Maternal Attitudes and Intentions About the COVID-19 Vaccine for Children Aged 5−11 Years

Christine A. Limbers, PhD, & Rachel Thompson, BA

Introduction: The current study assessed maternal attitudes and intention about the COVID-19 vaccine for children ages 5−11 years since the onset of the Delta variant and examined if the Delta variant changed maternal perceptions about COVID-19 vaccination and COVID-19 precautions for children.

Method: Participants were 821 mothers (mean age = 40.11 years; 84.3% White) from the United States who had at least one child aged 5−11 years old. They were recruited online and completed questionnaires on Qualtrics (Provo, UT) about their youngest children aged 5−11 years.

Results: Most mothers (n = 595; 72.6%) reported they were very likely to have their child vaccinated for COVID-19 once a vaccine is available for children. After controlling for maternal and child factors, maternal trust in the COVID-19 vaccine development and approval process (odds ratio [OR] = 35.07; p < .001) was associated with maternal likelihood of having one's child vaccinated for COVID-19.

Discussion: Our findings highlight that one strategy for increasing maternal intent to have one's child vaccinated for COVID-19 may be bolstering maternal trust in the COVID-19 development and approval process. J Pediatr Health Care. (2022) 36, 416−429

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Conflicts of interest: None to report.

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INTRODUCTION

Szilagyi et al. (2021) conducted one of the most comprehensive studies on parental perceptions and intentions about the COVID-19 vaccine for their children. In this study, 28% of parents of children ages 0−18 years in the United States reported they were very likely to have their child vaccinated for COVID-19 (Szilagyi et al., 2021). Parents were most likely to report the intent to have their child vaccinated if their child was older and if they had obtained a bachelor's degree or higher, identified as Democrat, and had already received or expressed intent to receive the COVID-19 vaccine for themselves. Parents reported their child's physician was a highly trusted source for information about the COVID-19 vaccine (Szilagyi et al., 2021).

Although the study by Szilagyi et al. (2021) provides valuable information on parents' perceptions and intentions about the COVID-19 vaccine for their children, a more current investigation of this topic is warranted because data for this study were collected in February and March of 2021, before the onset of the Delta variant in the United States. The highly contagious Delta variant, which became the predominant COVID-19 variant circulating in the United States from July 2021 through December 2021, has been diagnosed at higher rates and led to greater hospitalizations among children and adolescents in the United States than previous variants (American Academy of Pediatrics, 2021; Siegel et al., 2021).

The current study aimed to assess maternal attitudes and intentions about the COVID-19 vaccine for their children since the Delta variant onset. We also sought to examine if

the Delta variant changed maternal perceptions about COVID-19 vaccination and COVID-19 precautions for their children. Given that the COVID-19 vaccine was already authorized for emergency use in adolescents ages 12 years and older at the time of the study, we chose to specifically assess maternal attitudes and intentions about the COVID-19 vaccine in mothers of children ages 5−11 years as the COVID-19 vaccine had not yet been approved for emergency use in children in the United States in this age range.

METHODS

Participants and Procedures

Participants were a sample of 821 mothers of 1,785 children aged ≤ 17 years. To be eligible to participate in the study, participants had to indicate being a woman from the United States aged at least 18 years and had at least one child aged 5−11 years. Potential participants who were not literate in English were excluded from the study.

Participants were recruited between September 22, 2021 and October 11, 2021 through the social media platforms Facebook (Meta Platforms, Inc., Menlo Park, CA) and Reddit (San Francisco, CA). An advertisement that contained a link to the study was posted on group pages relevant to mothers and parenting. The link took potential participants to a Qualtrics (Provo, UT) survey in which they responded to initial screening questions related to their gender, age, ages of their children, and country of residence. Potential participants who selected they were female, aged at least 18 years, had at least one child aged 5−11 years, and lived in the United States were presented with a short description of the study and consent form. Potential participants who wanted to proceed with the study were asked to provide their consent to participate by checking a box on the screen. Participants completed questionnaires online through Qualtrics. Mothers who had multiple children aged 5−11-years were asked to complete the questions about their youngest child in that age range. The decision to ask about the youngest child in the 5−11-year-old age range was based on Szilagyi et al. (2021) that parents of younger children were less likely to report the intent to have their child vaccinated. Financial compensation was not offered for participation in the study. The study procedures were approved by the Institutional Review Board at Baylor University.

Measures

The questionnaires for this study were adapted from Szilagyi et al. (2021). Mothers who had multiple children aged 5−11 years were asked to complete the questions about their youngest child in that age range.

Maternal Intent to Have Child Receive the COVID-19 Vaccine

Participants were asked, "How likely are you to get your child vaccinated for COVID-19 once a vaccine is available for children?" Response options were as follows: very likely, somewhat likely, somewhat unlikely, very unlikely, and unsure. Participants were also asked, "If a vaccine against COVID-19 becomes available for children, do you plan to get your child vaccinated?" Response options were as follows: yes, as soon as possible; yes, but I want to wait and see; no, but I want to wait and see; no, I will not get a COVID-19 vaccine for my child; and not sure. Participants were asked, "If you have a child 12 years old or above, have they been vaccinated?" Response options were as follows: yes, no, and not applicable.

Vaccine Hesitancy and Access

Vaccine hesitancy and access were assessed through an adapted version of the World Health Organization's Vaccine Hesitancy Scale (Kempe et al., 2020). Participants were presented with the following statements: a COVID-19 vaccine might cause lasting health problems for my child; I am concerned about serious side effects of a COVID-19 vaccine for my child; a COVID-19 vaccine will not be around long enough to be sure it is safe for my child; I will do what my child's doctor or health care provider recommends about a COVID-19 vaccine; a COVID-19 vaccine will be beneficial to my child, getting a COVID-19 vaccine for my child will be important for the health of others in my community; a COVID-19 vaccine for my child will be effective if approved by the Food and Drug Administration or Centers for Disease Control and Prevention (CDC); getting a COVID-19 vaccine is a good way to protect my child from COVID-19; a COVID-19 vaccine will be important for my child's health; and once approved, my family will have access to a COVID-19 vaccine for my child. Response options were strongly disagree, somewhat disagree, somewhat agree, and strongly agree. Participants were asked, "How concerned are you about your child contracting COVID-19?" Response options were as follows: not at all, somewhat, and very.

Maternal Likelihood of Getting a COVID-19 Vaccine

Participants were asked, "How likely are you to get the COVID-19 vaccine for yourself?" Response options were as follows: I have already been vaccinated, very likely, somewhat likely, somewhat unlikely, and very unlikely.

Child Influenza Vaccination History

Participants were asked, "Has your child received a flu vaccine in the past two influenza seasons (2019 to 2020 and 2020 to 2021)?" Response options were as follows: yes and no.

Trusted Information on the COVID-19 Vaccine

Participants were asked to rate how much they trust the following sources of information about the COVID-19 vaccine: your child's doctor, your child's school or school district, your local public health department, the CDC, the American Academy of Pediatrics, your close friends and family members, coworkers, classmates, or other acquaintances, and social media (e.g., Facebook, Instagram [Meta Platforms, Inc.], Twitter [Twitter, Inc., San Francisco, CA]).

Response options were as follows: do not trust at all, trust somewhat, trust mostly, trust completely, and not applicable.

Trust in Vaccine Development and Approval Process

Participants were asked, "How much do you trust the process in general (not just for COVID-19) to develop safe vaccines for children?" and, "How much do you trust the governmental approval process to ensure a COVID-19 vaccine is safe for children?" Response options were as follows: fully trust, mostly trust, somewhat trust, and do not trust.

Changes Because of the Delta Variant

Participants were asked, "Has the Delta variant changed your opinions on vaccination for your child?" Response options were as follows: yes, I am more likely now to vaccinate my child because of the Delta variant; yes, I am less likely now to vaccinate my child because of the Delta variant; and no, there has been no change. Participants were also asked, "Has the Delta variant changed your opinions on what precautions your child should take?" Response options were as follows: yes, I have my child wear masks and social distance more now; yes, I have my child wear masks and social distance less now; and no, there has been no change.

Communication with Health Care Provider

Participants were asked, "Has your child's doctor or health care provider talked to you about the vaccine for your child?" Response options were as follows: yes, they gave me information; yes, they encouraged me to get it once my child is eligible; yes, they expressed concerns about the vaccine; and no, they have not discussed the vaccine with me.

Demographic Information

Participants completed a demographic questionnaire that evaluated the following information: maternal age, number of children 17 years and younger, race (White, Black, Hispanic, Asian, Other), overall household annual income (< $10,000, $10,000−$19,999, $20,000−$29,999, $30,000−$39,999, $40,000−$49,999, $50,000−$74,999, $75,000−$99,999, $100,000−$150,000, > $150,000), marital status (married, divorced, separated, widowed, other), highest level of education (high school diploma, some college, college degree, master's degree, doctoral degree), state residing in, urban or rural city of residence, employment status, and political party identification (Democrat, Republican, Independent, Other, and I do not identify with a political party). Participants were also asked if any of their children or parents (grandparents to their children) residing in the home have a compromised immune system or are in another high-risk category and if anyone in their home had previously been diagnosed with COVID-19.

Statistical Analysis

Descriptive statistics were computed to assess maternal intent to have a child receive the COVID-19 vaccine, vaccine hesitancy and access, maternal likelihood of getting a COVID-19 vaccine, child influenza vaccination history, trusted sources of information on the COVID-19 vaccine, trust in vaccine development and approval process, school safety COVID-19 precautions, changes because of the Delta variant, and communication with a health care provider.

Point-biserial correlations were used to assess the associations between the demographic and main study variables and maternal intent to have a child receive the COVID-19 vaccine. For these analyses, the maternal likelihood of having one's child vaccinated was coded as 1 = very likely and 0 = somewhat likely, somewhat unlikely, very unlikely, and unsure. Point-biserial correlations were designated as small (0.10−0.29), medium (0.30−0.49), and large (> 0.50).

Binary logistic regression analysis was used to examine the associations between maternal intent to have one's child receive the COVID-19 vaccine, maternal and child factors, and maternal trust in information sources. Maternal (i.e., age, number of children, annual household income, marital status, highest level of educational attainment, political party identification, employment status, urban versus rural area, COVID-19 vaccination status) and child (i.e., child influenza vaccination history) factors associated with maternal intent to have one's child receive the COVID-19 vaccine in the point-biserial correlation analyses were entered into block 1. Maternal trust in the COVID-19 vaccine development and approval process and all the information sources except close friends and family members, coworkers, classmates, or other acquaintances, was not associated with maternal intent to have one's child receive the COVID-19 vaccine in the point-biserial analysis, were entered into block 2.

All statistical analyses were performed in SPSS (version 26; IBM, Armonk, NY), and a p value < .05 was considered statistically significant.

RESULTS

Participant Characteristics

A total of 1,022 individuals were administered the initial screening questions. Of these individuals, 147 were not eligible to participate in the study because they reported their gender as male, they were not 18 years or older, did not have at least one child between the ages of 5 and 11 years, or did not live in the United States. Fifty-four individuals started the questionnaires but did not finish. Thus, the final sample comprised 821 mothers.

For mothers, the number of children aged < 17 years ranged from one child to 11 children with a mean of 2.18 children (SD = 0.96). For target children aged 5−11 years mothers responded to questions about were 421 (51.3%) boys and 388 (47.3%) girls; the mean age of these children was 6.92 years (SD = 1.84). The mean age of mothers in the sample was 40.11 years (SD = 5.49; range = 22−65 years). With regard to race, 692 (84.3%) mothers identified as White, 53 (6.5%) as Hispanic, 30 (3.7%) as Asian, 12 (1.5%) as Black, and 31 (3.8%) as Other. Mothers were from all 50 states across the United States, with Texas (n = 130; 15.8%), California (n = 104; 12.7%), Oklahoma (n = 65; 7.9%), and Illinois (n = 65; 7.9%) being the most represented states.

Most mothers reported living in an urban area ($n = 644$; 78.4%). In terms of educational attainment, 22 (2.7%) mothers had earned a high school diploma, 107 (13%) had attended some college, 271 (33%) held a college degree, 278 (33.9%) held a master's degree, and 141 (17.1%) held a doctoral degree. Most mothers reported being married ($n = 728$; 88.7%). With regard to political party identification, mothers reported being Democrat ($n = 502$; 61.1%), Republican ($n = 77$; 9.4%), Independent ($n = 77$; 9.4%), and other or not identifying with a political party ($n = 160$; 19.5%).

Descriptive Statistics

Maternal intent to have a child receive the COVID-19 vaccine

Most mothers ($n = 595$; 72.6%) reported they were very likely to have their child vaccinated for COVID-19 once a vaccine is available for children; 55 (6.7%) mothers indicated being somewhat likely, 130 (15.8%) indicated being very unlikely, 21 (2.6%) indicated being somewhat unlikely, and 19 (2.3%) indicated being unsure. Similarly, 571 (69.5%) mothers indicated planning to have their child vaccinated as soon as possible if a vaccine against COVID-19 becomes available for children; 80 (9.7%) mothers reported yes, but I want to wait and see; 112 (13.6%) mothers reported no, I would not get a COVID-19 vaccine for my child; 35 (4.3%) mothers reported no, but I want to wait and see; and 23 (2.8%) mothers reported not sure. Among mothers who reported they were likely to have their child aged 5−11 years vaccinated, 471 (72.9%) reported wanting to do so to keep their child from getting sick with COVID-19. Among mothers who indicated they were likely to get their child vaccinated, 314 (48.5%) indicated they still perceived risk in the vaccine. Among mothers who reported they were unlikely to have their child 5−11 years old vaccinated, 69 (41.6%) indicated the vaccine had not been studied for long enough, and 67 (40.4%) indicated concerns about the possibility of lasting health problems because of the vaccine. Of the 188 mothers who had at least one child aged ≥ 12 years, 131 (69.7%) indicated their child had already been vaccinated.

Vaccine hesitancy and access

Figure 1 depicts maternal responses to the questions about vaccine hesitancy and access. More than half of mothers strongly agreed that I will do what my child's doctor or health care provider recommends about a COVID-19 vaccine ($n = 461$; 56.2%), a COVID-19 vaccine will be beneficial to my child ($n = 558$; 68%), getting a COVID-19 vaccine for my child will be important for the health of others in my community ($n = 596$; 72.6%), a COVID-19 vaccine for my child will be effective if approved by the Food and Drug Administration or CDC ($n = 464$; 56.5%), getting a COVID-19 vaccine is a good way to protect my child from COVID-19 ($n = 582$; 70.9%), a COVID vaccine will be important for my child's health ($n = 534$; 65%), and

once approved my family will have access to a COVID-19 vaccine for my child ($n = 631$; 76.9%).

Maternal likelihood of getting a COVID-19 vaccine

Most mothers reported already getting the COVID-19 vaccine ($n = 726$; 88.4%) or being somewhat likely to receive it ($n = 7$; 0.9%).

Child influenza vaccination history

Most mothers ($n = 624$; 76%) reported that their child received a flu vaccine in the past two seasons (2019−2020 and 2020−2021).

Trusted information on the COVID-19 vaccine

Figure 2 depicts maternal responses regarding the sources they trust about the COVID-19 vaccine. Mothers reported completely or mostly trusting their child's doctor ($n = 706$; 86%), their child's school or school district ($n = 419$; 51%), their local public health department ($n = 551$; 67.1%), the CDC ($n = 592$; 72.1%), the American Academy of Pediatrics ($n = 663$; 80.8%), close friends and family members, coworkers, classmates, or other acquaintances ($n = 292$; 35.6%), and social media ($n = 9$; 1.1%).

Trust in vaccine development and approval process

In response to, "How much do you trust the process in general (not just for COVID-19) to develop safe vaccines for children?" mothers indicated fully trust ($n = 389$; 47.4%), mostly trust ($n = 293$; 35.7%), somewhat trust ($n = 89$; 10.8%), and do not trust ($n = 43$; 5.2%). Concerning how much mothers trust the governmental approval process to ensure a COVID-19 vaccine is safe for children, 316 (38.5%) fully trust, 281 (34.2%) mostly trust, 87 (10.6%) somewhat trust, and 129 (15.7%) do not trust.

Changes because of the Delta variant

Most mothers reported the Delta variant had not changed their intention on vaccination for their child ($n = 609$; 74.2%); 192 (23.4%) mothers reported that because of the Delta variant, they are now more likely to vaccinate their child, and 12 (1.5%) mothers reported that because of the Delta variant they are now less likely to vaccinate their child. Three-hundred and fifty-four (43.1%) mothers reported that they now have their child wear masks and social distance more because of the Delta variant, and 453 (55.2%) mothers indicated that they have not changed because of the Delta variant COVID-19 precautions they take for their child.

Communication with a health care provider

Most mothers ($n = 498$; 60.7%) reported that their child's physician or health care provider had not talked to them about the COVID-19 vaccine for their child; 292 (35.6%) mothers indicated their child's physician or health care provider had talked to them or shared information with them about the COVID-19 vaccine for their child.

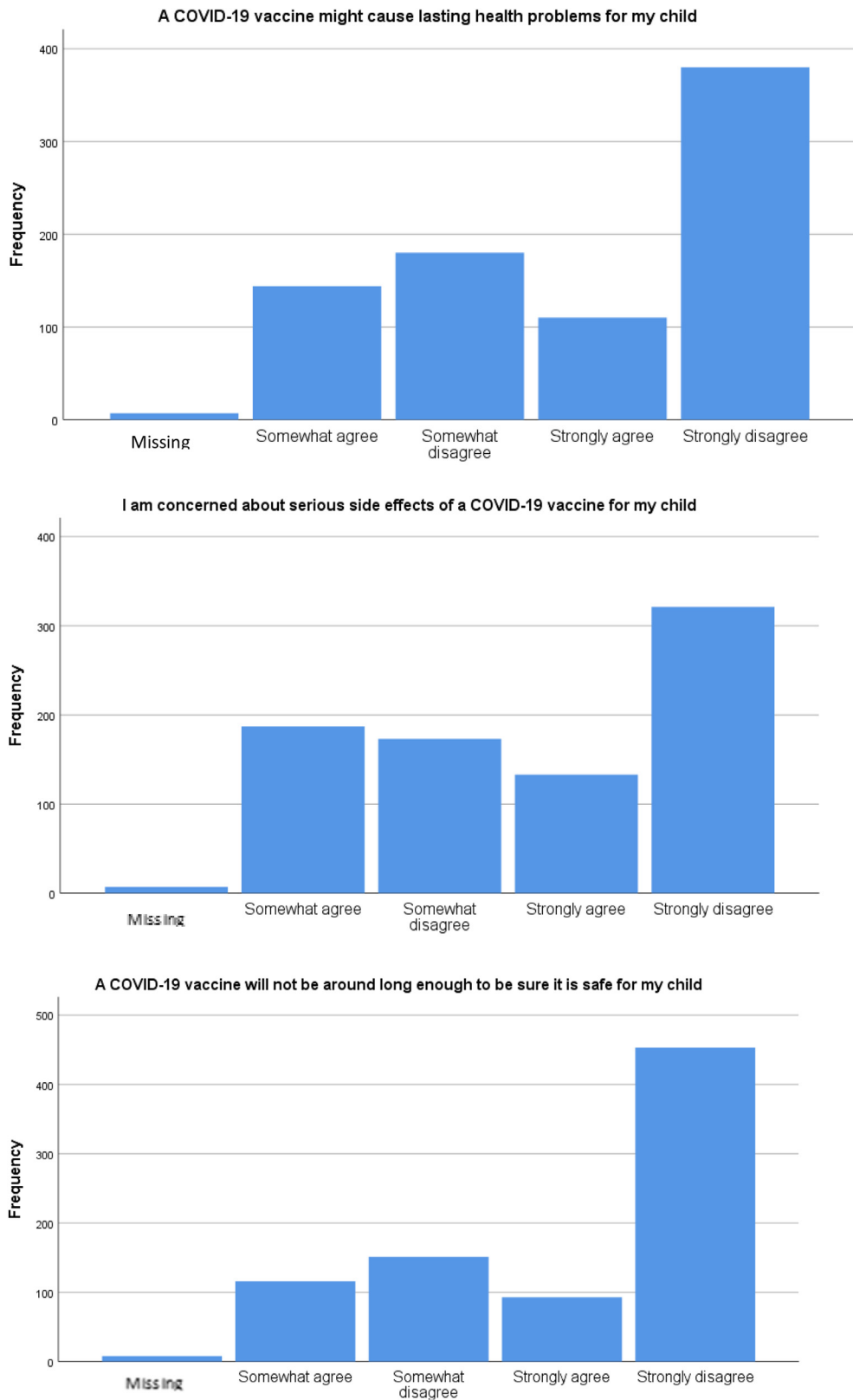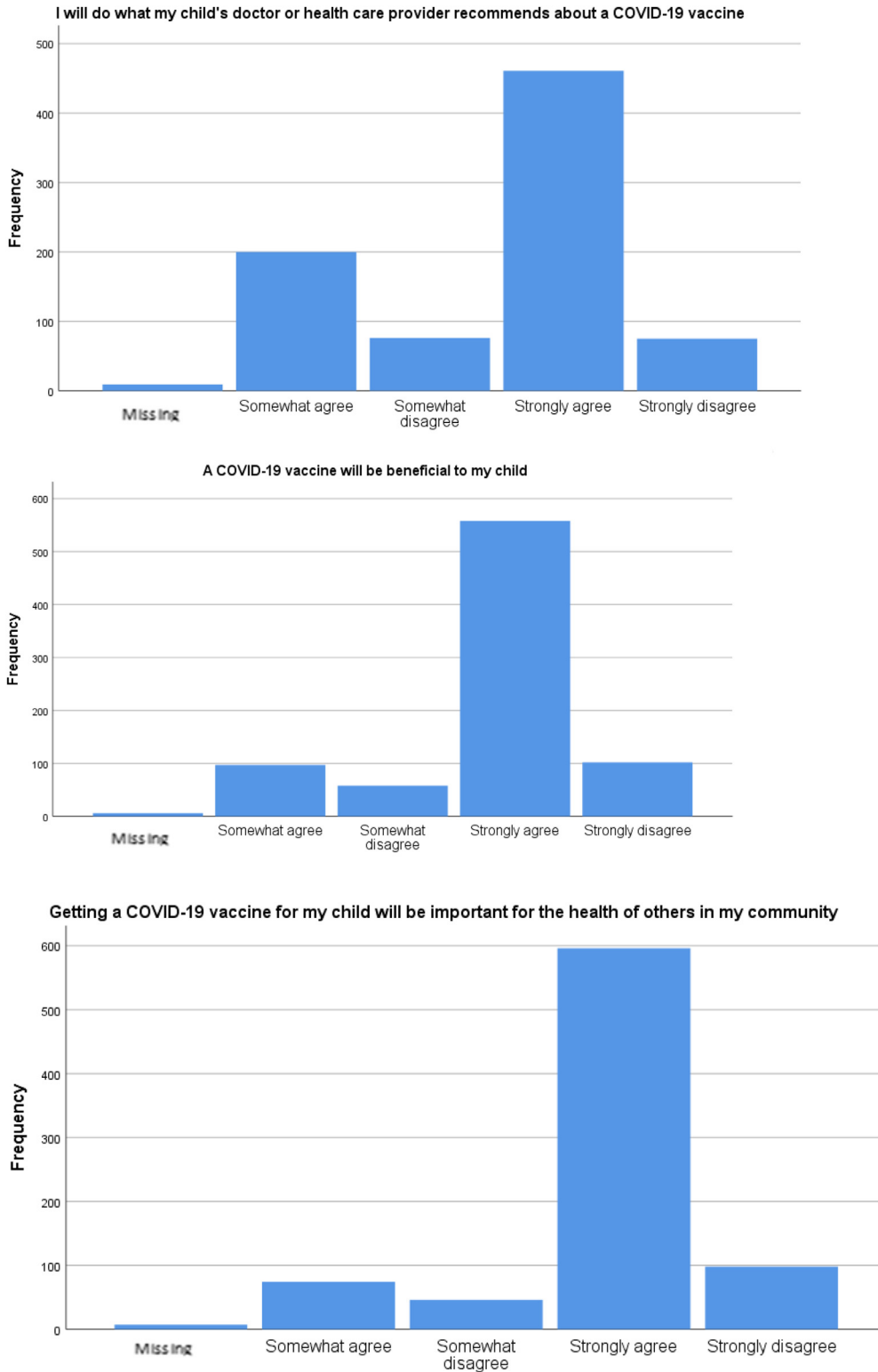**FIGURE 1.** Maternal responses about vaccine hesitancy and access.

FIGURE 1. Continued.

I will do what my child's doctor or health care provider recommends about a COVID-19 vaccine

A COVID-19 vaccine will be beneficial to my child

Getting a COVID-19 vaccine for my child will be important for the health of others in my community

Point-biserial correlations

Table 1 provides the point-biserial correlations between the demographic variables and maternal likelihood of having one's child vaccinated for COVID-19. These correlations were in the small range except for Democratic political party identification, which was in the large range ($r_{pb} = 0.55; p < .001$).

Table 2 provides the point-biserial correlations between the maternal likelihood of having one's child vaccinated for

FIGURE 1. Continued.

A COVID-19 vaccine for my child will be effective if approved by the FDA or CDC

Getting a COVID-19 vaccine is a good way to protect my child from COVID-19

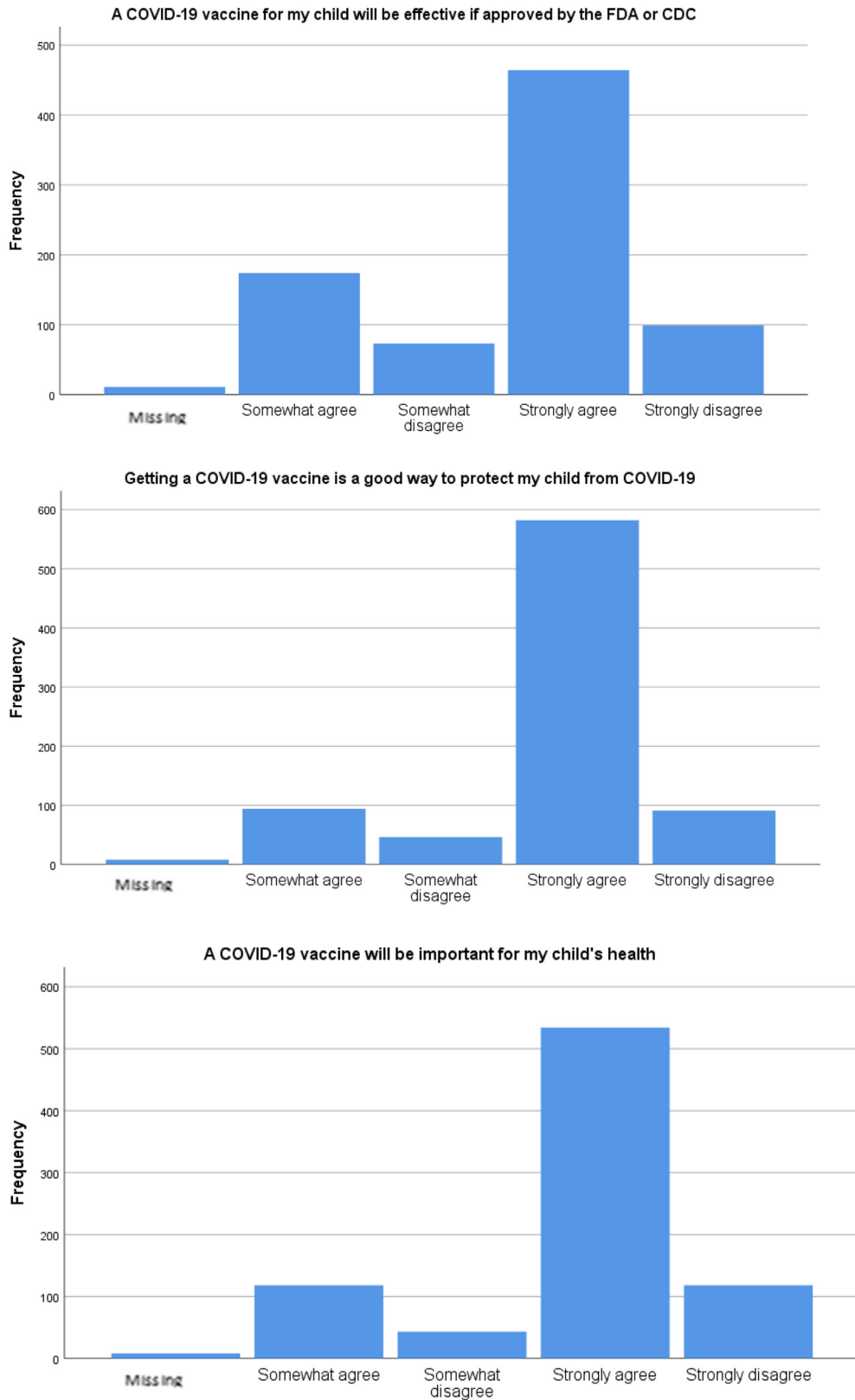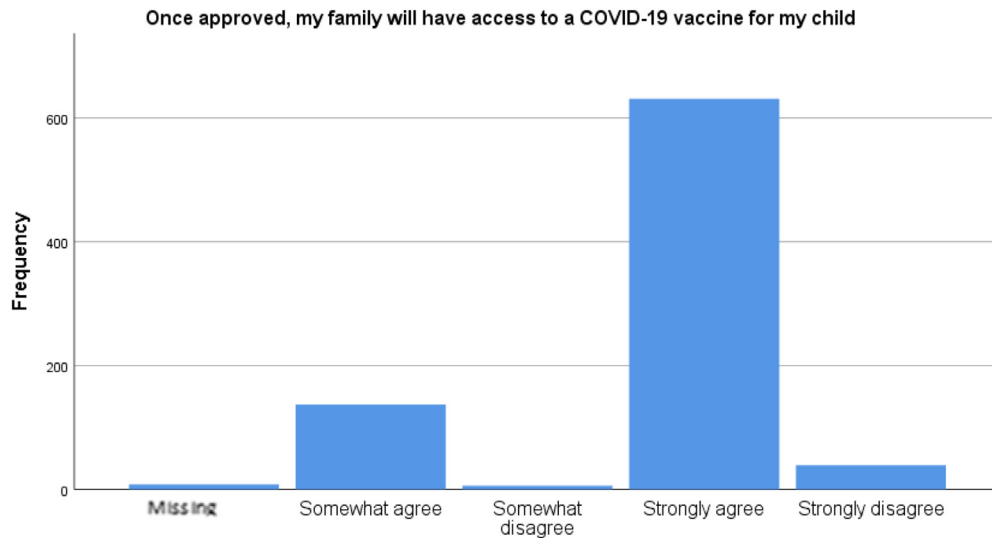A COVID-19 vaccine will be important for my child's health

FIGURE 1. Continued.

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COVID-19 and vaccine hesitancy and access. All the correlations were in the large range except for the correlation between the likelihood of having one's child vaccinated and my family will have access to a COVID-19 vaccine for my child once approved (r_{pb} = 0.48; p < .001), which was in the medium range. The largest positive correlations were evidenced between the likelihood of having one's child vaccinated, and a COVID-19 vaccine will be important for my child's health (r_{pb} = 0.83; p < .001), a COVID-19 vaccine will be beneficial to my child (r_{pb} = 0.82; p < .001), and getting a COVID-19 vaccine for my child will be important for the health of others in my community (r_{pb} = 0.80; p < .001).

Table 3 presents the point-biserial correlations between the maternal likelihood of having one's child vaccinated for COVID-19, the maternal likelihood of getting a COVID-19 vaccine, child influenza vaccination history, current school format, trust in COVID-19 vaccine development and approval process, concern about my child getting COVID-19, sources of trusted information about the COVID-19 vaccine, and communication with a health care provider. Trust in the COVID-19 vaccine development and approval process (r_{pb} = 0.79; p < .001) was most strongly associated with a greater maternal likelihood of having one's child vaccinated for COVID-19.

Binary logistic regression analysis
Table 4 includes the odds ratio (OR) and 95% confidence interval for the full model for which the primary outcome variable was the maternal likelihood of having one's child vaccinated for COVID-19. After controlling for maternal and child factors, maternal trust in the COVID-19 vaccine development and approval process (OR = 35.07; p < .001), trust in the child's physician (OR = 1.65; p < .01), and trust in the local public health department (OR = 1.87; p < .05)

were associated with the maternal likelihood of having one's child vaccinated for COVID-19. Maternal factors associated with the likelihood of having one's child vaccinated for COVID-19 were maternal COVID-19 vaccination status (OR = 27.48; p < .01) and political party identification (OR = 7.43; p < .001).

DISCUSSION
An important strategy to mitigate the spread of COVID-19 is the widescale vaccination of eligible individuals. The current study assessed maternal attitudes and intention about the COVID-19 vaccine for their children ages 5−11 years since the onset of the Delta variant. Nearly three out of four mothers in our sample reported being very likely to have their child vaccinated for COVID-19 once a vaccine is available, and most mothers indicated planning to have their child vaccinated as soon as possible once a COVID-19 vaccine becomes available for their child. Despite a large percentage of mothers reporting intent to have their child aged 5−11 years vaccinated for COVID-19, nearly half of mothers who indicated they were likely to get their child vaccinated reported they still perceived risk in the vaccine. Mothers who reported they were unlikely to have their child 5−11 years old vaccinated were more likely to report concerns about the vaccine not being studied for long enough and the possibility of side effects and lasting health problems in their child. Consistent with these findings, maternal trust in the COVID-19 vaccine development and approval process was the strongest predictor of maternal intent to have one's child vaccinated after controlling for child and maternal factors. Taken as a whole, our findings highlight that one key strategy for increasing maternal intent to have one's child vaccinated for COVID-19 may be bolstering trust in the COVID-19 development and approval process. Trust may

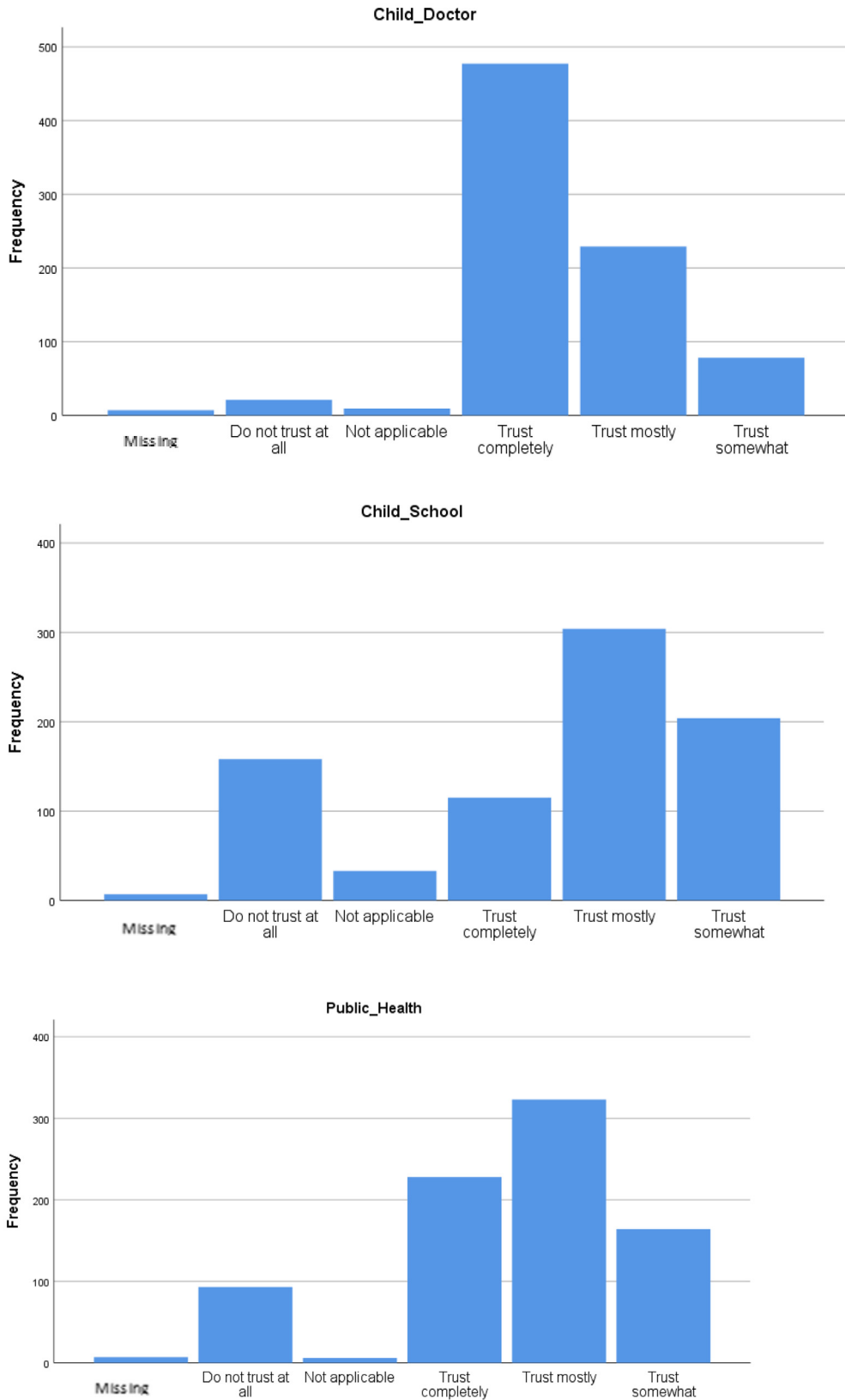**FIGURE 2.** Trusted sources of information about COVID-19 vaccine.
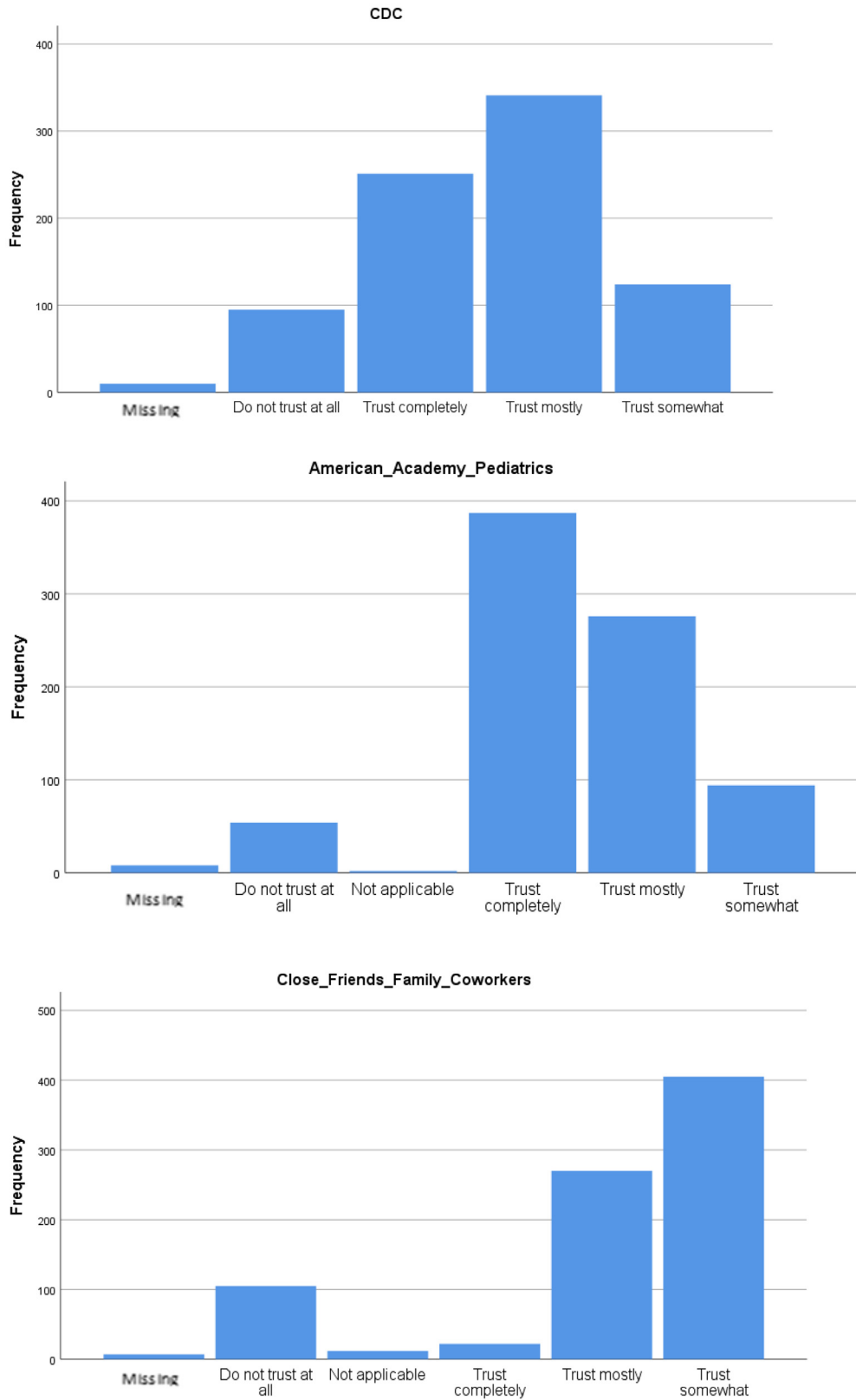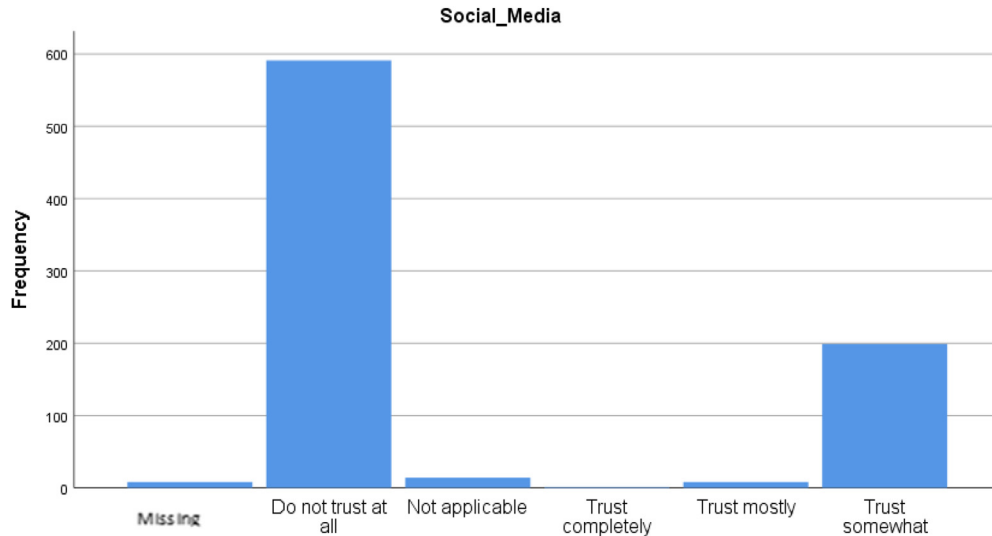
FIGURE 2. Continued.

FIGURE 2. Continued.

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be fostered among mothers of children aged 5−11 years, including targeted public health campaigns that aim to educate parents about the vaccine development and approval process.

Although most mothers indicated that the Delta variant had not changed their intention on vaccination for their child aged 5−11 years, a little less than half of the mothers in our sample reported that they now have their child wear masks because of the Delta variant and social distance more. Similar to Szilagyi et al. (2021), mothers in our sample reported the child's physician as the most trusted source of information about the COVID-19

TABLE 1. Point-biserial correlations between demographic variables and the maternal likelihood of having one's child vaccinated for COVID-19

Demographic variables	Maternal likelihood of having child vaccinated for COVID-19
Maternal age	0.15***
Target child age	0.00
Target child gender	−0.01
Number of children aged ≤ 17 years	−0.18***
Race	0.04
Annual household income	0.19***
Marital status	0.08*
Highest level of education	0.24***
Having someone in the home with a compromised immune system or in a high-risk category	0.04
Someone in the home was previously diagnosed with COVID-19	−0.22***
Political identification	0.55***
Employment status	0.12**
Urban versus rural area	0.11**

Note. *Maternal likelihood of having child vaccinated coded as 1 = very likely and 0 = somewhat likely, somewhat unlikely, very unlikely, and unsure; target child gender coded as 1 = girl and 0 = boy; Race coded as 1 = White and 0 = non-White; Annual household income coded as 0 = < $10,000, 1 = $10,000−$19,999, 2 = $20,000−$29,999, 3 = $30,000−$39,999, 4 = $40,000−$49,999, 5 = $50,000−$74,999, 6 = $75,000−$99,999, 7 = $100,000−$150,000, and 8 = > $150,000; marital status coded as 1 = married and 0 = separated, divorced, widowed, other; Highest level of education coded as 0 = high school diploma, 1 = some college, 2 = 4-year college degree, 3 = master's degree, and 4 = doctoral degree; Having someone in the home with compromised immune system or in high-risk category coded as 1 = yes and 0 = no; someone in home previously diagnosed with COVID-19 coded as 1 = yes and 0 = no; political identification coded as 1 = Democrat and 0 = Republican, other, Independent, do not identify with a political party; employment status coded as 1 = yes employed full-time outside home and 0 = no not employed outside home full-time; Urban versus rural area coded as 1 = urban and 0 = rural.*
***p < .001;
**p < .01;
p < .05.

TABLE 2. Point-biserial correlations between vaccine hesitancy and access and the maternal likelihood of having one's child vaccinated for COVID-19

Study variables	Maternal likelihood of having child vaccinated for COVID-19
A COVID-19 vaccine might cause lasting health problems for my child	−0.65***
I am concerned about the serious side effects of a COVID-19 vaccine for my child	−0.67***
A COVID-19 vaccine will not be around long enough to be sure it is safe for my child	−0.75***
I will do what my child's doctor or health care provider recommends about a COVID-19 vaccine	0.68***
A COVID-19 vaccine will be beneficial to my child	0.82***
Getting a COVID-19 vaccine for my child will be important for the health of others in my community	0.80***
A COVID-19 vaccine for my child will be effective if approved by the FDA or CDC	0.74***
Getting a COVID-19 vaccine is a good way to protect my child from COVID-19	0.78***
A COVID-19 vaccine will be important for my child's health	0.83***
Once approved, my family will have access to a COVID-19 vaccine for my child	0.48***

Note. FDA, Food and Drug Administration; CDC, Centers for Disease Control and Prevention. Maternal likelihood of having a child vaccinated coded as 1 = very likely and 0 = somewhat likely, somewhat unlikely, very unlikely, and unsure; Vaccine hesitancy and access variables coded as 0 = strongly disagree, 1 = somewhat disagree, 2 = somewhat agree, and 3 = strongly agree.
***$p < .001$.

TABLE 3. Point-biserial correlations between the maternal likelihood of having one's child vaccinated for COVID-19, the maternal likelihood of getting a COVID-19 vaccine, child influenza vaccination history, current school format, trust in COVID-19 vaccine development and approval process, concerned about my child getting COVID-19, sources of trusted information about the COVID-19 vaccine, communication with a health care provider, and Delta variant changed opinion about child vaccination

Study variables	Maternal likelihood of having child vaccinated for COVID-19
Mother COVID-19 vaccination status	0.57***
Child influenza vaccination history	0.42***
Current school format	0.14***
Trust in COVID-19 vaccine development and approval process	0.79***
Concerned about my child getting COVID-19	0.53***
Communication with health care provider	0.18***
Has the Delta variant changed your opinions on vaccination for your child	0.06
Trusted source child's doctor	0.42***
Trusted Source child's School or school district	0.18***
Trusted Source local public health department	0.33***
Trusted source Centers for Disease Control and Prevention	0.35***
Trusted source American Academy of Pediatrics	0.43***
Trusted Source close friends and family members, coworkers, classmates, or other acquaintances	0.05
Trusted source social media	0.13***

Note. Maternal likelihood of having child vaccinated coded as 1 = very likely and 0 = somewhat likely, somewhat unlikely, very unlikely, and unsure; mother COVID-19 vaccination status coded as 1 = already vaccinated and 0 = not vaccinated; child influenza vaccination history coded as 1 = yes, received a flu vaccine in the past two influenza seasons and 0 = did not receive a flu vaccine in the past two influenza seasons; current school format coded as 1 = in- person learning with masks required and 0 = in − person learning without masks required; trust in COVID-19 vaccine development and approval process coded as 1 = completely trust or mostly trust and 0 = somewhat trust and do not trust; concerned about my child getting COVID-19 coded as 0 = not at all, 1 = somewhat, and 2 = communication with health care provider coded as 1 = yes, they gave me information; yes, they encouraged me to get it once my child is eligible, and yes, they expressed concerns about the vaccine, and 0 = no, they have not discussed the vaccine with me; has the Delta variant changed your opinions on vaccination for your child coded as 1 = yes, I am more likely now to vaccinate my child because of the Delta variant; and yes, I am less likely now to vaccinate my child because of the Delta variant; and 0 = no, there has been no change; Trusted sources coded as 0 = do not trust, 1 = somewhat trust, 2 = mostly trust, and 3 = fully trust.
***$p < .001$.

TABLE 4. Binary logistic regression examining the maternal likelihood of having one's child vaccinated for COVID-19

Variables	Odds ratio	95% confidence interval
Block 1		
Number of children	1.06	0.72−1.55
Marital status	1.84	0.55−6.19
Maternal education	0.80	0.55−1.17
Political party	7.43***	3.73−14.78
Household income	0.78	0.60−1.00
Maternal age	1.04	0.98−1.11
Employment status	1.22	0.61−2.44
Urban versus rural area	0.75	0.34−1.69
Mother COVID-19 vaccination status	27.48**	2.63−287.14
Child influenza vaccination history	0.94	0.43−2.07
Block 2		
Trust in COVID-19 vaccine development and approval process	35.07***	16.27−75.60
Trusted source child's doctor	1.65**	1.15−2.36
Trusted source child's school or school district	1.22	0.81−1.83
Trusted source local public health department	1.87*	1.15−3.05
Trusted source Centers for Disease Control and Prevention	0.71	0.46−1.10
Trusted source American Academy of Pediatrics	1.35	0.89−2.04
Trusted source social media	1.13	0.74−1.73

Note: Maternal likelihood of having child vaccinated coded as 1 = very likely and 0 = somewhat likely, somewhat unlikely, very unlikely, and unsure; annual household income coded as 0 = < $10,000, 1 = $10,000–$19,999, 2 = $20,000–$29,999, 3 = $30,000–$39,999, 4 = $40,000–$49,999, 5 = $50,000–$74,999, 6 = $75,000–$99,999, 7 = $100,000–$150,000, and 8 = > $150,000; Marital status coded as 1 = married and 0 = separated, divorced, widowed, other; Highest level of education coded as 0 = high school diploma, 1 = some college, 2 = 4-year college degree, 3 = master's degree, and 4 = doctoral degree; political identification coded as 1 = Democrat and 0 = Republican, other, Independent, do not identify with a political party; Employment status coded as 1 = yes, employed full-time outside home; and 0 = no not employed outside home full-time; Urban versus rural area coded as 1 = urban and 0 = rural; Mother COVID-19 vaccination status coded as 1 = already vaccinated and 0 = not vaccinated; Child influenza vaccination history coded as 1 = yes, received a flu vaccine in the past two influenza seasons; and 0 = did not receive a flu vaccine in the past two influenza seasons; Trust in COVID-19 vaccine development and approval process coded as 1 = completely trust or mostly trust and 0 = somewhat trust and do not trust; Trusted sources coded as 0 = do not trust, 1 = somewhat trust, 2 = mostly trust, and 3 = fully trust.
***p < .001;
**p < .01;
*p < .05.

vaccine for children. One important method for bolstering trust in the COVID-19 development and approval process may be by encouraging pediatricians and family physicians to provide parents with information about the child's COVID-19 vaccine, including an overview of the development and approval process and the potential benefits of their child receiving the vaccine. Most mothers in our sample reported that their child's physician or health care provider had not talked to them about the COVID-19 vaccine for their child.

In our study, trust in the child's physician and the local public health department were associated with the maternal likelihood of having one's child vaccinated for COVID-19 after controlling for maternal and child factors. As such, local public health departments may also play a critical role in educating parents of children aged 5−11 years about the COVID-19 development and approval process and the potential benefits of the COVID-19 vaccine. Local public health departments can also help families identify places administering the

COVID-19 vaccine to children. Most mothers in our sample reported their child would have access to a COVID-19 vaccine once approved.

There were some limitations to our study. Data were collected via the social media platforms Facebook and Reddit. Although groups on parenting were targeted, it is likely that mothers with strong beliefs about the COVID-19 vaccine or who were more decided on whether they would have their child vaccinated were more likely to participate in the study. Our sample comprised a disproportionate percentage of educated, Democratic, and White mothers. Our findings may not generalize to the U.S. population of mothers aged 5−11 years, especially more conservative, less educated, and racially diverse U.S. mothers.

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