weakened with less effective vaccines.

Contact avoidance, or social distancing, is suggested by World Health Organization to limit the spread of COVID-19 by enforcing a distance of at least 6 feet away from each other and avoiding spending time in crowded places or groups. Public health professionals universally agree that to prevent the further spread of COVID-19 requires a collective public response, such as wearing a mask in public and maintaining social distancing.

As the general public became more informed with COVID-19, it also meant that consumers grew weary of spending too much time shopping inside physical stores (Tyko, 2020). COVID-19 has changed how consumers view and value stores as they have embraced the value of safety, speed, and convenience. Also, a vast majority of consumers have turned to curbside pickup orders compared to before the pandemic, with only a small number of these consumers planning to shop in-store again for the foreseeable future (Dworksi, 2020).

Drawing from the standpoint of protection motivation theory, individuals take action to maintain social distancing during the COVID-19 pandemic. Ongoing safety concerns about shopping in-store (Buyakie, 2021) and expected shipping delays from retailers can lead to a possible surge in usage of curbside pickup. Therefore, we propose that:

H4: Consumers who have higher intention to maintain contact avoidance have higher intention to use a curbside pickup.

H5: Consumers who have higher anticipation of shipping delays have a higher intention to use a curbside pickup.

We may have an immediate product need. For example, in the case of empty shelves for toilet paper rolls, we may not tolerate delivery waits but go outside and pick them up right from the shelves. For perishable products, such as frozen groceries or ice-creams, whose quality quickly deteriorates due to environmental conditions, we might be concerned about their quality change over time, resulting in choosing a purchase channel that allows an immediate pickup. Curbside pickup offers the flexibility to schedule for pickup when convenient, rather than being beholden to a random delivery window. The curbside pickup could afford our shopping goals when we want to maintain contact avoidance and obtain the product immediately. Therefore, we propose that:

H6(a): Immediate product need strengthens the positive relationship between contact avoidance intention and the intention to use a curbside pickup.

H6(b): Immediate product need strengthens the positive relationship between shipping delays anticipation and the intention to use a curbside pickup.

To test our hypotheses, we collected data in March 2021 and November 2021. We compared the estimation results from each data set obtained at different times. We also control for various factors, including age, gender, education level, political affiliation, years of experience in Internet usage, online grocery shopping experiences before COVID-19, curbside pickup grocery shopping experiences before COVID-19, and income (only in the November survey) to tease out an unbiased association between focal variables in our model. <Figure 1> depicts our research model.

Ⅲ. Research Methodology

3.1. Data Collection

We test our hypotheses by implementing the scenario-based factorial survey approach (Johnston et
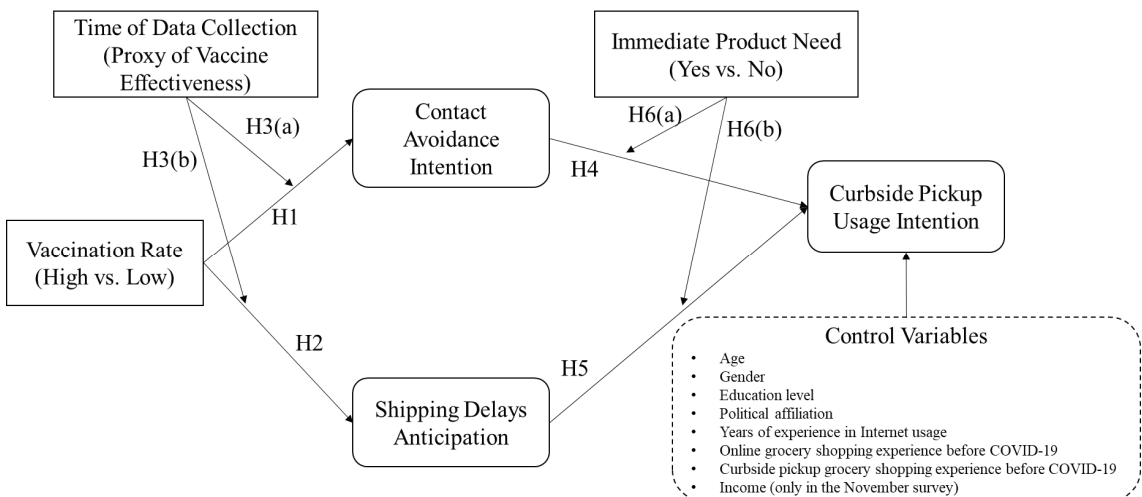
<Figure 1> Research Model

al., 2016, Rossi and Anderson, 1982). Specifically, we present participants with hypothetical scenarios through vignettes written descriptions of situations and then request responses on various rating scales. Our experimental design manipulates the immediacy of product need (immediate vs. not immediate) and the two levels of vaccination rates, low (0% to 25%) vs. high (50% to 75%). We conducted the survey twice, once in March 2021 and the other in November 2021. An example of the vignettes provided to the participants is shown in <Appendix A>.

We first provided a brief introduction of curbside pickup to our participants, particularly those without curbside pickup experience (around 36.5% of participants). Then, we randomly assigned each participant to one of our vignettes. After reading the assigned vignettes, participants were asked to respond to survey questions per the presented situation using a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). We also had two manipulation check questions in our November survey with a 7-point Likert scale: How high is the local vaccination rate in your scenario? and How much will you tolerate for 'temporarily out of stock' of your items? Then, we asked their intention to use a curbside pickup, intention to maintain contact avoidance, anticipation for shipping delays, and demographics. Our measures for intention to use a curbside pickup and intention to maintain contact avoidance are three items adapted from Mackenzie et al. (1986). Our measures for anticipation for shipping delays are three items adapted from Cho (2004). When measuring participants' political affiliation, we asked them to choose among the three choices: Democrat, Neutral, and Republican.

We conducted our survey on US consumers using Amazon Mechanical Turk. Respondents who completed the survey received a reward of $0.70 each. Two attendance check questions were added to remove careless responses. In our first survey conducted in March 2021, a total of 387 responses were collected, with 141 invalid responses that did not pass the attendance check questions or had missing value, resulting in 246 valid responses collected. In our second survey conducted in November 2021, out of the 684 initial responses, we collected 415 valid responses. The participants' demographics are given in <Table 1>.

3.2. Measurement Model Assessment

Before the main analysis, we check whether our manipulation was successful. Participants with the 50% ~ 75% local vaccination rate reported a higher vaccination rate (M_{VAC} = 4.29 , SD_{VAC} = 2.06) than the 0% ~ 25% group (M_{VAC} = 2.49, SD_{VAC} = 1.35). Also, participants assigned to the immediate need group reported being less tolerant for 'temporarily out of stock' (M_{IMM} = 1.86, SD_{IMM} = 1.72) than the others (M_{IMM} = 4.04, SD_{IMM} = 2.98).

We assess our measures regarding reliability, convergent validity, and discriminant validity. <Table 2> summarizes factor loading values, average variance extracted (AVE), composite reliability (CR), and Cronbach's Alpha. We aggregate the March and the November surveys to assess these measures. The loading values for all items are greater than the recommended value of 0.6 (Kline, 2014). Composite reliability values range from 0.842 to 0.876, and Cronbach's alpha values range from 0.718 to 0.788, respectively, fulfilling the criterion of 0.7 (Nunnally, 1978). All values for AVEs are greater than the criterion of 0.5 (Hu et al., 2004). <Table 3> shows the discriminant validity of our measures with the square root of AVEs greater than the correlations among constructs (Chin, 1998).

<Table 1> Participant Demographics

Demographic	The March Survey (n_{Mar}=246)		The November Survey (n_{Nov}=415)	
	Frequency	Percentage	Frequency	Percentage
Gender				
- Female	88	35.8	141	34.0
- Male	158	64.2	274	66.0
Age				
- 18 to 24	12	4.9	23	5.5
- 25 to 34	100	40.7	168	40.5
- 35 to 44	78	31.7	115	27.7
- 45 to 54	28	11.4	56	13.5
- 55 to 64	24	9.8	44	10.6
- 65 to 74	2	0.8	5	1.2
- 75 or older	2	0.8	4	1.0
Region				
- Midwest	48	19.5	83	20.0
- Northeast	42	17.1	65	15.7
- South	95	38.6	176	42.4
- West	61	24.8	91	21.9
Education				
- Less than high school degree	1	0.4	2	0.5
- High school degree or equivalent	15	6.1	33	8.0
- Some college	20	8.1	33	8.0
- Associate degree	22	8.9	36	8.7
- Bachelor's degree	137	55.7	253	61.0
- Graduate degree	51	20.7	58	14.0
Year of experience in Internet usage				
- Less than 3 years	6	2.4	9	2.2
- 4 to 7 years	57	23.2	92	22.2
- 8 to 10 years	31	12.6	55	13.3
- More than 10 years	152	61.8	259	62.4
Online groceries shopping experience before COVID-19				
- Yes	176	71.5	303	73.0
- No	70	28.5	112	27.0
Curbside groceries shopping experience before COVID-19				
- Yes	150	61.0	270	65.1
- No	96	39.0	145	34.9
Political affiliation				
- Democrat	140	56.9	159	38.3
- Neutral	60	24.4	145	34.9
- Republican	46	18.7	111	26.8

<Table 1> Participant Demographics (Cont.)

Personal income last year				
- Over $150,000	-	-	7	1.7
- $100,000 - $149,999	-	-	10	2.4
- $75,000 - $99,999	-	-	31	7.5
- $50,000 - $74,999	-	-	75	18.1
- $25,000 - $49,999	-	-	100	24.1
- $10,000 - $24,999	-	-	105	25.3
- Less than $10,000	-	-	86	20.7

Note: The personal income was not collected in the March survey

<Table 2> Reliability and Convergent Validity

Variable	Item	Loading values	Cronbach's α	rho_A	CR	AVE
Curbside Pickup Usage Intention (CI)	CI1	0.849				
	CI2	0.829	0.782	0.786	0.873	0.697
	CI3	0.813				
Contact Avoidance Intention (CA)	CA1	0.823				
	CA2	0.824	0.718	0.727	0.842	0.640
	CA3	0.735				
Shipping Delays Anticipation (SD)	SL1	0.838				
	SL2	0.840	0.788	0.792	0.876	0.702
	SL3	0.824				

<Table 3> Discriminant Validity

Variable	CI	CA	SD
CI	0.835		
CA	0.417	0.800	
SD	0.432	0.232	0.838

Note: Leading diagonal shows the square root of AVE of each construct

3.3. Structural Model Assessment

We assess our structural model using SmartPLS 3.3.3. We test our hypotheses through 500 sample bootstraps. Path coefficients and significance values for the main effects are reported in <Table 4>.

With the March survey, our assessment supports H1, H2, H4, H5, and H6(b) but rejects H6(a), after controlling for age, gender, education level, political affiliation, years of experience in Internet usage, on-line grocery shopping experiences before COVID-19, and curbside pickup grocery shopping experiences before COVID-19.

When the community is less vaccinated, consumers intend to avoid interaction with others (H1) and have higher anticipation for shipping delays (H2). We also conduct independent sample t-tests for H1 and H2. In the group of low vaccination rate (n_L = 137), the mean (standard deviation) of contact avoidance intention is 5.616 (0.927), and the mean

<Table 4> Structural Model Testing Result

The March survey				
Path	Path coefficient	t-value	p-value	Hypothesis
H1: VR → CA	-0.493	12.007	< 0.001	Supported
H2: VR → SD	-0.795	44.295	< 0.001	Supported
H4: CA → CI	0.433	7.253	< 0.001	Supported
H5: SD → CI	0.352	5.258	< 0.001	Supported
H6a: CA*I	-0.046	0.785	> 0.1	Rejected
H6b: SD*I	0.126	2.142	< 0.05	Supported
The November survey				
H1: VR → CA	-0.094	1.830	> 0.05	Rejected
H2: VR → SD	-0.190	3.939	< 0.001	Supported
H4: CA → CI	0.257	5.602	< 0.001	Supported
H5: SD → CI	0.326	7.435	< 0.001	Supported
H6a: CA*I	0.015	0.304	> 0.1	Rejected
H6b: SD*I	0.191	4.373	< 0.05	Supported

(standard deviation) of shipping delays anticipation is 5.569 (0.643), whereas, in the group of high vaccination rate (n_H = 109), they are 4.413 (1.234) and 3.364 (1.035), respectively. The mean difference between the two groups is statistically significant for both variables (t-values are 8.454 and 19.459, respectively).

Consumers' heightened contact avoidance and shipping delays anticipation are associated with their high intention to use a curbside pickup (H4 and H5). The immediate product need moderates the relationship between shipping delays anticipation and curbside pickup usage intention (H6b), but not between contact avoidance intention and curbside pickup usage intention (H6a). None of our control variables are statistically significant.
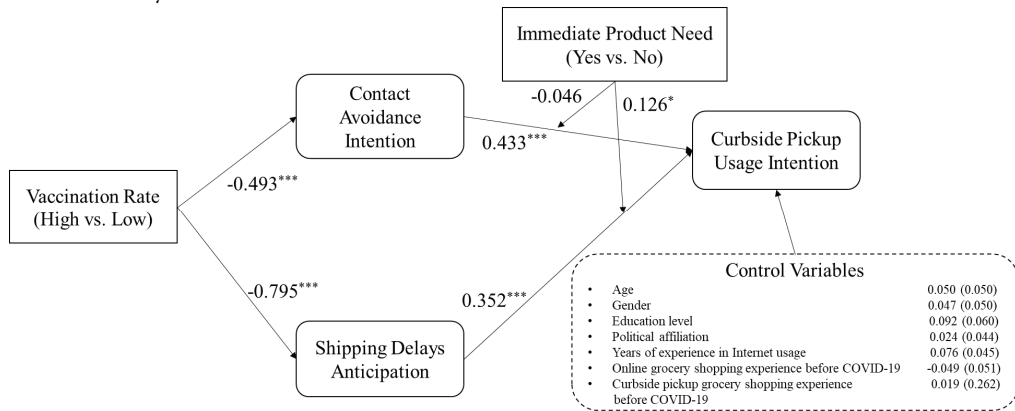
With the November survey, however, we find inconsistent results. H2, H4, H5, and H6 are still supported, but H1 is rejected. Furthermore, the association between Vaccination Rate and Shipping Delays Anticipation is significantly weakened in the November survey (M_{VR_SD} = -0.190, SD_{VR_SD} = 0.048)

compared to the March survey (M_{VR_SD} = -0.795, SD_{VR_SD} = 0.018) (the spooled t-test on the difference in coefficient estimates for H2 confirms the significant difference with t-value of 9.482). These differences support our hypotheses H3(a) and H3(b), where the effects of the vaccination rates are weakened with a lowered vaccine effectiveness for the COVID variants. None of our control variables are statistically significant.[1]
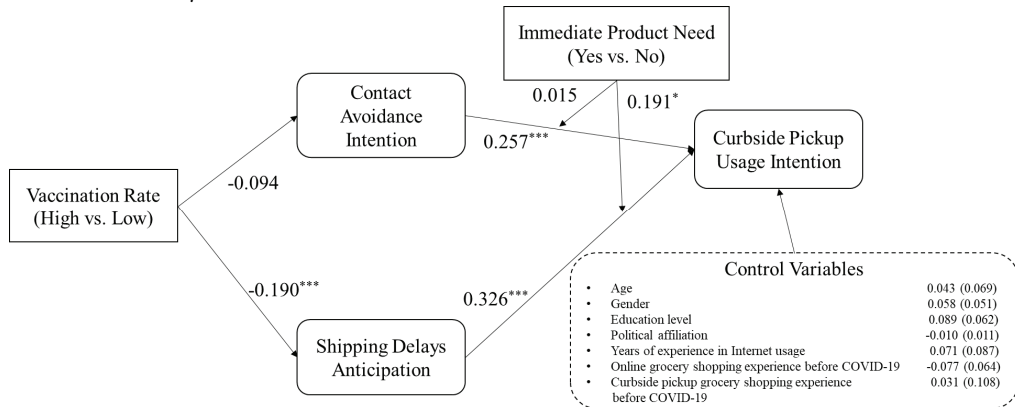
As of November 2021, citizens have different reactions to COVID-19 vaccination programs. The federal government and many large companies mandate the vaccination by socially penalizing those unvaccinated to some extent (Benveniste, 2021). While proactively providing protection against the COVID-19, vaccine mandates trigger an issue of sup-

1) We collected the income as a control variable in the November survey only and confirmed that the income was insignificant. Further, incorporating the income into the model barely affects our focal coefficients' size and significance <Appendix C>. For a fair comparison between the March and November surveys, we report the results without controlling for the income.
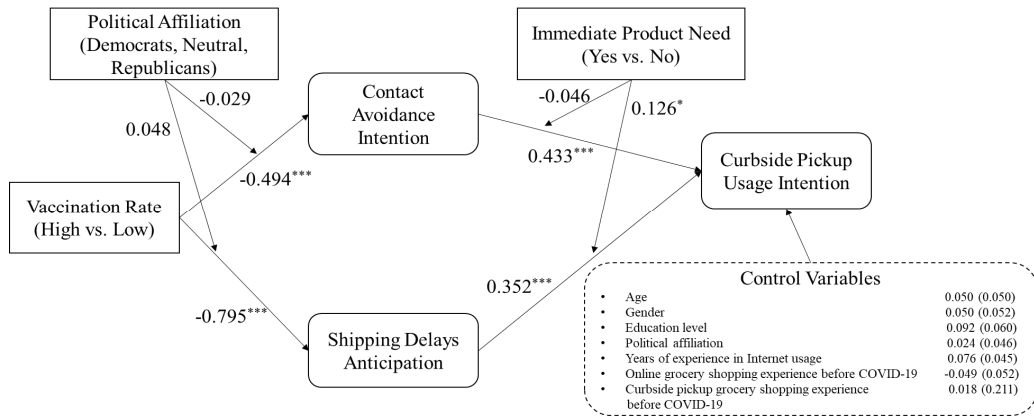
2(a) The March Survey

2(b) The November Survey

<Figure 2> Structural Model Testing Result

Note: $^*p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$, standard errors are in parentheses
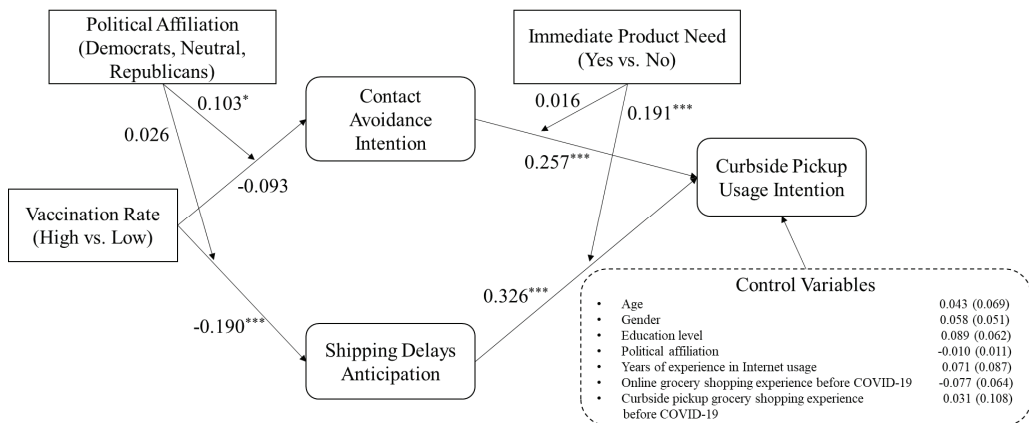
pressing the right of self-determination and intruding on an individual's free will. Such society-driven pressure recently arose public opinions against the COVID-19 vaccine programs, particularly those not in favor of the current ruling party. Several states, such as Texas, Florida, and Georgia, sued the Biden administration over the federal requirement, which calls on all federal workers and contractors to be vaccinated (Pollard, 2021). Also, many anti-vaccine mandate protests erupt in the US and other countries such as Australia, New Zealand, and European countries (Haring, 2021).

As a post hoc analysis, we further examine a possible moderating role of political affiliation responding to the vaccination rates, given that republicans drive recent anti-vaccine mandate protests (Sexton, 2021). In March, consumers' political affiliation did not moderate the relationship between Vaccination Rate and Contact Avoidance Intention, whereas it did in November <Figures 4(a) and 4(b)>. Specifically, H1 is supported for Democrats, whereas it is not supported for politically neutral and republican consumers <Table 5>. Furthermore, H3 and H6(b) are rejected for republicans.

3(a) The March Survey

3(b) The November Survey

<Figure 3> Structural Model Testing Result with Political Affiliation as the Moderator

Note: $^*p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$, standard errors are in parentheses

IV. Discussion and Conclusions

In this study, we investigate consumers' intention to use a curbside pickup amid the COVID-19 pandemic. Through vignette-based surveys, we examine how the vaccination rates affect consumers' intention to maintain contact avoidance and their anticipation for shipping delays, which in turn affects consumers' intention to use a curbside pickup, as well as exploring the moderating effect of immediate product need. We collected our data at different stages of vaccine penetration with new COVID-19 variants. Our analysis results with the November survey are different from those with the March survey.

Protection motivation theory may explain why we obtained different results from data sets obtained at other times <Table 6>. In March 2021, we had a great fear of being infected by the COVID-19, whereas as of November 2021, we are slowly returning to normal and strive to find a way to live with it.

<Table 5> Structural Model Testing Result with Political Affiliation as Moderator (The November Survey)

Path	Path coefficient	t-value	p-value	Hypothesis
Total (n_{Nov} = 415) (Political affiliation as the moderator)				
H1: VR → CA	-0.093	1.829	> 0.05	Rejected
H2: VR → SD	-0.190	3.957	< 0.001	Supported
H4: CA → CI	0.257	6.163	< 0.001	Supported
H5: SD → CI	0.326	7.751	< 0.001	Supported
H6a: CA*I	0.016	0.338	> 0.1	Rejected
H6b: SD*I	0.191	4.492	< 0.001	Supported
VR*PA → CA	0.103	2.045	< 0.05	
VR*PA → SD	0.026	0.549	> 0.1	
Democrats (n_{Demo} = 159)				
H1: VR → CA	-0.268	3.420	< 0.01	Supported
H2: VR → SD	-0.202	2.677	< 0.01	Supported
H4: CA → CI	0.211	3.175	< 0.01	Supported
H5: SD → CI	0.359	4.879	< 0.001	Supported
H6a: CA*I	0.013	0.167	> 0.1	Rejected
H6b: SD*I	0.193	2.855	< 0.01	Supported
Neutral ($n_{Neutral}$ = 145)				
H1: VR → CA	-0.010	0.116	> 0.1	Rejected
H2: VR → SD	-0.239	2.873	< 0.01	Supported
H4: CA → CI	0.185	2.575	< 0.01	Supported
H5: SD → CI	0.310	4.070	< 0.001	Supported
H6a: CA*I	-0.068	0.884	> 0.1	Rejected
H6b: SD*I	0.360	5.586	< 0.001	Supported
Republican (n_{Rep}=111)				
H1: VR → CA	-0.003	0.030	> 0.1	Rejected
H2: VR → SD	-0.146	1.550	> 0.1	Rejected
H4: CA → CI	0.333	4.026	< 0.001	Supported
H5: SD → CI	0.317	2.506	< 0.05	Supported
H6a: CA*I	0.098	0.768	> 0.1	Rejected
H6b: SD*I	0.151	0.667	> 0.1	Rejected

That is, we are on the way to a balance rather than entirely sacrificing our social activities. While the conditional probability of being infected without vaccination is high both in March and November, with new COVID variants and many breakthrough infections reported, our attitude towards vaccination might be changed. Some argue that natural immunity outperforms vaccination. CDC also officially confirms that mRNA vaccines may cause severe heart damages, such as myocarditis and pericarditis (CDC 2021). As such, the vaccination might not be perceived as an effective coping as much as in March. Therefore, we could obtain different results from the November survey.

<Table 6> March vs. November: Comparing the Components in the Protection Motivation Theory

Components in the protection motivation theory	March 2021	November 2021
(a) the magnitude of noxiousness of an event	* Stuck with great fear of being infected * Obsessed with the aftereffects (e.g., brain fogs, stroke, or blockages in their lungs)	* Slowly returning to normal * Living with the COVID-19 * Moving from pandemic to epidemic
(b) the conditional probability that the event will occur if no adaptive behavior is performed	* High	* High
(c) the availability and effectiveness of a coping response	* Vaccines are available and effective * Vaccines may cause side effects (e.g., arm pain and redness, fever)	* Many breakthrough infection cases reported * Some argue that natural immunity outperforms vaccination * Vaccines may cause severe heart damages (e.g., myocarditis, pericarditis)

Our findings provide substantial theoretical and managerial implications. This study contributes to the research stream of consumers' shopping channel usages amid the COVID-19 pandemic. BOPIS behaviors had received relatively little academic attention before the pandemic, as they were not very popular practices. Under the pandemic, the curbside pickup has become a vital shopping conduit, and it is now imperative to understand what drives it. This study is one of the first to reveal pandemic-specific drivers of using a curbside pickup service. Specifically, we identify two antecedents of curbside pickup usage, contact avoidance intention and shipping delays anticipation, and empirically validate their potential effects. We also find that immediate product need may strengthen the positive relationship between anticipation of shipping delays and the intention to use a curbside pickup.

We also reveal that vaccination rates could affect contact avoidance intention and anticipation for shipping delays. However, such effects might depend on our perception of vaccine effectiveness. Both negative associations between the vaccination rates and contact avoidance intention, and between the vaccination rates and anticipation for shipping delays are weakened in November compared to March.

This study also casts timely implications for business amid the pandemic, considering a different level of vaccination rate. Consumers are more willing to use a curbside pickup with higher contact avoidance and shipping delays anticipation. Depending on the vaccination rate, shopping platforms may secure more in-stocks for local branches to meet consumer demands for the curbside pickup. Further, given that consumers may choose their preferred purchase channel to curbside pickup due to delivery delays, shopping platforms may strategically reserve more curbside pickup demands by adjusting delivery capacity when needed.

We conclude by articulating the limitations of this study and providing future research directions. Our samples are limited to users solely in the US, a car-centric country. As such, our model might not be generalized to countries such as Hong Kong, where shoppers heavily rely on public transportation. Further, while we focus on grocery shopping, future research may expand to the scopes of various products or industries, such as restaurants or fashion items.

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<Appendix A> Description of Vignettes

Imagine that your local COVID-19 vaccination rate is 0 ~ 25% [or 50 ~ 75%], and you need to shop for groceries. Your shopping list contains items that you need immediately [or do not need immediately] (Please imagine the items). You check online (through a website or mobile app) and notice that all the items you need are in stock and available for curbside pickup at the local grocery store.

<Appendix B> Constructs and Measures

● Intention to use curbside pickup (CI): (Adapted from MacKenzie et al., 1986)
Question: In this situation described, would you intend to use curbside pickup?
CI1. Unlikely – Likely
CI2. Impossible – Possible
CI3. Improbable – Probable

● Intention to avoid contact (CA): (Adapted from MacKenzie et al., 1986)
Question: In this situation described, would you intend to avoid contact?
CA1. Unlikely – Likely
CA2. Impossible – Possible
CA3. Improbable – Probable

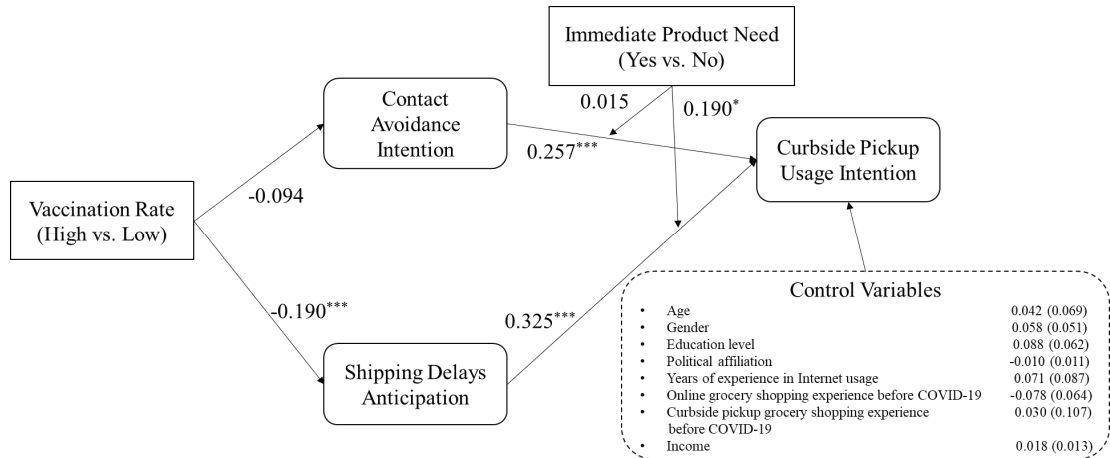● Anticipation for shipping delays (SD): (Adapted from Cho, 2004)
Question: In this situation described,
SD1. I worry that there will be a shipping delay with online orders.
SD2. I worry that same-day delivery won't be guaranteed.
SD3. I worry that online orders won't be delivered on time as usual.

<Appendix C> Structural model testing result with the income as a control variable (the November survey)

Note: $^*p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$, standard errors are in parentheses

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