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EDITORIAL

Introduction to the special section: the importance of behavioral medicine in the COVID-19 pandemic response

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Preventative behaviors, including getting vaccinated, wearing a mask, and physical distancing, are at the heart of controlling the spread of COVID-19. Currently, vaccination has become the cornerstone of most governments' strategies to minimize viral transmission and reduce the number of hospitalizations and deaths. However, vaccine hesitancy is still a major problem across most countries, with unvaccinated people at the highest risk of becoming infected and hospitalized. As we have seen most recently with the omicron variant, the hospitalization and care of unvaccinated people increases the potential for health care systems to become overwhelmed [1].

As behavior is at the heart of managing health during the pandemic, governments have used a number of different mechanisms to motivate individuals to engage in preventative behaviors, ranging from threatening messages to minimizing barriers to incentives such as lottery tickets [2,3]. These measures have had an inconsistent impact on vaccine uptake, with most public health officials unsure about how best to leverage the behavioral sciences and, thus, what to do moving forward; and here is where behavioral medicine comes in.

As most behavioral scientists know, making the decision to engage in a new behavior is complex. Our field is rife with theoretical frameworks to model this [4]. Whenever we make a complex decision, we weigh our beliefs about consequences, susceptibility and social norms, and the costs and benefits. More specifically, we consider when those costs and benefits might occur. In general, people value more immediate benefits over future benefits, and fear immediate costs more than long-term consequences [5]. In the context of getting vaccinated, individuals incur both actual and anticipated costs, for example the time spent registering for a vaccination, planning the process and getting vaccinated (actual costs) and any potential side effects, possible time lost from work, or future reliance on others (anticipated costs). In addition, one might incur costs for the delayed benefit of avoiding a potential illness, which some people think may not occur, might not be severe, or might not affect their daily lives.

Why do people hesitate in getting a vaccine? In a simplified version of vaccine hesitancy, when the "current" costs are perceived to be greater than the "future" benefits. Understanding the factors that drive this cost–benefit ratio are critical to developing community- or population-based behavior change practices and policies, which is one of the key goals of behavioral medicine science.

The special section in this issue of *Annals of Behavioral Medicine* contains a set of articles focusing on the efficacy of a variety of pandemic mitigation behaviors and the determinants of engaging—or not—in those behaviors. Collectively, the articles in the special section provide important perspectives on how both health psychology theories and public health approaches should be combined to leverage behavioral medicine as we navigate the future twists and turns of the COVID pandemic.

Consistent with a number of behavior change theories and models, Shiloh and colleagues [6] demonstrated the link between intention and behavior in an Israeli sample with data collected at two time points, before (October–November 2020) and after (February–March 2021) vaccines were available. Intentions to get vaccinated were highly correlated with getting vaccinated, with a correct classification of over 80% of the sample. Furthermore, a multivariate model showed that 86% of the variance

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in vaccine intentions was explained by individual factors (e.g., past influenza vaccination behavior), social factors (e.g., perceived vaccination social norms), and COVID-19 vaccine attitudes. However, individual models suggested that the lion's share of variance in intentions (84%) was explained by COVID-19 vaccine attitudes. Surprisingly, COVID-19-specific factors, such as previously contracting the disease or knowing someone that had showed relatively small associations with intention. Not only is the strong link between attitudes and intentions interesting, but the fact that attitudes varied by sociodemographic characteristics is also consistent with a second paper in the special section [7].

Bleakley et al. [7] collected data on a U.S. sample in October–November 2020 and again 4 weeks later. They found the interaction of age and ethnicity to shape the relationship between baseline attitudes and future intentions to get the vaccine. For example, there was a strong association between attitudes and intentions in Black individuals under 50 compared with Black individuals over 50, which was the opposite finding for Hispanic individuals (i.e., a stronger association for those over age 50 than those under age 50). This study, in combination with the Shiloh et al. study [6], highlight the influence of COVID 19 attitudes on intentions to receive a vaccine, which in turn, are correlated with vaccine behaviors, and how both psychological and sociodemographic characteristics shape those attitudes. Taken together, the studies by Blakely et al. and Shiloh et al. provide evidence for the need to develop tailored prevention approaches for increasing COVID 19 vaccination rates.

Drawing on decades of behavioral medicine studies, we know that *how* information is presented has a significant impact on how it is perceived and how it affects behavior [8,9]. Gong et al. [10] describe a novel messaging experiment in China, conducted in November–December 2020. The findings provide insight into how we may need to use tailored approaches to impact behavior, even in the context of government policies. Individuals (aged 18–49) were randomized to receive either loss, gain, altruistic, or neutral messages around getting vaccinated for COVID 19. Compared with neutral messages, the three other kinds of messages increased vaccine intentions, with loss-framed messaging slightly more effective than gain-framed or altruistic messaging. This result contrasts with findings of the International Assessment of COVID-19-related Attitudes, Concerns, Responses and Impacts in Relation to Public Health Policies (iCARE) study (www.icarestudy.com [11]), where altruistic motivations were the most highly endorsed reasons to get vaccinated among people who had received a full vaccine schedule (which, at the time, was either two doses of a two-dose vaccine or one dose of a one-dose vaccine). It is important to note, however, that the Gong et al.'s study did not target individuals who were resistant or hesitant about getting vaccinated, i.e., the group of individuals that we need to target with additional public health interventions. Moreover, the study did not provide a breakdown of the characteristics of those who were impacted by the four different kinds of messages. This is essential information if governments want to consider tailoring messaging to certain communities of social groups.

The article by Morestead et al. [12] examines COVID-19 preventative behaviors other than vaccination in a North American population in the early days of the pandemic (March and May 2020). They found that either a general perception of high perceived threat toward COVID-19, or low threat perceptions combined with greater altruism (i.e., low perceived threat combined with high state empathy) was associated with engaging in a greater number of preventative COVID behaviors such as hand washing, minimizing social contact, and avoiding travel. Given the growing literature on the added benefits of matching health messages to individual characteristics and beliefs [8], it is important to take these elements into consideration when developing and delivering public health message campaigns.

The potential importance of tailored public health messaging, in combination with other pandemic policies, is highlighted in the article by Luszczynska et al. [13], which draws on data collected during the first wave of the COVID-19 pandemic (March–September 2020) in 14 countries within Europe, Asia, North America, Africa, and Oceania. Even with a simple and highly engaged pandemic mitigation behavior such as hand washing, the "strictness" of general government measures can reduce engagement in the behavior by reducing self-efficacy beliefs. Coupling increasingly restrictive policies with messaging that still allows individuals to be empowered in engaging and monitoring preventative behaviors may offset the perceived potential negative consequences of government mandates that appear to limit individual rights and choices.

Tailored message framing coupled with ongoing policies might be the kind of strategy needed to reduce the compensatory behaviors, shown in the study by Aranguren [14]. This creative French experimental study explored facemask wearing and physical distancing with two independent samples at two different time points during the pandemic before vaccinations were available—one when mask wearing was recommended (June 2020) and the second when mask wearing was mandatory (September 2020). A number of interesting findings emerged. First, there was a trade-off among the two preventive behaviors: Individuals tended to ignore physical distancing recommendations when people wore masks (especially when masks were recommended but not mandated). Second, there was a notable sex difference in the response, conditional on government policy. Women showed more risk-compensatory behavior when mask wearing was mandatory (i.e., they

did not physical distance when people wore masks), than when masks were recommended; in contrast, men engaged in similar levels of risk-compensatory behaviors whether masks were recommended or required. Though there are a number of potential explanations for this, the key take-home point, once again, is that understanding individual differences is critically important and needs to be leveraged to develop sophisticated, elegant, tailored interventions. Simply having a policy may not be enough.

This set of manuscripts only skims the surface of the health disparities that have been exposed at all phases of the pandemic. There has been and continues to be a socioeconomic and cultural divide between those getting and not getting vaccinated, as well as in those who do and do not engage in the other preventative behaviors. Although some of the studies examined differences between racial/ethnic or age groups, we need to go deeper to understand how the history, customs, and shared beliefs of these groups might strongly influence vaccine and pandemic preventative behaviors.

It is clear that the pandemic is not likely to end in the near future. Data suggest that we will keep seeing various waves of infections, with new variants, and the subsequent turning on and off of various government mitigation policies. Based on the papers within this issue, it would seem that if we are to get through the pandemic faster, policymakers will need to be creative and couple policies with tailored interventions. Behavioral science expertise and knowledge should be utilized to target customized interventions to those who are the most hesitant while acknowledging culture specific beliefs and concerns. This is clearly most important in the area of vaccination, given the critical role it plays in the pandemic response, but also needs to extend to all prevention and mitigation behaviors.

Using the growing behavioral medicine evidence base, behavioral medicine scientists have the responsibility to advise and inform policy makers about how to manage both the development and delivery of vaccination policies. Many behavioral health organizations, such as the Society for Behavioral Medicine and the Behavioral Medicine Research Council have focused efforts to do this. Journals such *as Annals of Behavioral Medicine* aim to publish the best science in the area of behavior change to inform these efforts. At this point in the pandemic, in order for research to be "policy worthy," Annals is encouraging work that examines interventions or mechanisms, for example, work that demonstrates psychosocial moderation of infection risk through biological, psychological, social, and cultural pathways, rather than the correlates of preventive behaviors. We will need to show that optimizing tailored behavioral interventions, such as messaging, will lead individuals and communities to feel empowered to continue engaging and monitoring the key behaviors that align with those policies in an attempt to get to the end of this pandemic in the most efficient way possible.

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