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## Original article

## Views on COVID-19 and Use of Face Coverings Among U.S. Youth

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## A B S T R A C T

**Purpose:** Little is known about the views of U.S. youth on COVID-19 or their use of face coverings. Closing this gap could facilitate messaging to promote COVID-19 risk mitigation behaviors.

**Methods:** In July 2020, a five-question text message survey was sent to 1,087 youth aged 14–24 years. Questions assessed youths' perceptions regarding the likelihood of contracting COVID-19, the potential impact of contracting COVID-19 on their lives, the possibility of spreading COVID-19 to others, and their use of face coverings around others with whom they do not live. Coding was conducted to assign responses to discrete categories and to identify common themes.

**Results:** Of 1,087 eligible participants, 797 (73.3%) were included in analyses. Of these participants, 27.3% believed they would likely contract COVID-19 in the next few months, 90.3% believed contracting COVID-19 would have a moderate or significant impact on their lives, 86.0% were moderately or very concerned about spreading COVID-19, and 89.2% reported wearing face coverings all or most of the time. Factors affecting face covering use included the desire to avoid contracting and spreading COVID-19, peer influence, and policy mandates.

**Conclusions:** Youths' perceptions regarding the risk of contracting COVID-19 varied, but most believed their lives would be adversely impacted if this occurred. Most youth were concerned about spreading COVID-19 and wore face coverings, but many made exceptions to face covering use when around close contacts. Public health campaigns may be most effective if they leverage positive peer influence and appeal to youths' desire not to spread COVID-19 to others.

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**IMPLICATIONS AND CONTRIBUTION**

Little is known about the views of youth on COVID-19 or their use of face coverings. In this text message survey, most youth were concerned about spreading COVID-19; 89.2% wore face coverings most or all of the time. Public health campaigns should appeal to youths' desire not to spread COVID-19.

Youth aged 14–24 years are increasingly accounting for new U.S. cases of coronavirus disease 2019 (COVID-19) [1–3]. Between March 1 and December 12, 2020, young adults aged 18–24 years had the highest weekly incidence of COVID-19 of any age

group [4]. Adolescents aged 14–17 years had similar weekly COVID-19 incidence as adults aged 65 years and older [4].

Public health campaigns have been initiated across the country to encourage youth to practice social distancing, avoid large gatherings, and use face coverings while around others [5–7]. However, it is unclear how these campaigns can optimally text message to youth. Although prior studies have assessed the frequency of risk mitigation behaviors such as face covering use among youth [8–13], few studies have assessed what influences

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youth to engage in these behaviors or the degree to which they perceive COVID-19 to be a danger to themselves and others. In one study, investigators interviewed 13 young adults in Wisconsin to assess behaviors potentially related to COVID-19 exposure. However, investigators did not interview adolescents, and study sample size was limited [14].

Interventions aimed at changing youth behavior are often unsuccessful because they are adult-led or ignore the developmental needs of youth [15]. Tailored interventions that considering the specific needs, preferences, and characteristics of youth may be a more effective strategy [16]. In this vein, the goal of this study was to inform the messaging of youth-focused campaigns to promote recommended risk mitigation behaviors by gathering data on youths' perceptions of COVID-19. To achieve this goal, an open-ended text message survey of U.S. youth aged 14–24 years was administered in mid-July 2020. The study used a convergent mixed methods design in which quantitative and qualitative data from the same sample were integrated, thus facilitating understanding of both the prevalence of behaviors and the factors that influence behaviors.

## Methods

### Data source and sample

Participants were from the National MyVoice Text Message Cohort, a large-scale, longitudinal mixed methods study of over 1,000 U.S. youth [17]. Since 2016, cohort members have received weekly text-message surveys on diverse topics, including vaping, gun control, and opioid misuse [18–20]. Members receive \$1 per survey. Youth are eligible to enroll in the cohort if they are aged 14–24 years and have a phone with texting capability. Recruitment occurs through social media advertisements. Recruitment is targeted to meet demographic benchmarks based on weighted samples from the 2017 American Community Survey [21] (age, gender, race/ethnicity, and region of the country). However, quotas based on these benchmarks are not strictly imposed. Consequently, the composition of the cohort at any given time may not meet benchmarks.

Response rates for the MyVoice cohort typically are between 60% and 90% [22–25]. Youth provide a variety of responses, ranging from single words to multiple-sentence paragraphs. Responses exceeding length limitations by cellular providers are received as multiple messages and are combined into a single response.

This study was approved by the Institutional Review Board of the University of Michigan (HUM00119981). Consent was obtained from participants electronically; parental consent was waived due to minimal risk and to ensure youth are not differentially excluded because of parental availability.

### Survey questions

The survey included five questions that were developed and pilot-tested by a team of youth and survey experts. The survey included both open- and closed-ended questions. The four open-ended questions (Q1, Q2, Q3, Q5) were analyzed using qualitative methods, whereas the fourth question (Q4) was intentionally closed-ended to allow estimation of the frequency of face covering use.

Q1. Do you think you'll get COVID-19 in the next few months? Tell us why.

Q2. If you got COVID-19, how do you think it would impact your life?

Q3. If you got COVID-19, how concerned would you be about spreading it to others? Tell us why.

Q4. How often do you wear a mask/face covering when you are near people you don't live with? (Always, most of the time, some of the time, rarely, never).

Q5. What influences whether or not you wear a mask/face covering when you are near people you don't live with?

The first three questions assessed risk perception and responsibility toward others, two key constructs when messaging to youth. For example, if youths' sense of responsibility to avoid spreading COVID-19 is strong, this messaging might leverage their desire to protect others. The fourth and fifth questions were designed to assess barriers and facilitators to face covering use.

### Sample

Between July 17 and July 24, 2020, the survey was sent to 1,087 MyVoice cohort members. Cohort members were excluded from the sample if they did not respond to any question or only provided unintelligible responses (e.g., responding "Next" or with a single letter). For members included in the sample ("participants"), five analyses were conducted, one for each question. In each analysis, participants were excluded if they had a missing or unintelligible response to the question.

### Analytical plan

In analyses of the four open-ended questions, coding was conducted to assign participants to discrete response categories (e.g., very concerned, moderately concerned, or little or no concern regarding spreading COVID-19 to others). An inductive thematic analysis was conducted, as outlined by Braun and Clarke [26]. Four authors (M.D., M.W., X.A., A.F.), each with experience in qualitative analysis of MyVoice data, read 100 responses to each question and discussed the content. A codebook for each question was created (Appendix 1). Two authors then independently coded all responses, updating the codebook as needed. Coding was compared; minor disagreements were resolved by the lead author and systematic discrepancies were resolved via group discussion. Themes were developed by grouping related codes within each question.

### Statistical analysis

Demographic characteristics of cohort members included and excluded from the sample were compared using chi-squared tests. To assess demographic factors associated with face covering use, logistic regression was used to model wearing a face covering all or most of the time versus sometimes, rarely, or never as a function of age group (aged 14–17 years vs. aged 18–24 years), gender, race/ethnicity, participant education level, Census region, and free lunch status while in high school (a potential indicator of low socioeconomic status). To improve interpretability, average marginal effects were calculated, or the absolute change in the predicted probability of the outcome if all respondents had a particular value of the variable compared with the baseline value, holding other variables at their observed values [27].

**Table 1**  
Themes and representative quotes regarding perceived risk of contracting COVID-19 in the next few months (n = 791 participants)

Category	Themes <sup>a</sup>	Quote	Participant characteristics
Likely or somewhat likely/depends (n = 422, 53.4%)	Risk of contracting COVID-19 at school or college (n = 138, 32.7%)	I am going back to college dorming and I fear that the school won't be able to control it	19, female, Asian, Northeast
		I think I might, because I'm going back to school at a university with a large out of state population	19, male, white, Midwest
	Risk of contracting COVID-19 at work (n = 88, 20.9%)	Most likely, I work... as a housekeeper and have been working through the whole pandemic	21, nonbinary, American Indian, West
		I work in a restaurant drive thru and I'll be getting a second job as a server in September. People aren't very considerate and won't stay home when they're sick or they don't wear masks when they're not eating	19, female, American Indian/Hispanic, Northeast
	Inadequate precautions (n = 88, 20.9%)	Restrictions are becoming less strict and people are starting to ignore social distancing	24, male, white, Northeast
		I want to be hopeful that it'll get better, that at the same time I don't think it will. Not enough people are wearing masks and they keep going out in public, so the virus is just too spread and will take a long time to recover from	16, female, Asian, West
Unlikely (n = 363, 45.9%)	Taking precautions (n = 259, 71.3%)	I definitely don't think I'll get COVID. I'm really careful, I wear my mask, and I limit my social exposure heavily.	17, nonbinary, white, West
		No, because I've been avoiding people and things, so hopefully I can keep my exposure down	24, male, American Indian, Midwest
	Already had COVID-19 (n = 25, 6.9%)	I think I already had it in early March. I'm being above average safe like a B but it can affect anyone	22, female, black, South
		I already had COVID and recovered	16, transgender, American Indian, West
	COVID-19 is not that serious or infectious (n = 19, 5.2%)	It's not too bad. If I was gonna get it, I'd already have honestly. I've worked two jobs in the fast food industry and am out for over 12 hours of the day	15, female, white, Midwest
		It is hard for me to imagine getting COVID-19 because I feel as though I've been desensitized to it. I don't personally know anybody who has gotten it, and I've still worked my job and done alright in school throughout this pandemic. I will be going to college starting this August, though, and it will possibly pose a threat there	18, male, white, Midwest
		I am an overall healthy person and not worried about it	18, female, white, South

<sup>a</sup> Percentages refer to percentage of participants in the category.

Regressions were only conducted for face covering use. Unlike the other four questions, the question assessing face covering use was purposively designed to provide quantitative data, the meaning of which was unambiguous.

Analyses were conducted using Stata 15.1 (StataCorp) and two-sided hypothesis tests with  $\alpha = .05$ .

## Results

### Sample

Of 1,087 eligible cohort members, 287 were excluded because they did not respond to any question and three were excluded because they only provided unintelligible responses. A total of 797 (73.3%) cohort members provided at least one intelligible

answer and were included in the sample. The 290 excluded cohort members differed from the 797 participants by race/ethnicity ( $p < .05$ ) and education ( $p < .001$ ) (Appendix 2). Mean age of the 797 participants was 19.1 years (SD 2.6); 51.8% were female and 55.6% were non-Hispanic white. Over half (51.8%) of participants had completed a high school education or less (including those still in high school), and 36.1% were eligible for free or reduced lunch while in high school (see Appendix 2 for other demographic characteristics). Sample sizes in the five analyses ranged between 701 and 791 participants.

### Response length and coding agreement

Response length ranged from 2 to 890 characters (mean: 70.2). Initial coding agreement ranged from 58% to 88% across questions.

**Table 2**

Themes and representative quotes regarding perceived impact of contracting COVID-19 on participants' lives (n = 752 participants)

Category	Themes <sup>a</sup>	Quote	Participant characteristics
Significant or moderate impact (n = 679, 90.3%)	Self-isolation (n = 371, 54.6%)	...if I did contract the virus I would be unable to see my family members until I fully recovered. This would be really challenging emotionally for me, and for them	23, female, white, Midwest
		I would have to self-isolate as I cannot risk giving it to my at-risk loved ones	19, male, American Indian, South
	Impact on work (n = 135, 19.9%)	It would prevent me from working which is what my life consists of so it would be negative impact	19, male, white, Northeast
		It would upend pretty much everything, even just by forcing me to take time off work	21, transgender, white, West
	Impact on education (n = 91, 13.4%)	It would be rough as a college student having to self-isolate at home and not be able to actually attend class and participate in study groups	19, male, white, West
		I wouldn't be able to do school work or worry about college. I would be scared cuz there's no cure	16, female, black, South
	Impact on personal and family finances (n = 63, 9.3%)	I'd have to stay home from work and so would my parents. I wouldn't mind but they would be stressed out about money	18, female, black, Northeast
		I would not have the money to afford health care	20, male, white, Midwest
	Physical health consequences (n = 184, 27.1%)	Well, I could die, it could cause irreparable damage to my lungs or maybe some other important organ in my body...	20, transgender, white, Midwest
		Since I'm young hopefully not much but there's a risk I'll get long lasting effects	17, male, American Indian/Hispanic, West
	Mental health consequences (n = 69, 10.2%)	I would become very depressed	17, female, black, South
		I would need to quarantine for 2 weeks, which would negatively impact my mental health due to loneliness	20, male, white, South
	High-risk, including self or family (n = 94, 13.8%)	I could experience complications because I have a congenital heart disease. I would also not be able to see my friends or go to work...	16, female, white, Northeast
I have asthma, so it could probably kill me. My mother also has asthma and a number of other illnesses that could easily contribute to it being fatal to her as well if I were to spread it to her. Quite frankly, this virus could ruin my family's life		21, nonbinary, black, Midwest	
Little or no impact (n = 50, 6.6%)	Illness would not be serious (n = 19, 38.0%)	I think it would be like a cold and I'd stay home get better and move on like the flu	16, female, Hispanic white, South
		I'm thinking that I will most likely be asymptomatic	23, male, white, Midwest
	Already staying home and taking precautions (n = 9, 18.0%)	It wouldn't really [impact me]. I'll probably be doing the same thing I'm doing now	16, female, black, South
		Nothing would change, I stay home 99% of the time anyway	24, male, Asian, Midwest

<sup>a</sup> Percentages refer to percentage of participants in the category.

### Perceived risk of contracting COVID-19

Of the 791 participants included in the analysis of question 1, 216 (27.3%) believed contacting COVID-19 in the next few months was likely, 206 (26.0%) believed this was somewhat likely or depended on the circumstances, and 363 (45.9%) believed this was unlikely. Table 1 displays themes and representative quotes for participants in the former two categories versus the third category; for each quote, demographic characteristics of participants are included to provide context.

Among the 412 participants who believed contracting COVID-19 was likely or somewhat likely, or that the risk depended on

the circumstances, many reported that it was “inevitable” due to their level of interaction with others, including at school (a theme present in 32.7% of the 412 participants) or work (20.9%): “I work in retail, and even though my employer is doing a really good job of protecting us, I feel like it's inevitable” (22, male, white, Midwest). In addition, 20.9% believed inadequate precautions were being taken by other people or by organizations such as schools, businesses, or governments: “I do not think that the school has implemented great social distancing rules for lecture halls” (20, female, black, South).

Among 363 participants who believed contracting COVID-19 was unlikely, 71.3% believed they were low-risk because they

**Table 3**

Themes and representative quotes regarding level of concern regarding spreading COVID-19 to others (n = 726 participants)

Category	Themes <sup>a</sup>	Quote	Participant characteristics
Very or moderately concerned (n = 624, 86.0%)	Concern about severity and infectiousness (n = 209, 33.5%)	It spreads really easily through the air, and spreads the most before I would even realize I was sick.	17, nonbinary, white, Northeast
		I would be very concerned because this isn't child's play. This is bad. It can take out healthy people kinda bad.	19, female, black, South
	Obligation to reduce the spread of COVID-19 (n = 191; 30.6%)	I would be extremely concerned because I care about other people. That seems to be an unreasonable belief for some people, but if I knew I was positive I would quarantine myself completely (as best as possible)	21, female, black, Northeast
		I would be very concerned. I feel irresponsible doing anything but quarantining, even social distancing	19, male, white, West
	Concern about spreading COVID-19 to high-risk people (n = 144; 23.1%)	I would be very concerned, I wouldn't want anyone else to get it that has a higher risk of not being able to recover from it	16, female, Hispanic/other, West
Quite concerned because covid19 is quite infectious and I would never want to purposefully or accidentally increase the chances of infecting a high-risk persons		23, male, biracial, Northeast	
Little or no concern (n = 93, 12.8%)	Difficulty of isolating from others (n = 135; 21.6%)	I live with multiple people, one of whom travels to work everyday via train	19, female, Hispanic white, Northeast
		I would be seriously concerned, since I live in close quarters with other's and in my hall, we would share a community restroom, as well as being someone who would regularly talk to residents.	20, nonbinary, white, West
Little or no concern (n = 93, 12.8%)	Would take precautions (n = 83; 89.2%)	I wouldn't be very concerned about it because I would probably just remain at home for other people's safety.	21, male, biracial, west
		I would lay in bed all day. Already did actually. I couldn't get up	18, male, white, South
		I wouldn't really care I would probably continue life as usual but I would try to stay indoor for 14 days and if I couldn't I would at least do the social distancing part	24, female, Asian, South

<sup>a</sup> Percentages refer to percentage of participants in the category.

were taking precautions, such as staying home and using face coverings. Just 6.9% of these participants believed they had already contracted COVID-19 and were now immune: "I already had it so I have the antibodies" (18, female, white, West). Only 5.2% believed contracting COVID-19 was unlikely because the virus is not very contagious: "It isn't as infectious as it has been made out to be. Most of this is now just all politics" (18, male, white, West).

#### Perceived impact of contracting COVID-19 on youths' lives

Of 752 participants included in the analysis of question 2, 679 (90.3%) believed contracting COVID-19 would have a significant or moderate impact on their lives, 50 (6.6%) indicated there would be no or little impact, and 23 (3.1%) were unsure. [Table 2](#) displays themes and representative quotes among participants in the first and second of these categories.

Among the 679 participants who believed contracting COVID-19 would have a significant or moderate impact on their lives, 54.6% cited the impact of self-isolation: "It would suck. I'd of course have to quarantine myself and wouldn't be able to see my friends, cook, or go outside for a while" (20, male, Hispanic white, Northeast). Some (19.9%) participants were concerned they would miss work, 13.4% were concerned about the impact on

their education, and 9.3% were concerned about the impact of contracting COVID-19 on their finances or their family's finances, for example owing to reduced income from work or the costs of treatment: "I really hope I don't die or go into hospital and can recover on my own because I don't have health insurance" (24, female, Asian, Midwest). Many participants were concerned about consequences for their physical health (27.1%) or mental health (10.2%), while 13.8% mentioned the possibility of severe COVID-19 illness in themselves or a family member due to an underlying medical condition.

Among the 50 participants who believed COVID-19 would have little impact on their lives, 38.0% believed the illness would not be serious (e.g., because few young people experience severe COVID-19 illness). Some (18.0%) reported that little would change because they were already mostly staying at home: "I don't think it would impact it much since I'd stay home like I am anyway" (24, female, white, South).

#### Concern regarding spreading COVID-19 to others

Of 726 participants included in the analysis of question 3, 483 (66.5%) were very concerned, 141 (19.4%) were moderately concerned, and 93 (12.8%) had little or no concern. [Table 3](#) displays



**Table 4**

Proportion of participants reporting wearing face coverings always or most of the time when around others, by demographic characteristics (n = 719 participants)<sup>a</sup>

Variable	Sample size	No. (%) wearing face coverings always or most of the time	Average marginal effect <sup>b</sup> (95% CI)
<b>Age</b>			
14–17 years	240	210 (87.5%)	Reference
18–24 years	479	431 (90.0%)	5.2 (–2.3, 12.6)
<b>Gender</b>			
Female	372	335 (90.1%)	Reference
Male	287	249 (86.8%)	–4.1 (–9.4, 1.2)
Other	60	57 (95.0%)	5.3 (–1.1, 11.3)
<b>Race/ethnicity</b>			
Non-Hispanic white	400	346 (86.5%)	Reference
Non-Hispanic black	60	52 (86.7%)	1.1 (–8.7, 10.9)
Hispanic/any race	94	88 (93.6%)	8.2 (2.1, 14.2)
Non-Hispanic Asian	103	99 (96.1%)	10.3 (5.2, 15.4)
Other or multiracial/non-Hispanic	61	55 (90.2%)	4.0 (–4.4, 12.4)
Missing	1	1 (100.0%)	N/A
<b>Participant education level</b>			
Less than high school <sup>c</sup>	254	227 (89.4%)	Reference
High school graduate	114	102 (89.5%)	–1.7 (–8.4, 5.0)
Some college or technical school	222	193 (86.9%)	–6.5 (–14.1, 1.1)
Associate's or technical school graduate	25	24 (96.0%)	4.5 (–4.7, 13.8)
Bachelor's degree or higher	104	95 (91.4%)	–2.1 (–10.8, 6.6)
<b>Region</b>			
Northeast	106	96 (90.6%)	Reference
Midwest	251	225 (89.6%)	–.7 (–7.4, 5.9)
South	200	171 (85.5%)	–5.0 (–12.3, 2.3)
West	162	149 (92.0%)	–.1 (–7.4, 7.2)
<b>Free lunch status while in high school</b>			
No	449	401 (89.3%)	Reference
Yes	263	233 (88.6%)	–2.0 (–7.3, 3.3)
Missing	7	7 (100.0%)	N/A

N/A, not applicable.

<sup>a</sup> 7 participants with missing data for race/ethnicity and/or free lunch status were excluded from the sample when conducting the regression analysis. Consequently, the sample size for the regression was 712.

<sup>b</sup> Average marginal effects represent the absolute change in the predicted probability of the outcome if all respondents had a particular value of the categorical variable compared with the reference category, holding other variables at their observed values.

<sup>c</sup> Includes participants still in high school.

themes and representative quotes among participants in the first two categories versus the third.

Among the 624 participants who were very or moderately concerned, the most salient theme was concern about the severity and infectiousness of COVID-19 (33.5%). Many described COVID-19 as deadly or contagious, while others emphasized asymptomatic spread. Another prominent theme was feeling personally obligated (including a sense of responsibility, worry, or guilt) to reduce the spread of COVID-19 to others (30.6%): “I would never want to put someone else’s health at risk” (19, female, American Indian, Midwest). Many participants (23.1%) reported concerns about spreading COVID-19 to a high-risk close contact, including themselves, children, siblings, parents, and grandparents: “I would be very concerned because mostly all the people I’m around are more at risk and have some health issues (15, female, Hispanic, West). Some (21.6%) mentioned it would be difficult to self-isolate, for example due to their living or work arrangements.

Among the 93 participants with little or no concern regarding spreading COVID-19 to others, 89.2% believed they could mitigate spread by isolating from others: “I would not be too concerned because I would self-quarantine and take all safety precautions” (16, male, American Indian, West).

#### Frequency of face covering use

Of 719 participants included in the analysis of question 4, 396 (55.1%) indicated they always wore face coverings when near people with whom they do not live, 245 (34.1%) most of the time, 44 (6.1%) sometimes, 18 (2.5%) rarely, and 16 (2.2%) never. Overall, 641 (89.2%) participants reported wearing face coverings always or most of the time, whereas 78 (10.9%) reported wearing face coverings sometimes, rarely, or never. The only factors associated with wearing face coverings always or most of the time were Hispanic ethnicity (adjusted difference: +8.2 percentage points, 95% CI: 2.1–14.2) and non-Hispanic Asian race/ethnicity (adjusted difference: +10.3 percentage points, 95% CI: 5.2–15.4) compared with non-Hispanic white race/ethnicity (Table 4).

#### Factors influencing face covering use

The analysis of question 5 included 701 participants; Table 5 displays themes and representative quotes. Among these participants, 21.1% reported wearing face coverings to prevent spread to others: “We are still in a pandemic and I don’t want to spread the virus to others if I’m a carrier” (24, female, white, Northeast). These participants often additionally emphasized that wearing a face covering was the socially responsible thing to do and “saves lives” (19, male, Hispanic white, South). In addition, 15.3% reported wearing face coverings to lower their personal risk of contracting COVID-19.

Many participants (22.3%) indicated that their face covering use depended on the setting, including their ability to physically distance, whether they were indoors, and the type of activity. Many (19.7%) also noted that wearing face coverings depended on their relationship with others. Youth commonly reported not wearing face coverings around immediate family members, partners, or roommates: “I consider my siblings and parents to be part of my ‘pod’ even though I do not live with them” (23, female, white, Midwest). However, some youth also included extended family, friends, and co-workers. For example, one participant remarked that “friends don’t count” when considering when to wear a face covering (18, male, white, Midwest).

For 15.7%, wearing face coverings was influenced by the behaviors of others. Some were less likely to wear face coverings if they believed the people around them were taking adequate precautions: “If I’m with someone who I know doesn’t interact with many people outside of their own family, I can justify hanging out with them without a mask” (24, male, white, Northeast). Some reported that peer influence encouraged use of face coverings: “People are starting to judge others if they don’t wear one so it’s better to just wear it” (18, female, Hispanic white, South). By contrast, others reported that peer influence can discourage face covering use: “If I’m with a very close friend/family member, it’s almost insulting to them to wear a mask, as they think I don’t trust that they’ve been careful” (18, female, white, South).

Finally, 14.0% were influenced by public health recommendations and policy mandates. For some, public health recommendations from groups like the Centers for Disease Control and Prevention appealed to their desire not to spread COVID-19. By

**Table 5**  
Themes and representative quotes regarding factors that influence mask use (n = 701 participants)

Themes <sup>a</sup>	Quote	Participant characteristics
Reducing the risk of others getting sick (n = 148, 21.1%)	Just protecting others and not being selfish	19, male, Asian, West
Reducing personal risk of contracting COVID-19 (n = 107, 15.3%)	My common sense that masks prevent the spread of COVID-19 and asymptomatic people can still be carriers and my basic human decency to care about other people not getting it	24, female, Hispanic white, Midwest
	I always wear a mask, because it reduces the chances of me getting infected (or me infecting someone else if I don't know that I'm infected myself)	23, male, white, Midwest
Depending on the setting (ability to physically distance indoors or outdoors; type of activity) (n = 156, 22.3%)	The fact that I don't live with them, they could be sick	17, female, Asian, Northeast
	The amount of distance/barriers between myself and the person are the largest contributing factor	21, nonbinary, black, Midwest
Depending on relationship with others (n = 138, 19.7%)	I think proximity is a big thing. If I am outside and distant from others I may not keep my mask on, but indoors is a different story	22, female, Asian, West
	How well I know them. I always wear one if I go out to a store or to eat, but not always with my friends	18, female, black, Northeast
	If they are classmates that I hang out with often I don't wear a mask. Otherwise I do	24, male, white, Midwest
Influenced by the behavior of others (taking precautions, peer pressure) (n = 110, 15.7%)	How much contact they've had with other people and if they've been at home social distancing	20, female, biracial, South
Public health recommendations and policy mandates (n = 98, 14.0%)	Unless I am very certain about a close friend's level of precaution, I don't take any risks. I am ALWAYS masked with strangers	19, male, white, Midwest
	Public health policy from scientists	24, nonbinary, white, Midwest
	The CDC and WHO all say that wearing a mask helps stop the spread. If it's required to wear one to enter a store I will wear one. If not then I don't	17, female, American Indian, Northeast 18, male, white, South
	Rules of the government rather than my own personal philosophy	24, female, Asian, South

<sup>a</sup> Percentages refer to percentage of participants in the category.

contrast, some participants reported they only wore face coverings due to policy mandates: “I choose to only wear one when I have to because they are useless” (19, male, white, Northeast). Few participants reported that preserving their autonomy influenced whether they wore face coverings.

Notably, many youth (33.2%) reported that decisions to wear face coverings were affected by multiple factors: “[It is influenced by] how close I am to them, both physically and socially. I don't wear a face mask when I'm with a group of close friends because we're all very careful about not seeing too many people or being in large gatherings, so there's a lower risk than when I'm in a supermarket or with random people” (18, male, white, Northeast).

## Discussion

In this mixed methods study of youth aged 14–24 years, one-quarter of participants believed they would likely contract COVID-19 in the next few months, while another one-quarter believed contracting COVID-19 was somewhat likely or that the risk depended on the circumstances. Most believed contracting COVID-19 would have a moderate or significant impact on their lives, and most were moderately or very concerned about spreading COVID-19 to others. Over 89% of participants reported wearing a face covering all or most of the time, but many youth made exceptions when around close friends and family members.

Many participants believed they had increased risk of contracting COVID-19 because they attended schools and colleges or worked in environments in which they had close contact with others. Although this belief might be substantiated by emerging evidence of surging COVID-19 cases at colleges [28] a potential concern is that these participants may not feel it is worthwhile to take precautions

because of the inevitability of infection. Youth-focused public health campaigns may need messaging that empowers youth to reduce their risk of COVID-19 in schools and colleges. Most participants who believed they were unlikely to contact COVID-19 cited the precautions they were taking; only a few cited an inaccurate belief that COVID-19 was not very infectious.

Most participants believed contracting COVID-19 would negatively impact their lives, for example, by impeding education or work. However, some felt that contracting COVID-19 would have little or no impact due to the generally benign course of COVID-19 in youth. This belief, while not completely erroneous, may nonetheless reflect an incomplete understanding of the risks of COVID-19 to youth. In one study of young adults hospitalized with COVID-19, 10% required mechanical ventilation and 2.7% died [29]. In addition, reports have surfaced that otherwise healthy college students have died from COVID-19 [30–32]. Findings suggest that some youth may need additional education about the risks of COVID-19 to their health.

Participants overwhelmingly reported concern about spreading COVID-19 to others, especially those at risk for severe illness. Those who were less concerned believed they could prevent spread through self-isolation. Collectively, findings suggest most youth believe they have a responsibility to prevent the spread of COVID-19, consistent with other research assessing youths' views on the pandemic [10,14]. Public health campaigns aimed to promoting recommended risk mitigation behaviors may be effective if they emphasize youths' role in ensuring community health and protecting others who are vulnerable.

While the media has frequently depicted youth as willfully ignoring recommendations to wear face coverings [33–35], this study suggests a more nuanced picture. Overall, 55.1% of



participants reported always wearing face coverings when around others with whom they do not live, consistent with a prior survey which found that approximately half of college students always wore face coverings in public [9]. Another 34.1% wore face coverings most of the time. Only 10.8% sometimes, rarely, or never wore face coverings. Many participants reported less face covering use when around close contacts and individuals perceived to be taking adequate precautions, suggesting that public health campaigns should encourage consistent face covering use regardless of situation. Furthermore, some participants mentioned that peer influence could play either a positive or negative role in influencing whether they use face coverings, consistent with a study of COVID-19 risk factors [14]. Peer influence is particularly important in shaping behavior in adolescence and young adulthood, including encouraging prosocial behavior and discouraging risky behaviors [36–40]. Public health campaigns could leverage the power of peer influence by highlighting that most U.S. youth wear face coverings all or most of the time.

This study has several strengths, including a high response rate. Analyses provide some of the first data on the views of adolescents on COVID-19 and their use of face coverings. Qualitative data allowed assessment of the rationale behind participants' views and behaviors. This information can inform messaging to youth in public health campaigns and help clinicians effectively counsel youth on risk mitigation behaviors.

This study also has limitations. First, participants represent a convenience sample of youth who opted to take text-message surveys. Consequently, generalizability of results to all U.S. youth is unclear. Second, some participants may have felt pressure to report that they were practicing recommended risk mitigation behaviors. Any such social desirability bias would result in overestimation of face covering use among youth. Finally, this survey was conducted in mid-July 2020. It is likely that youths' views and behaviors have been impacted by recent events, such as rising U.S. COVID-19 cases and deaths [41] and changes to face covering policies in their states, schools, and work settings.

Findings suggest that most youth are taking COVID-19 seriously and engaging in recommended risk mitigation behaviors, although a sizable number are not. On the basis of this study's findings, youth-focused public health campaigns should empower youth to reduce their risk of contracting COVID-19, educate youth about the risks of COVID-19 to their health, appeal to youths' desire not to spread COVID-19 to others, and leverage the power of peer influence.

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## Supplementary Data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.jadohealth.2021.02.015>.

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