

This PDF is available at <http://nap.edu/26004>

SHARE    



## Encouraging Protective COVID-19 Behaviors among College Students (2020)

### DETAILS

16 pages | 8.5 x 11 | PDF

ISBN 978-0-309-68587-0 | DOI 10.17226/26004

### CONTRIBUTORS

National Academies of Sciences, Engineering, and Medicine

GET THIS BOOK

FIND RELATED TITLES

### SUGGESTED CITATION

National Academies of Sciences, Engineering, and Medicine 2020. *Encouraging Protective COVID-19 Behaviors among College Students*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/26004>.

Visit the National Academies Press at [NAP.edu](http://NAP.edu) and login or register to get:

- Access to free PDF downloads of thousands of scientific reports
- 10% off the price of print titles
- Email or social media notifications of new titles related to your interests
- Special offers and discounts



Distribution, posting, or copying of this PDF is strictly prohibited without written permission of the National Academies Press. (Request Permission) Unless otherwise indicated, all materials in this PDF are copyrighted by the National Academy of Sciences.

Copyright © National Academy of Sciences. All rights reserved.

Authors: Adriana Galván\*  
Elizabeth Cauffman\*\*  
Dominique Brossard\*\*\*

This rapid expert consultation was produced through the Societal Experts Action Network (SEAN), an activity of the National Academies of Sciences, Engineering, and Medicine that is sponsored by the National Science Foundation. SEAN links researchers in the social, behavioral, and economic sciences with decision makers to respond to policy questions arising from the COVID-19 pandemic. This project is affiliated with the National Academies' Standing Committee on Emerging Infectious Diseases and 21st Century Health Threats.

SEAN is interested in your feedback. Was this rapid expert consultation useful? For further inquiries regarding this rapid expert consultation or to send comments, contact [sean@nas.edu](mailto:sean@nas.edu) or (202) 334-3440.

\*University of California, Los Angeles

\*\*University of California, Irvine

\*\*\*Member of SEAN Executive Committee

## COLLEGE STUDENT COVID-19 PROTECTIVE BEHAVIORS

1

**EXECUTIVE SUMMARY**

This rapid expert consultation is intended to support college administrators and local governments as they work together and with students to prevent the spread of COVID-19 on college campuses and in the surrounding communities. It presents research-informed habit-promoting and communication strategies to encourage the adoption of behaviors that can stem the spread of COVID infections on college campuses. The discussion is grounded in a previous rapid expert consultation produced by the Societal Experts Action Network, with developmentally appropriate adaptations for college-age individuals. Developmental psychology and brain research can guide campus leaders in implementing these strategy adaptations, based on several key tenets:

- Many adolescents and young adults are socially driven, with a strong desire for reward and acceptance.
- Identity, agency, and autonomy are centrally important during the college years.
- College students are primed for exploration, and risk taking is a normative part of their development.
- Prosocial inclinations are strong among college-age students.
- Students can enhance the creation and implementation of policies that affect them.

**Habit-Promoting Strategies**

The following five habit-promoting strategies can help decision makers overcome barriers to behavior change and encourage protective behaviors among college students to mitigate the spread of COVID-19 on campuses:

1. Make the Behavior Easy to Start and Repeat.
2. Make the Behavior Rewarding to Repeat.
3. Tie the Behavior to an Existing Habit.
4. Alert People to Behaviors that Conflict with Existing Habits and Provide Alternative Behaviors.
5. Provide Specific Descriptions of Desired Behaviors.

**Communication Strategies**

The following ten strategies may be more effective if they are developed and implemented in collaboration with students and give students agency to operationalize their existing knowledge of the coronavirus and protective behaviors:

1. Use Clear, Consistent, and Transparent Messaging, with Attention to Mode of Transmission.
2. Avoid Undue Attention to the Frequency of Socially Undesirable Behaviors, Instead Emphasizing Responsibility.
3. Foster Efficacy and Avoid Fatalism, with Attention to Student Agency.
4. Appeal to the Collective Good of One's Community, Focusing on Prosocial Behavior and Activism.
5. Use Trusted Messengers, Amplified by Social Media and Other Influencers.
6. Tailor the Framing of the Message to the Audience, with Attention to the Risk-Reward Calculus.
7. Link Prevention Behaviors to Identities, with Attention to Campus Affiliations.
8. Highlight Social Disapproval of a Target Audience Member's Failure to Comply When It Occurs, without Overemphasizing Risk.
9. Highlight the Growing Prevalence of Behavior Change, Using Positive Messaging.
10. Avoid Repeating Misinformation, Even to Debunk It.

## COLLEGE STUDENT COVID-19 PROTECTIVE BEHAVIORS

2

## INTRODUCTION

College campus communities find themselves in uncharted territory as they face the challenges posed by COVID-19.<sup>1</sup> Students are adjusting to new ways of learning, living, and staying safe on campus, even as many of them are undergoing important developmental changes that make exploration, risk taking, and peer relationships more salient.<sup>2</sup>

As administrators work to keep campuses safe and encourage protective behaviors, they must remain mindful of students' need for social interaction. While guidance for striking this balance exists, including from the Centers for Disease Control and Prevention [1], particular challenges arise because college students live together with people of their own age, and some may not see the benefit of changing their behavior to control the spread of the virus. Moreover, some who have tested positive for COVID-19 may no longer adopt protective behaviors because they believe they have antibodies that are protecting them, despite a lack of scientific consensus around immunity.

Colleges have adopted various approaches to meet these challenges, creating “contracts” that require students to refrain from on-campus parties and wear masks, forming large bubbles by keeping students on campus, and reducing the number of students and enforcing physical distancing and mask wearing in classrooms. For their part, most students are complying with campus COVID-19 policies; however, applying the findings of research in developmental science may make it possible to achieve greater adoption and compliance.

This rapid expert consultation is intended to support college administrators and local governments as they work together and with students to prevent the spread of COVID-19 on college campuses and in the surrounding communities. It is intended to serve as a companion document to a rapid expert consultation on COVID-19 testing on college campuses. This document

- describes general behavioral and risk communication strategies informed by research in social psychology, cognitive psychology, developmental psychology, behavioral economics, and communications that can promote the adoption of protective behaviors to mitigate the spread of COVID-19;
- summarizes research related to college students' development and behaviors;
- identifies core components of evidence-based programs and interventions to prevent risky behaviors among adolescents; and
- presents developmentally appropriate adaptations of the general strategies for adopting protective COVID-19 behaviors as they relate to college students.<sup>3</sup>

---

<sup>1</sup>For the sake of brevity, the term “college” is used herein to refer to both colleges and universities.

<sup>2</sup>The authors recognize that college students can belong to many different age groups, including older adults. However, this rapid expert consultation focuses on the age range of 18 to 25 years because ongoing social and emotional development during this time serves as the basis for the tailored strategies presented herein.

<sup>3</sup>The full statement of task for this rapid expert consultation is as follows: “The National Academies of Sciences, Engineering, and Medicine will produce a rapid expert consultation that explores strategies for encouraging college and university students to adopt protective behaviors during COVID-19, such as mask wearing, physical distancing, and hand washing. It will draw on the science of adolescent development, risk communications, social psychology, and behavioral economics, and on lessons learned from approaches that some colleges and universities have undertaken to encourage adoption of protective behaviors among students. The document will summarize what is known from available research and illustrative university experience to identify lessons and strategies that institutions of higher education could use as they make plans for the spring 2021 semester and beyond. The rapid expert consultation will be reviewed in accordance with institutional guidelines.”

### COVID-19 AND COLLEGE CAMPUSES

Under any circumstances, college is a learning experience and a ground for experimenting. Above all, many college students are socially driven, and college can be an exciting time for forming new friendships and romantic relationships. For many, moreover, college represents their first prolonged period away from parental supervision, so sensation- and novelty-seeking may be primary behavioral motivators. These nonacademic aspects of college can be as important as academics to some students, and they raise important considerations for the adoption of such COVID-19 protective behaviors as mask wearing and physical distancing. Taking risks and making mistakes during this time are normal and to be expected, although not always compatible with health and safety [2]. Indeed, risk taking is part of growing up and becoming independent [3].

In 2020 and for the foreseeable future, college students are experiencing these phenomena under extraordinary circumstances and stress. Some are having to drop out, pause their studies, or take extra classes to graduate early because family members are losing jobs during the pandemic or ill or dying with the virus. Others are attempting to continue their studies under those circumstances. For students who have resumed their college education since the pandemic-related closures, the campus environment has changed. Opportunities for face-to-face interaction in classes, common areas, and recreational and social activities, which are important to students' ongoing social and emotional development, are necessarily limited to keep them safe.

Colleges are not a monolith. In addition to variations in size, resources, location, and demographics, they vary widely in how they are responding to the pandemic and in the experiences students are having on campuses across the country. Nonetheless, many colleges share some common phenomena related to COVID-19 that intersect with students' developmental needs and have implications for their adoption of protective behaviors:

- Anecdotally, most college students are following or want to follow the rules while finding ways to engage in social interaction and other typical college behaviors. Many are looking to campus leaders for clear guidance and supports for staying safe (e.g., regular testing and contact tracing).
- For various reasons, some students are disregarding guidance on protective measures, with implications for the safety of those on campus and in the surrounding communities and for campus-based measures and messages.

#### STUDENT PERSPECTIVES

College-age participants in an ongoing national poll of what young people experience and need during the COVID-19 pandemic and a focused study in Winnebago County, Wisconsin, have shared the following views and experiences [4]:

“It has made it very difficult to see anyone whatsoever. I am stuck in my college dorm and I do not see anyone ever, which is very bad for people.”

“I think I will catch COVID in the next few months because university is starting soon and I do not think that the school has implemented great social distancing rules for lecture halls.”

“I’ve chosen to eat outside. I’ve chosen to do the things that I think are good that I also like to do. I felt like that was a risk versus a reward type of thing.”

“For me it’s more of who am I affecting the most. When it comes to, like, my grandparents or people at the grocery store, I don’t want—even if do have it, and if I don’t have any symptoms, why spread it to other people?”

“I think it’s just hard, because nobody has the same message, and I feel like since it’s a pandemic, and since it’s a health issue, it shouldn’t be about confusing messages....[That] makes me not really want to listen to anything.”

## COLLEGE STUDENT COVID-19 PROTECTIVE BEHAVIORS

4

- Transmission on campus is occurring in situations where people do not wear masks (e.g., in dorms or at football games, parties, and sorority and fraternity gatherings). Some of these events are publicized on social media, with implications for diffusing prosocial norms and guidance on precautionary measures.
- Some colleges are trying to strike the right balance between incentives for adopting protective behaviors and sanctions for noncompliance.
- Anecdotally, collaborations with student organizations and student leaders are facilitating successful adaptations of safe social norms that prevent transmission on campus.
- Engagement with local authorities is often necessary, such as when information about campus outbreaks and infection rates needs to be conveyed, when parties are taking place outside of the college authorities' jurisdiction, and when students live and shop off campus.
- Anxiety and depression are on the rise [5]. These conditions can prompt behaviors that are less desirable for preventing the spread of COVID-19.
- “Shaming” of students (public highlighting of disapproval and noncompliance) is occurring
  - among college students themselves, which can be detrimental to the sense of campus community; and
  - toward college students on the part of some communities where colleges and universities are located.

### STRATEGIES FOR PROMOTING THE ADOPTION OF COVID-19 PREVENTIVE BEHAVIORS AMONG COLLEGE STUDENTS

A [previous rapid expert consultation](#) produced by the Societal Experts Action Network [6] is intended to help decision makers identify strategies for increasing adherence to protective behaviors that can reduce the spread of COVID-19, including mask wearing, physical distancing, and handwashing. That document presents research-based habit-promoting and communication strategies that can encourage adoption of those behaviors.

Those general strategies apply to college students.<sup>4</sup> While many college students are adults, many others are undergoing important developmental and maturation processes that influence their behavior. For example, the ability to read other people's emotions and make attributions about their beliefs, thoughts, desires, intentions, and feelings advances sharply during adolescence. College students thereby become markedly more sophisticated in taking another person's point of view and making decisions about fairness, trustworthiness, and cooperation [7].

Campus leaders who are determining how to encourage compliance with COVID-19 protective behaviors must take these developmental processes into account. Accordingly, this section tailors the general behavioral and communication strategies described in the previous rapid expert consultation to this unique stage of the lifespan. These adaptations are guided by developmental psychology and brain research and are based on several key tenets:

- **Many adolescents and young adults are socially driven, with a strong desire for reward and acceptance.** The mere presence of a peer impacts how adolescents and young adults make reward-related, risky, and cognitive decisions [8]. As noted above, as adolescents spend increasingly more time with peers, they become more attuned to social-affective input and are better able to read other people's emotions [9]. As a result, messaging about “we” as a community that includes successes on the campus in, for example, keeping rates low or

---

<sup>4</sup>The National Science Foundation's Directorate for Social, Behavioral and Economic Sciences has recently funded Rapid Response Research (RAPID) grants in the Divisions of Behavioral and Cognitive Sciences and Social and Economic Sciences related to risk communication about COVID-19 to young people. Some of this research continues to explore how people make risky decisions in context. Once published, this research can further contribute to the development of communication strategies tailored for different users.

confining an outbreak, may be effective. Depending on their developmental stage, college students also may have different motivational processes from those of older adults [10]. They may be more reactive and more likely to do things they find rewarding. These sensitivities have implications for decision making: in general, decision-making processes for adolescents and young adults may be altered in emotionally charged contexts and in the presence of peers [11].

- **Identity, agency, and autonomy are centrally important during the college years.** As part of normal development, youth establish a sense of social and cultural heritage, a clear self-concept, a secure sense of self in light of feedback from significant others, self-acceptance and self-esteem, and personal stability and integration [12].
- **College students are primed for exploration, and risk taking is a normative part of their development.** Sensation seeking is normal for adolescents and young adults; it is not inherently dangerous and can be as simple as attending a party with friends [13]. During this developmental period, moreover, the risk-taking calculus itself places greater weight on the immediate rewards of a behavior than on its costs [14]. Connectivity in key parts of the brain that process rewards and respond to stimuli contributes to the allure of risk taking for adolescents and young adults.
- **Prosocial inclinations are strong among college-age students.** The desire to contribute and engage in behaviors that help others or have an impact on society rises sharply among adolescents and young adults. Enhanced social cognition allows adolescents to move beyond simple rules (e.g., equality or equity) to consider the complexities of social situations when making prosocial decisions, opening new opportunities to make contributions “for the greater good.” Moreover, contributing can both promote and be a key element of traditionally conceived fundamental needs of the adolescent period, such as autonomy, identity, and intimacy. [15]
- **College students can enhance the creation and implementation of policies that affect them.** Not only do they understand their own experiences, but youth of this age are also developing an increasingly sophisticated capacity for complex thinking and reasoning. Moreover, when solving problems, older adolescents sometimes can think more creatively and flexibly relative to older adults [16]. Social hierarchy and the organizational function of social networks for young people play an important role in public health spaces. In fact, social status can be a powerful tool as a message amplifier [17]. For example, health promotion campaigns that capitalize on young people’s sense of status and their desire to be viewed as thoughtful and engaged adults are effective. Colleges can frame and implement guidelines such that specific positions and nodes can be leveraged to transmit institutional messages with heightened impact.

Box 1 describes some of the core components of evidence-based programs and interventions that show promise in preventing risky behaviors and thereby improving a variety of health outcomes among adolescents, although additional research is needed to demonstrate causal effects [18]. These components are reflected in the adaptations of habit-promoting and risk communication strategies presented in the following sections.

**BOX 1**  
**CORE COMPONENTS OF EVIDENCE-BASED PROGRAMS AND INTERVENTIONS TO PREVENT RISKY BEHAVIORS AMONG ADOLESCENTS**

As described by a National Academies report on adolescent development [18], core program or intervention components are discrete, reliably identifiable techniques, strategies, or practices intended to influence the behaviors, outcomes, or well-being of a service recipient (e.g., college students). The following core components have shown promise in preventing risky behaviors and thereby improving health outcomes among adolescents, and may be useful in the design and implementation of programs and interventions targeting COVID-19 protective behaviors on college campuses:

- **Universal programs and interventions, which are provided to all members of a population, regardless of their level of risk.** Risk targeting is not required for a program or intervention to be effective.
- **Programs and interventions that are developed and implemented with input and support from the youth they serve, providing insights into their most pressing needs.** On college and university campuses, including students of diverse ages, racial/ethnic backgrounds, socioeconomic status, rurality/urbanity, sexual orientations, sexes/genders, and disability/ability status can inform the development, implementation, and evaluation of programs and interventions.
- **Theory-based approaches, such as social competence, gist-based, or social influence approaches.** Programs and interventions that incorporate approaches based on behavioral theory, social-emotional learning, and positive youth development are more likely to be successful in promoting positive adolescent health behaviors and outcomes.



### Habit-Promoting Strategies

The previous rapid expert consultation [6] identified five habit-promoting strategies that decision makers can use to overcome barriers to behavior change and encourage behaviors protective against the spread of COVID-19 in their communities. These five strategies can be adapted for college campuses as follows:

1. **Make the Behavior Easy to Start and Repeat.** People are more likely to behave in healthy ways when that behavior is relatively frictionless, meaning that it takes little time and effort to perform [19]. College leaders could establish campus environments that encourage desirable behaviors, such as by making testing sites easily accessible, making testing a seamless process, distributing free masks, and installing sanitizing stations throughout the campus. Students also could be encouraged to hang their mask on their dorm room door or clip it to their ID card or backpack.
2. **Make the Behavior Rewarding to Repeat.** Strategies for making protective behaviors rewarding are especially salient for adolescents and young adults because their motivational systems are reward focused [20]. Examples include turning masks into status symbols and introducing a competitive or collaborative element to wearing or designing masks (e.g., supporting student-led collaboration or competition among dorms, disciplinary departments, or athletic team).
3. **Tie the Behavior to an Existing Habit.** People are more likely to repeat a behavior when they stack it onto an existing habit (a behavior they perform automatically) [21]. For college students, protective behaviors could be tied to habits of mobile phone use. For example, students could be encouraged to leave their mask by their phone, or text or pop-up phone reminders or apps related to COVID-19 protective behaviors could be developed.
4. **Alert People to Behaviors that Conflict with Existing Habits and Provide Alternative Behaviors.** Because college students are inclined to exercise agency and autonomy, telling them only what they cannot do may lead to pandemic fatigue and associated risky behaviors. For many college students, COVID-19 protective behaviors may feel like a barrier to what they want to do (interact with each other); thus, it is important to highlight safe ways to fill their developmental need for interaction. Examples include giving students the agency, authority, responsibility, and guidance to establish and maintain the health of their own “social pods,” or supporting club, team, or student leaders in planning and providing COVID-safe social activities.
5. **Provide Specific Descriptions of Desired Behaviors.** When individuals understand what specifically is expected of them, they are more likely to adopt the desired behavior. Colleges could invite students to design, draw, paint, or build objects connected to campus life that depict 6- to 12-foot distances.

### Communication Strategies

The following ten strategies adapted from the previous rapid expert consultation [6] suggest how risk communication can be more effective in promoting behavior change among college students. Some research on adolescence and early adulthood suggests that these strategies may be enhanced by having students help in developing and implementing them. Communications may also be more persuasive if they help college students operationalize their existing knowledge of the coronavirus and protective behaviors. And campus leaders may need to vary their messaging over the course of a term or school year to overcome pandemic fatigue and hold students’ attention.

1. **Use Clear, Consistent, and Transparent Messaging, with Attention to Mode of Transmission.** Clear messaging is important, and messages from different units on campus

- and city administrators should be accurate, consistent in content and tone, and transparent regarding procedures and data. Social media platforms are an essential source of messaging and information for college students, and they should be leveraged to convey clear, consistent, and transparent messages from authoritative sources.
2. **Avoid Undue Attention to the Frequency of Socially Undesirable Behaviors, Instead Emphasizing Responsibility.** Telling college students about the risks or prevalence of an undesirable behavior may actually make them more likely to engage in that behavior [22]. Media accounts that highlight the undesirable behavior involved in college outbreaks overemphasize that behavior and send a message of low expectations for college students. Appealing instead to college students' developing sense of responsibility to do their part in slowing the spread of COVID-19 may be a more effective approach.
  3. **Foster Efficacy and Avoid Fatalism, with Attention to Student Agency.** As adolescents and young adults are developing their sense of agency, they can be supported in making positive choices and effecting change by adopting protective measures.
  4. **Appeal to the Collective Good of One's Community, Focusing on Prosocial Behavior and Activism.** Adolescence and early adulthood represent a time of opportunity. Prosocial behavior and student activism are common on college campuses [23]. For some youth, particularly those in historically marginalized communities, active civic engagement may be an adaptive means of coping with systemic injustice [24]. Students could be encouraged to make COVID-19 mitigation a campus-wide cause, especially if their activism is tied to their identity as responsible and mature and as representing the college-age population. For example, some Black students at historically Black colleges and universities are taking action to stop the spread of COVID-19 because they realize that their communities are among those most affected by the disease [25].
  5. **Use Trusted Messengers, Amplified by Social Media and Other Influencers.** In addition to trusting their families, friends, and experts [26], younger students in particular are swayed by external influencers on YouTube, TikTok, Twitch, Instagram, Snap Chat, and other social media who could amplify messages from trusted experts. Messengers from within students' own campus communities, such as the leaders of student government, fraternities, sororities, clubs, sports teams, and other affinity groups, can also be influential if their messages are personal, authentic, and appealing to students. Accordingly, some campuses are hiring their students to serve as influencers and to share coronavirus safety information on social media.
  6. **Tailor the Framing of the Message to the Audience, with Attention to the Risk–Reward Calculus.** Adolescents engage in high-risk behavior on the basis of a cost/benefit analysis, whereas mature non-risk-taking young adults are more likely to take a gist-based approach that involves being aware of risk–reward trade-offs but leaning more on categorical (non-trade-off) thinking [27]. For college students who prize the ability to socialize with peers and perceive the risks of COVID-19 as low, socializing will seem worth the risk. Framing messages about COVID-19 in terms of health risks or death is unlikely to be effective with college students because death rates in their age group are relatively low. More effective framing might focus on how being infected with the disease will affect other people, such as peers or family members who are immunocompromised or otherwise at risk; who is most likely to suffer; how activities may be curtailed if infection rates increase; or how students' grades may be impacted if they become ill. A gist-based approach would emphasize that while the risks of hospitalization or death are small, they are real, and when hundreds are testing positive, the odds will eventually catch up.
  7. **Link Prevention Behaviors to Identities, with Attention to Campus Affiliations.** Because college is an important time for students to develop and explore their sense of identity, appealing to them as members of their college campus, dorm, major, fraternity, sorority, club, or team may be especially effective in establishing social norms. Examples include behavioral pledges and social media campaigns designed to reinforce social norms, and the

- use of such slogans as “Bruins keeping each other safe,” “Tigers support Tigers,” or “Please stay one tiger (at least 6 feet) apart from other people.”
8. **Highlight Social Disapproval of a Target Audience Member’s Failure to Comply When It Occurs, without Overemphasizing Risk.** While campuses need students to regard behaviors that can spread COVID-19 as socially unacceptable, they also need to be cautious about the emphasis they place on risk. Some college students perceive risk-taking activities as inherently fun and exciting and engage in behaviors precisely because those behaviors are considered dangerous [28]. Therefore, highlighting the risk of going to bars or parties could motivate them to take those risks. Instead, universities might work with influential social media sites (e.g., Barstool) to counter content that emphasizes those types of behaviors with messages that enforce such social norms as staying home and hanging out with roommates. It might also be effective to illustrate the potential consequences of failure to comply, such as by sharing stories of how students and their families have been affected by the virus. As another example, the “Mask Up or Pack Up” campaign on campuses across the country conveys the message that if students do not do their part, everyone will be forced to go home.
  9. **Highlight the Growing Prevalence of Behavior Change, Using Positive Messaging.** For college students, positive messaging can be more effective than a focus on negative behaviors or outcomes. Examples include such messages as “More than X% of students on our campus say they wear masks every day” or “Our state is #1 in the country in terms of mask wearing.” Frequent reminders of lower infection and transmission rates and how outbreaks have been minimized (exemplified by dashboards at Cornell University and the University of Wisconsin-Madison) have anecdotally been successful.
  10. **Avoid Repeating Misinformation, Even to Debunk It.** Efforts to debunk misinformation can have the unintended effect of reinforcing false beliefs [29]. With a strategy such as “Five Myths about the Coronavirus,” for example, people tend to remember the myths and not the facts. Calling attention to misinformation related to the pandemic (e.g., “COVID-19 is a hoax”) does not directly increase and may even decrease the likelihood that people will adopt specific protective behaviors [30]; instead, repeating the truths about COVID and protective measures is more likely to be effective. Universities could provide information to help students, staff, and parents communicate COVID safety information effectively to people who may not recognize the importance of preventing its spread.

## CONCLUSION

College communities across the country are encouraging behaviors that can stem the spread of COVID-19 on campuses, and most college students appear to be complying with campus COVID-19 policies. Combining insights from developmental science with habit-promoting and risk communication strategies from social and cognitive psychology, behavioral economics, and communications research can enhance efforts to promote the adoption of protective behaviors among college students while recognizing and supporting their need for social interaction.

*SEAN is interested in your feedback. Was this rapid expert consultation useful? Send comments to [sean@nas.edu](mailto:sean@nas.edu) or (202) 334-3440.*

## REFERENCES

- [1] Available: <https://www.cdc.gov/coronavirus/2019-ncov/community/colleges-universities/considerations.html>.
- [2] Institute of Medicine and National Research Council. (2011). *The science of adolescent risk-taking: Workshop report*. Washington, DC: National Academies Press. doi: 10.17226/12961.
- [3] National Academies of Sciences, Engineering, and Medicine. (2019). *The promise of adolescence: Realizing opportunity for all youth*. Washington, DC: National Academies Press. doi: 10.17226/25388.
- [4] Research protocols and question bank available: <https://www.researchprotocols.org/2017/12/e247/> and <https://hearmyvoicenow.org/questionbank>.
- Wilson, R.F., Sharma, A.J., Schluechtermann, S., Currie, D.W., Mangan, J., Kaplan, B., Goffard, K., Salomon, J., Casteel, S., Mukasa, A., Euhardy, N., Ruiz, A., Bautista, G., Bailey, E., Westergaard, R., and Gieryn, D. (2020). Factors influencing risk for COVID-19 exposure among young adults aged 18–23 years—Winnebago County, Wisconsin, March–July 2020. *Morbidity and Mortality Weekly Report*, 69(41), 1497-1502. doi: 10.15585/mmwr.mm6941e2.
- [5] Chirikov, I., Soria, K.M., Horgos, B., and Jones-White, D. (2020). Undergraduate and graduate students' mental health during the COVID-19 pandemic. *UC Berkeley: Center for Studies in Higher Education*. Available: <https://escholarship.org/uc/item/80k5d5hw>.
- Waselewski, E.A., Waselewski, M.E., and Chang, T. (2020). Needs and coping behaviors of youth in the U.S. during COVID-19. *Journal of Adolescent Health*, 67, 649-652.
- [6] National Academies of Sciences, Engineering, and Medicine. (2020). *Encouraging adoption of protective behaviors to mitigate the spread of COVID-19: Strategies for behavior change*. Washington, DC: National Academies Press. doi: 10.17226/25881.
- [7] Blakemore, S., and Mills, K.L. (2014). Is adolescence a sensitive period for sociocultural processing? *Annual Review of Psychology*, 65(1), 187-207.
- Burnett, S., Bird, G., Moll, J., Frith, C., and Blakemore, S.J. (2009). Development during adolescence of the neural processing of social emotion. *Journal of Cognitive Neuroscience*, 21(9), 1736-1750. doi: 10.1162/jocn.2009.21121.
- Garcia, N.V., and Scherf, K.S. (2015). Emerging sensitivity to socially complex expressions: A unique role for adolescence? *Child Development Perspectives*, 9(2), 84-90. doi: 10.1111/cdep.12114.
- Kilford, E.J., Garrett, E., and Blakemore, S.J. (2016). The development of social cognition in adolescence: An integrated perspective. *Neuroscience and Biobehavioral Reviews*, 70, 106-120. doi: 10.1016/j.neubiorev.2016.08.016.
- Overgaauw, S., van Duijvenvoorde, A.C., Gunther Moor, B., and Crone, E.A. (2015). A longitudinal analysis of neural regions involved in reading the mind in the eyes. *Social Cognitive and Affective Neuroscience*, 10(5), 619-627. doi: 10.1093/scan/nsu095.
- Pfeifer, J.H., Masten, C.L., Borofsky, L.A., Dapretto, M., Fuligni, A.J., and Lieberman, M.D. (2009). Neural correlates of direct and reflected self-appraisals in adolescents and adults: When social perspective-taking informs self-perception. *Child Development*, 80(4), 1016-1038. doi: 10.1111/j.1467-8624.2009.01314.x.
- [8] Chein, J., Albert, D., O'Brien, L., Uckert, K., and Steinberg, L. (2011). Peers increase adolescent risk taking by enhancing activity in the brain's reward circuitry. *Developmental Science*, 14(2), F1-F10. doi: 10.1111/j.1467-7687.2010.01035.x.
- Silva, K., Shulman, E.P., Chein, J., and Steinberg, L. (2016). Peers increase late adolescents' exploratory behavior and sensitivity to positive and negative feedback. *Journal of Research on Adolescence*, 26(4), 696-705. doi: 10.1111/jora.12219.
- Smith, A.R., Chein, J., and Steinberg, L. (2014). Peers increase adolescent risk taking even when the probabilities of negative outcomes are known. *Developmental Psychology*, 50(5), 1564-1568. doi: 10.1037/a0035696.
- Smith, A.R., Steinberg, L., Strang, N., and Chein, J. (2015). Age differences in the impact of peers on

- adolescents' and adults' neural response to reward. *Developmental Cognitive Neuroscience*, *11*, 75-82. doi: 10.1016/j.dcn.2014.08.010.
- [9]Garcia, N.V., and Scherf, K.S. (2015). Emerging sensitivity to socially complex expressions: A unique role for adolescence? *Child Development Perspectives*, *9*(2), 84-90. doi: 10.1111/cdep.12114.
- [10]Gee, D.G., Bath, K.G., Johnson, C.M., Meyer, H.C., Murty, V.P., van den Bos, W., and Hartley, C.A. (2018). Neurocognitive development of motivated behavior: Dynamic changes across childhood and adolescence. *Journal of Neuroscience*, *38*(44), 9433-9445.
- Foulkes, L., and Blakemore, S.J. (2016). Is there heightened sensitivity to social reward in adolescence?. *Current Opinion in Neurobiology*, *40*, 81-85. doi: 10.1016/j.conb.2016.06.016.
- van Duijvenvoorde, A.C., Peters, S., Braams, B.R., and Crone, E.A. (2016). What motivates adolescents? Neural responses to rewards and their influence on adolescents' risk taking, learning, and cognitive control. *Neuroscience and Biobehavioral Reviews*, *70*, 135-147. doi: 10.1016/j.neubiorev.2016.06.037.
- [11]Breiner, K., Li, A., Cohen, A.O., Steinberg, L., Bonnie, R.J., Scott, E.S., Taylor-Thompson, K., Rudolph, M.D., Chein, J., Richeson, J.A., Dellarco, D.V., Fair, D.A., Casey, B.J., and Galván, A. (2018). Combined effects of peer presence, social cues, and rewards on cognitive control in adolescents. *Developmental Psychobiology*, *60*(3), 292-302. doi: 10.1002/dev.21599.
- Chein, J., Albert, D., O'Brien, L., Uckert, K., and Steinberg, L. (2011). Peers increase adolescent risk taking by enhancing activity in the brain's reward circuitry. *Developmental Science*, *14*(2), F1-F10. doi: 10.1111/j.1467-7687.2010.01035.x.
- Giedd, J.N., Blumenthal, J., Jeffries, N.O., Castellanos, F.X., Liu, H., Zijdenbos, A., Paus, T., Evans, A. C., and Rapoport, J.L. (1999). Brain development during childhood and adolescence: A longitudinal MRI study. *Nature Neuroscience*, *2*(10), 861-863.
- Konrad, K., Firk, C., and Uhlhaas, P.J. (2013). Brain development during adolescence: Neuroscientific insights into this developmental period. *Deutsches Arzteblatt International*, *110*(25), 425-431. doi: 10.3238/arztebl.2013.0425.
- Rudolph, M.D., Miranda-Domínguez, O., Cohen, A.O., Breiner, K., Steinberg, L., Bonnie, R.J., Scott, E.S., Taylor-Thompson, K., Chein, J., Fettiich, K.C., Richeson, J.A., Dellarco, D.V., Galván, A., and Casey, B.J. (2017). At risk of being risky: The relationship between "brain age" under emotional states and risk preference. *Developmental Cognitive Neuroscience*, *24*, 93.
- Steinberg, L., Albert, D., Cauffman, E., Banich, M., Graham, S., and Woolard, J. (2008). Age differences in sensation seeking and impulsivity as indexed by behavior and self-report: Evidence for a dual systems model. *Developmental Psychology*, *44*(6), 1764-1778.
- [12]Alessandria, K.P., and Nelson, E.S. (2005). Identity development and self-esteem of first-generation American college students: An exploratory study. *Journal of College Student Development*, *46*(1), 3-12. doi: 10.1353/csd.2005.0001.
- [13]Maslowsky, J., Buvinger, E., Keating, D.P., Steinberg, L., and Cauffman, E. (2011). Cost-benefit analysis mediation of the relationship between sensation seeking and risk behavior. *Personality and Individual Differences*, *51*(7), 802-806. doi: 10.1016/j.paid.2011.06.028.
- Romer, D., Reyna, V.F., and Satterthwaite, T.D. (2017). Beyond stereotypes of adolescent risk taking: Placing the adolescent brain in developmental context. *Developmental Cognitive Neuroscience*, *27*, 19-34. doi: 10.1016/j.dcn.2017.07.007.
- Steinberg, L. (2008). A social neuroscience perspective on adolescent risk-taking. *Developmental Review*, *28*(1), 78-106.
- Zuckerman, M., and Kuhlman, D.M. (2000). Personality and risk-taking: Common biosocial factors. *Journal of Personality*, *68*(6), 999-1029.
- [14]Cauffman, E., Shulman, E., Steinberg, L., Claus, E., Banich, M., Woolard, J., and Graham, S. (2010). Age differences in sensitivity to the rewards and costs of a risky decision as indexed by performance on the Iowa gambling task. *Developmental Psychology*, *46*, 193-207.
- [15]Fulgini, A.J. (2018). The need to contribute during adolescence. *Perspectives on Psychological*

- Science*, 14(3), 331-343.
- Eisenberg, N., Spinrad, T.L., and Knafo-Noam, A. (2015). Prosocial development. In R. Lerner (Ed.), *Handbook of child psychology and developmental science* (7th ed., Vol. 3, pp. 610-656). Hoboken, NJ: John Wiley & Sons.
- Cote, J. E. (2009). Identity formation and self-development in adolescence. In R.M. Lerner, and L. Steinberg (Eds.), *Handbook of adolescent psychology* (3rd ed., Vol. 1, pp. 266-304). Hoboken, NJ: John Wiley & Sons.
- [16]National Academies of Sciences, Engineering, and Medicine. (2019). *The promise of adolescence: Realizing opportunity for all youth*. Washington, DC: National Academies Press. doi: 10.17226/25388.
- Kleibecker, S.W., De Dreu, C.K., and Crone, E.A. (2013). The development of creative cognition across adolescence: Distinct trajectories for insight and divergent thinking. *Developmental Science*, 16(1), 2-12. doi: 10.1111/j.1467-7687.2012.01176.x.
- . (2016). Creativity development in adolescence: Insight from behavior, brain, and training studies. *New Directions for Child and Adolescent Development*, 2016(151), 73-84. doi: 10.1002/cad.20148.
- [17]Yeager, D.S., Dahl, R., and Dweck, C.S. (2018). Why interventions to influence adolescent behavior often fail but could succeed. *Perspectives on Psychological Science*, 13(1), 101-122.
- [18]National Academies of Sciences, Engineering, and Medicine. (2020). *Promoting positive adolescent health behaviors and outcomes: Thriving in the 21st century*. Washington, DC: National Academies Press. doi: 10.17226/25552.
- [19]Wood, W. (2019). *Good habits, bad habits*. New York: FSG Press.
- [20]Davidow, J.Y., Foerde, K., Galván, A., and Shohamy, D. (2016). An upside to reward sensitivity: The hippocampus supports enhanced reinforcement learning in adolescence. *Neuron*, 92(1), 93-99.
- Foulkes, L., and Blakemore, S.J. (2016). Is there heightened sensitivity to social reward in adolescence?. *Current Opinion in Neurobiology*, 40, 81-85. doi: 10.1016/j.conb.2016.06.016.
- Sturman, D.A., and Moghaddam, B. (2012). Striatum processes reward differently in adolescents versus adults. *Proceedings of the National Academy of Sciences of the United States of America*, 109(5), 1719-1724. doi: 10.1073/pnas.1114137109.
- [21]Gollwitzer, P.M., and Oettingen, G. (2019). Implementation intentions. In M.D. Gellman and I.R. Turner (Eds.), *Encyclopedia of behavioral medicine* (pp. 1043-1048). New York: Springer-Verlag.
- Keller, L., Bieleke, M., and Gollwitzer, P.M. (2019). Mindset theory of action phases and if-then planning. In K. Sassenberg and M.L.W. Vleik (Eds.), *Social psychology in action* (pp. 23-37). Cham: Springer.
- [22]National Academies of Sciences, Engineering, and Medicine. (2020). *Encouraging adoption of protective behaviors to mitigate the spread of COVID-19: Strategies for behavior change*. Washington, DC: National Academies Press. doi: 10.17226/25881.
- [23]Eagan, K., Stolzenberg, E.B., Bates, A.K., Aragon, M.C., Suchard, M.R., and Rios-Aguilar, C. (2015). *The American freshman: National norms fall 2015*. Los Angeles: Higher Education Research Institute, UCLA.
- [24]Diemer, M.A., and Rapa, L.J. (2016). Unraveling the complexity of critical consciousness, political efficacy, and political action among marginalized adolescents. *Child Development*, 87(1), 221-238.
- Gitwright, S., Cammarota, J., and Noguera, P. (2006). *Beyond resistance! Youth activism and community change: New democratic possibilities for practice and policy for America's youth*. New York: Routledge.
- Hope, E.C., and Spencer, M.B. (2017). Civic engagement as an adaptive coping response to conditions of inequality: An application of phenomenological variant of ecological systems theory (PVEST). In N.J. Cabrera and B. Leyendecker (Eds.), *Handbook on positive development of minority children and youth* (pp. 421-435). New York: Springer Science + Business Media.

- [25] Available: <https://www.insidehighered.com/news/2020/09/24/hbcus-experiencing-better-student-compliance-pandemic-restrictions-other>.
- [26] Available: <https://www.cogitatiopress.com/mediaandcommunication/article/view/515/515>.
- [27] Blalock, S.J., and Reyna, V.F. (2016). Using fuzzy-trace theory to understand and improve health judgments, decisions, and behaviors: A literature review. *Health Psychology, 35*(8), 781-792. doi:10.1037/hea0000384.
- Defoe, I.N., Dubas, J.S., Figner, B., and van Aken, M.A. (2015). A meta-analysis on age differences in risky decision making: Adolescents versus children and adults. *Psychological Bulletin, 141*(1), 48-84. doi:10.1037/a0038088.
- Reyna, V.F., and Mills, B.A. (2014). Theoretically motivated interventions for reducing sexual risk taking in adolescence: A randomized controlled experiment applying fuzzy-trace theory. *Journal of Experimental Psychology: General, 143*(4), 1627-1648. doi: 10.1037/a0036717.
- Reyna, V.F., Weldon, R.B., and McCormick, M. (2015). Educating intuition: Reducing risky decisions using fuzzy-trace theory. *Current Directions in Psychological Science, 24*(5), 392-398.
- Romer, D., Reyna, V.F., and Satterthwaite, T.D. (2017). Beyond stereotypes of adolescent risk taking: Placing the adolescent brain in developmental context. *Developmental Cognitive Neuroscience, 27*, 19-34.
- [28] Galván, A. (2010). Adolescent development of the reward system. *Frontiers in Neuroscience, 4*, 6-14.
- Moffitt, T.E., and Caspi, A. (2001). Childhood predictors differentiate life-course persistent and adolescence-limited antisocial pathways among males and females. *Developmental Psychopathology, 13*(2), 355-375.
- [29] Available: <https://www.frameworksinstitute.org/article/order-matters>.
- [30] Fishbein, M., and Ajzen, I. (2015). *Predicting and changing behavior*. New York: Routledge.
- Fishbein, M., Triandis, H., Kanfer, F.H., Becker, M., Middlestadt, S.E., and Eichler, A. (2001). Factors influencing behavior and behavior change. In A. Baum, T. Revenson, and J. Singer (Eds.), *Handbook of health psychology* (pp. 3-17). Mahwah, NJ: Lawrence Erlbaum Associates.
- Scheufele, D.A., Krause, N.M., Freiling, I., and Brossard, D. (2020). How not to lose the COVID-19 communication war. *Issues in Science and Technology*, April 17. Available: <https://issues.org/covid-19-communication-war>.

### ACKNOWLEDGMENTS

SEAN and the authors extend their gratitude to the staff of the National Academies of Sciences, Engineering, and Medicine for their assistance in preparing this document. In particular we thank Natalie Nielsen, Emily P. Backes, Monica Feit, and Nicole Kahn, who contributed editing and writing assistance. Thanks are due as well to Mike Stebbins (Science Advisors, LLC and Federation of American Scientists) and Kerry Duggan (SustainabiliD, LLC and Federation of American Scientists), consultants to SEAN, who provided additional editorial assistance. We also thank Rona Briere and Allie Boman for their editing assistance.

To supplement their own expertise, the authors received input from several external sources, whose willingness to share their perspectives and expertise was essential to this work. We thank Ashley Cate, student, University of Wisconsin-Madison; Tammy Chang, University of Michigan; Michelle Fisher, Delaware State University; Marisa Gerstein-Pineau, Frameworks Institute; David Hansen, Western Washington University; Mary Magnuson, student, University of Wisconsin-Madison; Ellen Peters, University of Oregon; Brianna Vanmatre, student, University of Wisconsin-Madison; and Joanna Lee Williams, Rutgers University.

We also thank the following individuals for their review of this rapid expert consultation: Ana Mari Cauce, Office of the President, University of Washington; Robert Crosnoe, Department of Sociology, University of Texas at Austin; Susan T. Fiske, Psychology and Public Affairs, Princeton University; Andrew Fuligni, Psychiatry and Biobehavioral Sciences, University of California, Los Angeles; Valerie Reyna, College of Human Ecology, Cornell University; and Laurence Steinberg, Department of Psychology, Temple University.

Although the reviewers listed above provided many constructive comments and suggestions, they were not asked to endorse the conclusions of this document, nor did they see the final draft before its release. The review of this document was overseen by Alicia L. Carriquiry, Department of Statistics, Iowa State University, and Robert A. Moffitt, Department of Economics, The Johns Hopkins University. They were responsible for making certain that an independent examination of this rapid expert consultation was carried out in accordance with the standards of the National Academies and that all review comments were carefully considered. Responsibility for the final content rests entirely with the authors and the National Academies.



COLLEGE STUDENT COVID-19 PROTECTIVE BEHAVIORS

15

**SOCIETAL EXPERTS ACTION NETWORK (SEAN)**

**EXECUTIVE COMMITTEE**

**MARY T. BASSETT** (*Co-chair*), Harvard University  
**ROBERT M. GROVES** (*Co-chair*), Georgetown University  
**DOMINIQUE BROSSARD**, University of Wisconsin-Madison  
**JANET CURRIE**, Princeton, University  
**MICHAEL HOUT**, New York University  
**ARATI PRABHAKAR**, Actuate  
**ADRIAN E. RAFTERY**, University of Washington  
**JENNIFER RICHESON**, Yale University

*Staff*

**MONICA N. FEIT**, *Deputy Executive Director, Division of Behavioral and Social Sciences and Education*  
**ADRIENNE STITH BUTLER**, *Associate Board Director*  
**EMILY P. BACKES**, *Senior Program Officer*  
**NATALIE R. NIELSEN**, *Senior Program Officer*  
**DARA SHEFSKA**, *Associate Program Officer*  
**PAMELLA ATAYI**, *Program Coordinator*