A R T I C L E

How resilient were we in 2021? Results of a LinkedIn Survey including biomedical and pharmaceutical professionals using the Benatti Resiliency Model

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Abstract

Enhancing resiliency should elevate innovation and efficiency in biomedical research and development (R&D); however, compared with other professions, data on practice of resilience is lacking. Using the Benatti Resiliency Model (5 anchors: Well-Being, Self-Awareness, Brand, Connection, and Innovation), we surveyed professionals, including those in biomedical and pharmaceutical R&D. A structured LinkedIn questionnaire (March 16–May 23, 2021), surveyed each model anchor using five categories. One hundred fifty-eight participants (~6% student/trainee, 18%, 27%, and 49% in 1–5, 5–15 or >15 years post-terminal degree) took the survey (90 in biomedical and pharmaceutical R&D). Over 50% chose "always"/"often" across questions, except external influence or engagement. The question with one of the lowest "always" scores (~15%) was "I get feedback on my influence and impact in my career" in Brand, highlighting areas for leadership development and coaching. In the anchor of Well-being, nutrition and stress management also received some lowest "always" scores (~15% for both). Connection and Innovation scores trended slightly higher in biomedical and pharmaceutical R&D. No students/trainees chose "always" in Brand, indicating evolution of brand maturity over time. Self- and survey-assessed resiliency scores were associated ($r_s = 0.37$, $p < 0.0001$). Our survey yielded actionable insights on Resilience, including "best practices" through an open-ended question for one thing most useful to boost resilience in the survey and is the first application of the Benatti Model for crowdsourced research.

Study Highlights

WHAT IS THE CURRENT KNOWLEDGE ON THE TOPIC?
Resilience is a key leadership competency. Whereas data on the practice of resilience in the healthcare provider sector are available, data on practice of resilience is lacking in biomedical and pharmaceutical research and development (R&D).

WHAT QUESTION DID THIS STUDY ADDRESS?
We aimed to collect data on resilience and identify opportunities/strategies on resilience boosting within the community of professionals, including the biomedical and pharmaceutical R&D sector of practice.

WHAT DOES THIS STUDY ADD TO OUR KNOWLEDGE?
This is the first application of mindful integration of the Benatti Resiliency Model for assessing the practice of resilience in the community of professionals, including those engaged in biomedical and pharmaceutical R&D. Our survey identified the importance of brand evolution over the course of one's career development, key opportunity areas (e.g., nutrition and stress management) and revealed ample strategies to boost resilience.

HOW MIGHT THIS CHANGE CLINICAL PHARMACOLOGY OR TRANSLATIONAL SCIENCE?
This study has revealed practical strategies that can be incorporated into the training and leadership development of scientists and professionals in clinical pharmacology and translational science.

INTRODUCTION

A recent Commentary in the Journal introduced the readership of *Clinical and Translational Science* (CTS) to the topic of resilience and its importance as a key leadership competency to prevent burnout.[1] The Benatti Resiliency Model provides an actionable framework comprised of five key anchors to boost resilience and prevent burnout.[2] These are Well-being, Self-awareness, Brand, Connection and Innovation. Purpose-oriented engagement within and outside one's primary organization is a critical enabler for transformative progress in translational sciences and pharmaceutical research and development (R&D), considering the vital role of interdisciplinary and cross-sector collaborations in a highly dynamic ecosystem.[3] Contexts of such engagement include nurturing of innovation at the interface of the academic and industry sectors,[4] proactive integration of the patient's voice,[5] and a strong emphasis on outsourcing through strategic partnerships with contract research organizations to boost efficiency.[6] More than ever, under the current pressures faced from coronavirus disease 2019 (COVID-19), we posit that sustainable progress and innovation in biomedical research and pharmaceutical development will require commitment to the practice of resilience, at both individual and organizational levels. Of note, burnout is on the rise. In a survey administered by Indeed, over half (52%) of survey respondents were experiencing burnout in 2021—up from the 43% who said the same in their pre-COVID-19 survey. Whereas burnout in related healthcare professions (e.g., medical and nursing practice) is well-recognized,[7–11] data regarding the level of resiliency in our discipline (e.g., biomedical and pharmaceutical professionals) compared with other professions are lacking.

To collect data on resilience with a focus on the biomedical and pharmaceutical R&D sector of practice, we launched a LinkedIn survey (March–May 2021) constructed as a questionnaire (see Supplementary full survey record) structured around the five core anchors of the Benatti Resiliency Model. Our research is the first application of the Benatti Model for evaluating the practice of resilience among professionals, including but not limited to biomedical and pharmaceutical R&D scientists. Herein, we present the results of this survey and discuss potential implications for coaching and leadership development to boost resilience and prevent burnout. We believe that these results will raise awareness by individuals and organizations to be more proactive in identifying anchors and strategies to enhance resilience, thereby increasing engagement and productivity.

METHODS

Development of the LinkedIn survey

SurveyMonkey (https://www.surveymonkey.com) was used to conduct the anonymous survey as described in the introduction. All three authors posted the survey on LinkedIn. Accordingly, access to participation in the survey was open to all LinkedIn members across sectors of practice, professional affiliations, or career levels without any specified eligibility criteria. The full survey questions and structure are included in the Supplementary Information.

Data analysis

GraphPad Prism (version 9.2; GraphPad Software) and Microsoft Excel (Microsoft 365) were used for data visualization and statistical analysis (e.g., Spearman's rank-order correlation[12]) when applicable. The individual responses in five ordered categories (i.e., always, often, sometimes, seldom, and never) were converted into scores of five (i.e., always) to one (i.e., never) for graphing and data analysis.

All individual replies (N = 158) for the open-ended question in the survey "Please describe one thing that you find most useful to boost your resilience" were reviewed and summarized by key words. Then an online tool https://www.wordclouds.com/ was used to generate a word cloud.

RESULTS

A structured LinkedIn questionnaire (March 16–May 23, 2021), surveyed each model anchor using five categories together with one's self-assessed resilience score using five ordered categories (i.e., always, often, sometimes, seldom, and never) and one open-ended question for one thing that boosts the respondent's resilience the most. One hundred fifty-eight participants (~6% student/trainee, 18%, 27%, and 49% in 1–5, 5–15 or >15 years post-terminal degree) took the survey (90 in biomedical and pharmaceutical R&D).

Over 50% of participants chose "always"/"often" across questions (Figure 1), except external influence or engagement. The question with one of the lowest "always" scores (~15%) was "I get feedback on my influence and impact in my career" in Brand, highlighting areas to pay more attention to for leadership development and coaching. In addition, "external engagement" (Connection, "I am engaged as an active member and/or a volunteer leader of scientific societies/professional organizations") and "external influence" (Innovation, "I proactively find opportunities to present or publish or organize symposia" and "I collaborate with others beyond my Institution and/or sector of practice") had distributions of scores with <20% of participants who chose "always" (~18%, 12%, and 17%, respectively). In the anchor of Well-being, "nutrition" (i.e., "I give my body the fuel it needs to perform [e.g., healthy diet, mindful eating, and hydration]") and "stress management" (i.e., "I know my stressors [e.g., too many meetings, conflicting priorities, constant change, difficult


FIGURE 1 The Benatti Resiliency Model and graphical representation of the survey results (N = 158 participants for all questions).

people] and have strategies for dealing with them.") also received some lowest "always" scores (~15% for both). All other questions had "always" scores above 20%.

Heat plots were generated to visualize the mean individual survey scores for all five categories (Figure 2a) and for each category, including Well-being, Self-awareness, Brand, Connection, and Innovation (Figure 2b–f). The median score for each survey question within each category centered around four (e.g., representing "often") except for "external engagement" and "external influence" with a median score of three. The 25th percentile centered around the score of three (e.g., representing "sometimes"), with the exceptions of "purpose," "career fit," "reputation," and "speak up" scoring at four and "external
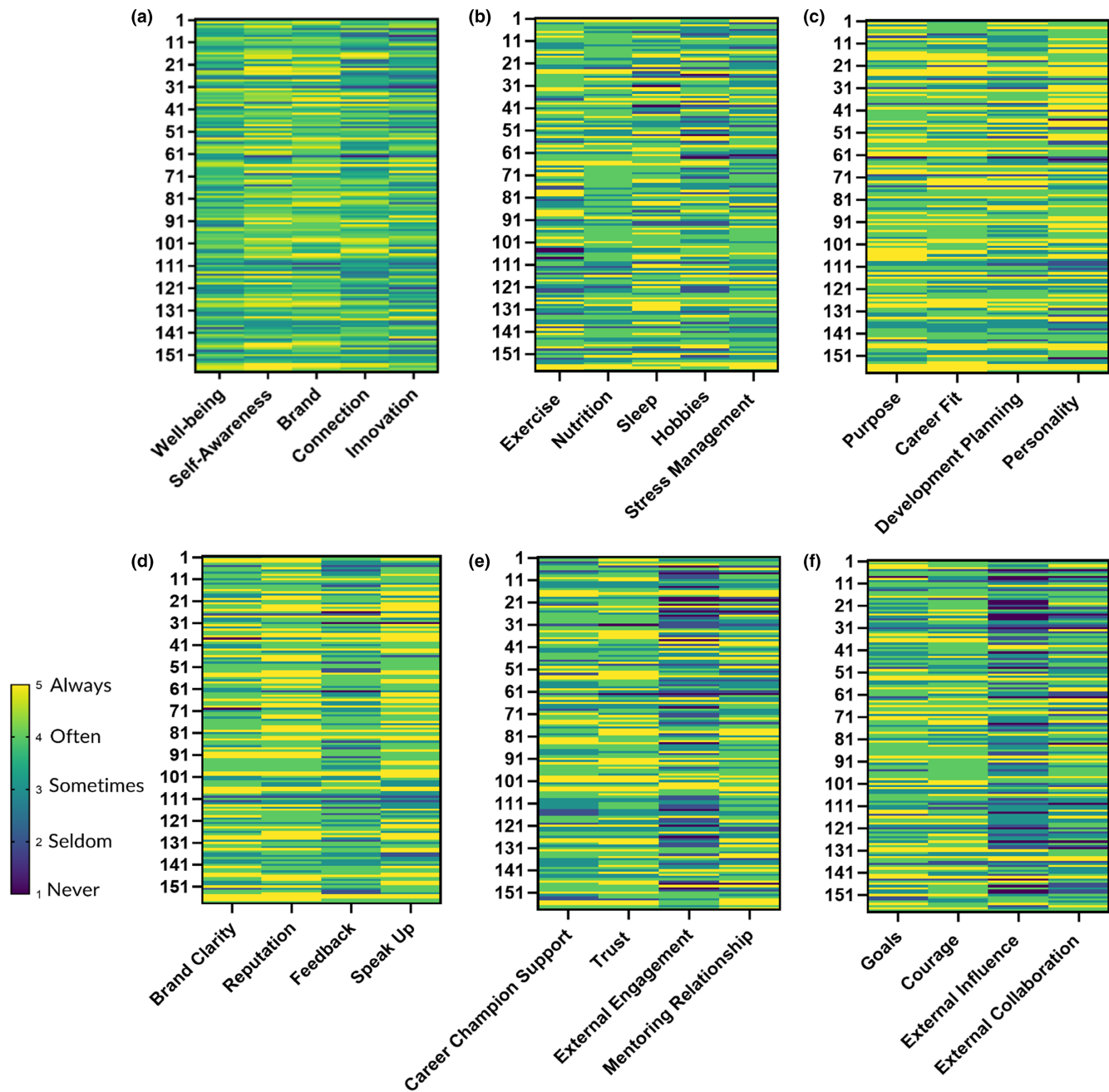
Number on the left y-axis represents the survey participant numbers in each row.

FIGURE 2 Heat plots for the survey results. (a) Mean individual scores for all five categories; (b) mean individual scores for Well-being; (c) mean individual scores for Self-awareness; (d) mean individual scores for Brand; (e) mean individual scores for Connection; and (f) mean individual scores for Innovation.

FIGURE 3 Comparison of survey scores for biomedical/pharmaceutical industry versus others (a) and people managers versus independent contributors (b).
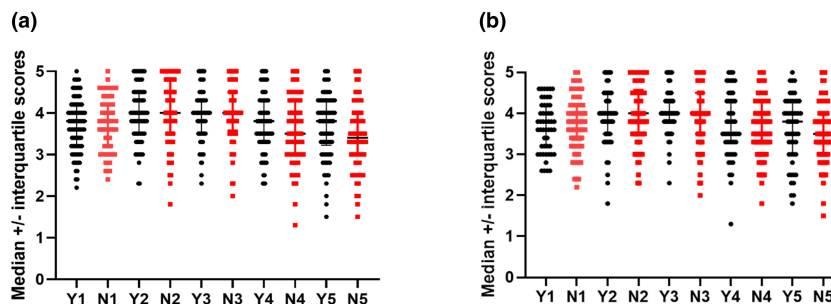
Numbers on X-axis represents question set 1 through 5

Q1: Well-being: Physical, emotional and spiritual health

Q2: Self-Awareness: Purpose, mindset and type

Q3: Brand: Attributes, impact, reputation

Q4: Connection: Cultivate relationships

Q5: Innovation: Challenge yourself

Symbols on X-axis represents in whether participants are (A) engaged in Biomedical Research, Pharmaceutical/Biotechnology/Medical Device industry, or Healthcare Delivery; or in (B) people managers

Y: Yes

N: No

engagement" and "external influence" scoring at two. The 75th percentile centered around the score of five (e.g., representing "always"), with the exceptions of "nutrition," "hobbies," "stress management," "feedback," "career champion support," "external engagement," "courage," "external influence," and "external collaboration" scoring at four. These heat plots further corroborated the findings in Figure 1 and illustrated the inter- and intrasubject variability in responses to the survey questions within each category and among the five categories as a whole.

Interestingly Connection and Innovation scores trended slightly higher in biomedical and pharmaceutical R&D, whereas the other three anchors (i.e., Well-being, Self-awareness, and Brand) of the model did not show trends by area of professional practice (Figure 3a). Furthermore, when evaluating data comparing managers versus independent contributors, we did not identify noteworthy differences in the surveyed areas across the anchors (Figure 3b). In addition, no students/trainees chose "always" in Brand (Figure 4c), compared with those within 1–5, 5–15, and >15 years (~18%, 27%, and 49% of participants, respectively) post getting their highest degrees, indicating evolution of brand maturity over time. The rest of the comparisons across the survey anchors did not indicate notable differences across the career stages despite students/trainees trending slightly lower in median scores in most anchors (Figure 4a–e). One caveat is that the sample size of students/trainees is small (~6% of participants), which limited robust comparisons.

To further assess the intrinsic validity of the Benatti Resiliency Model and also the fidelity of the survey itself,

we further assessed the association of self- and survey-assessed resiliency scores. Modest yet highly significant association was identified through Spearman's rank-order correlation ($r_s = 0.37$, $p < 0.0001$; Figure 5).

Finally, for the open-ended question for one thing most useful to boost resilience, ~280 ideas were identified by examining the answers and grouping them into different categories. "Exercise," "Connection," "People," "Family," "self," and "Meditation" received the largest number of mentions ($N \geq 10$ for each), center-piecing a Resilience word cloud (Figure 6).

DISCUSSION

Complexity in problems encountered in biomedical and pharmaceutical R&D, and in the tools and technologies available to address them is on the rise. Drug discovery and development today demands learning agility in not only the underlying science but also new research methods. Emerging areas like artificial intelligence and machine learning, and real-world data analytics are becoming integral components of the practice of Translational Medicine.[13–16] Rethinking how we manage change and substantiate evidence under uncertainty with the right sense of urgency has transformed drug and vaccine development, as witnessed during the COVID-19 pandemic.[17–21] Commitment to a growth mindset, totality of evidence approach, and trust are crucial to maximizing diversity and inclusion in drug development to enable the broadest possible access to medicines for all
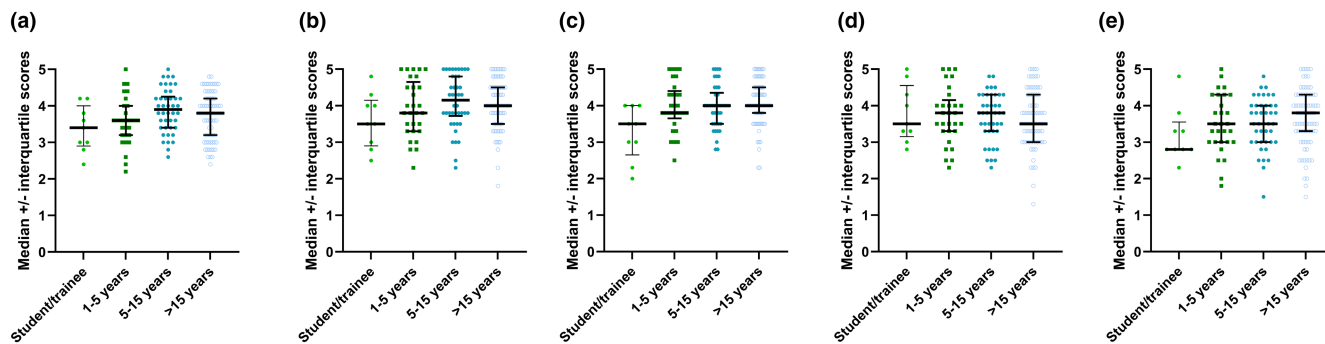
FIGURE 4 Comparison of survey scores across career stages for Well-being (a), Self-awareness (b), Brand (c), Connection (d), and Innovation (e).
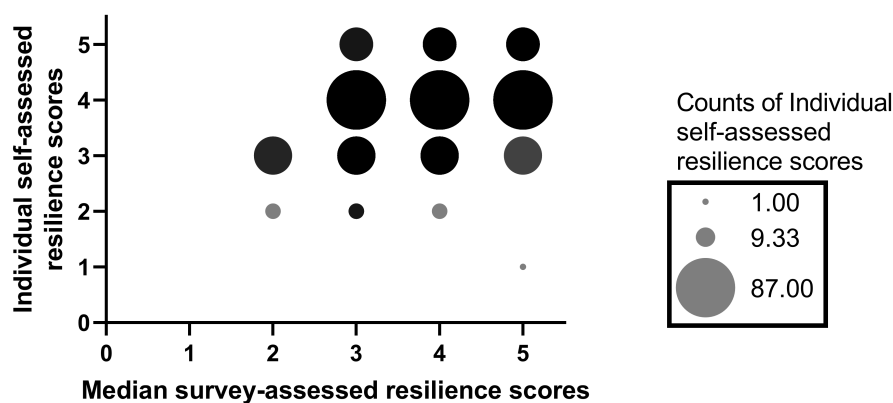

FIGURE 5 Self- and survey-assessed resilience scores (Spearman's rank-order correlation).

patients.[22,23] No scientist can expect to be an expert in all scientific specialties and research methods, necessitating comfort with gaps in knowledge and competencies, and in treating failures as learning opportunities. To thrive in today's dynamic ecosystem of biomedical and pharmaceutical R&D, scientists and leaders will need to nurture relationships with those who practice well outside their primary discipline. These relationships will transcend individuals, organizations, and sectors of practice. Giving and taking, teaching and learning, challenging and evolving our beliefs, unlearning, and sharing data and knowledge with trust will be vital in these relationships to drive the synergy needed to progress innovation with an infinite mindset.[24,25] The critical importance of collaborating without borders in advancing Translational Medicine and the value of institutional mentorship support programs have been reviewed and discussed previously.[3,26–28] In this dynamic ecosystem of biomedical research and pharmaceutical development, we posit that resilience is a key leadership competency that is vital to maximally unleash the power of diverse human talent engaged in the transformation of data to knowledge and today's discoveries to the medicines of tomorrow. The need to pay attention to stress and morale to mitigate burnout of academic biomedical scientists has been previously discussed, with the critical importance of trust-promoting leadership,

mental health support, and administrative support identified as enablers.[29–31] Resilience is crucial to mitigating burnout, especially in the context of challenges during the COVID-19 pandemic that have taken an emotional toll on one and all, impacting work-life integration and sustainability of clinical research by physician scientists as well as pharmaceutical R&D.[32,33]

In the present work, we present the results of a survey of professionals, including but not limited to those engaged in biomedical and pharmaceutical R&D, aimed at assessing the level of resilience using the Benatti Resilience Model.[2] The survey was launched on the LinkedIn platform to target professionals across disciplines and sectors of practice. All three co-authors posted/shared the survey for visibility across their networks. As two of the co-authors (S.Z. and K.V.) are scientists engaged in pharmaceutical R&D and more specifically in areas of Translational Medicine and Clinical Pharmacology, it was expected that a meaningful proportion of survey respondents would be professionals in biomedical/pharmaceutical sectors of practice. Consistent with our expectations, the survey population had a roughly balanced representation of those engaged in biomedical/pharmaceutical R&D (~57%) versus other professions (~43%). Overall, the results did not indicate meaningful differences in the distribution of survey results between the group engaged in

FIGURE 6 Word cloud based on responses to the open-ended survey question "Please describe one thing that you find most useful to boost your resilience".

biomedical/pharmaceutical R&D and the group affiliated with other professions, except for a trend for higher scores in the former group in the Connection and Innovation anchors. As the number of participants self-identified from academia and engaged in biomedical/pharmaceutical R&D was small ($N = 7$), no additional analysis was performed to compare the results between respondents with industry versus academic affiliations in biomedical/pharmaceutical sectors. Of note, the current survey did not collect the geographic information of participants. As such, differences in the practice of resilience by country cannot

be assessed from the data, representing a potential area for future research.

The distribution of our surveyed population largely consisted of career professionals (94%), with only a minority (6% represented by nine people) belonging to the student/ trainee category, which is not surprising as the survey was administered on LinkedIn, a social media platform primarily used by professionals. Nevertheless, when also considering the early career section of professionals who took the survey (29 people, ~18% of the overall population being within 1–5 years of receiving their highest degree),

~24% of the surveyed population (38 people) belonged to the student/trainee and early career category. An important finding in our survey was that with increasing years of professional experience, there is a steady evolution of brand maturity. Brand is one of the five anchors of the Benatti Model, and its importance in the scientific community has not been well appreciated until recently. The value of personal/professional brand development in the scientific community has been reviewed by Peter Hotez and we recommend readers to consult this reference for actionable guidance on brand cultivation for scientists.[34] In fact, several elements of Hotez's suggested action plans for brand development (e.g., presenting and publishing, cultivating relationships, and mentoring others) are reinforced by the Innovation and Connection anchors of the Benatti Model. This observation indicates the inter-connected nature of the model where the five anchors enable each other to reinforce resilience. Steering one's career in a direction that maximizes intersection of passion, skill, and institutional need, has been discussed by Borman-Shoap et al., as a strategy in relation to brand development.[35] This strategy for brand optimization is in fact deeply rooted in the Japanese concept of Ikigai.[36] For example, if a professional experience places a scientist at the perfect intersection of their skill and institutional need but outside of their core passion, risk for burnout will be high.[35] Considering how interdisciplinary the current landscape of biomedical and translational research is, we posit that it should be possible for academic mentors and industry managers alike to embed components of one's passion into the daily life of a student/trainee or employee. For example, a scientist primarily involved in laboratory-based experimental research may desire involvement in in silico quantitative analytics or patient-focused clinical research to enable a fuller experience and potential expansive career growth. Considering the penetration of data sciences into biomedical research and the dynamics of contemporary drug discovery and development,[3,37] the creation of such opportunities should be possible to consider as part of a multi-year professional development plan irrespective of sector of practice or stage of one's professional training and development. This will require some level of nontraditional out-of-the-box formulation of objectives and/or investments in sabbaticals or other experiential assignments as part of the formulation of research aims and talent development discussions but will benefit the individual and organization in the long run. Investment into brand development at the individual level should ultimately enhance institutional brand. Also relevant to brand development is the nurturing of purpose-orientation as part of training and development of students, post-doctoral researchers, and early career professionals. Knowing the WHY behind their work has been discussed as a missing competency in data scientists, and

a factor that limits organizations from unleashing the full potential of the discipline.[38] Germane to identifying one's sense of purpose is self-awareness, one of the anchors of the Benatti Model. In fact, step 1 of Borman-Shoap's strategy for brand development in the academic setting focuses on Self-reflection as part of a mentoring session.[35]

It should be noted that this survey was launched during March–May 2021—that is, ~1 year following the first lockdowns related to the COVID-19 pandemic. This is important to note, as this represents a point of time when survey respondents will likely have adapted for 1 year to a lifestyle of working remotely either partially or completely depending on their individual situations. Accordingly, we expect that the surveyed population will have been well into their own individual journeys in their ability to connect with others socially and professionally, manage their time for optimal productivity, and maintain some level of resilience overall during this period of unprecedented change and hardship faced by humanity worldwide. Also important to note is that the period of administration of this survey aligns with a point of time when notable progress had been made with respect to vaccine availability and/or anticipation in many developed and emerging global populations (https://ourworldindata.org/covid-vaccinations), although certain parts of the world were still experiencing the worst face of the pandemic's second wave (https://www.cnn.com/interactive/2021/05/world/covid-global-outlook-cnnphotos/).[39] Thus, depending on the individual situations of survey respondents and their loved ones, an unknown distribution of emotions ranging from hope to despair may underlie the survey results and the extent of observed variability. Whether this led to a greater than typical level of heterogeneity in well-being among other anchors of the Benatti Model (Figure 2), is unknown. In fact, it should be also acknowledged that the timing of our survey during the pandemic may have resulted to some extent in a level of selection bias in this uncontrolled research. The pandemic has clearly changed the way we work and how we adapt to change. Thus, despite these considerations, it is our opinion that the survey provides a useful point of reference for reflection in terms of the status of resilience in the professional community and the relative status in the biomedical/pharmaceutical R&D sector. In the overall survey population, External engagement (under Connection) and External influence (under Innovation) were two areas where there was a readily apparent lower distribution of scores than in the other areas within each of these anchors (blue lines in the Connection and Innovation panels of Figure 1). Clearly, many scientific conferences had been canceled owing to the pandemic in 2020 before we could adapt as a community to developing and meaningfully engaging in virtual offerings in 2021–2022. This may be one reason why the survey scores were lower in these anchors

related to external engagement or influence. It may also be related to the difficulties in managing work-life integration under remote/work from home settings[40] that may have precluded prioritization of external engagement. Although the trajectory of our ways of working and social connection in the coming years remains to be known, it could be of interest to repeat this survey (e.g., in 2025) to compare the findings at that point in relation to what we learned in 2021. Furthermore, the generalizability of the results to all professionals requires additional research, including broader study populations for assessment of intercultural and geographic consistency in the practice/demonstration of resilience.

In addition to surveying participants on each of the five anchors of the Benatti Resiliency Model using our structured questionnaire, the survey additionally sought open-ended feedback (on a scale of 1–5) regarding the individual's overall self-assessed level of resilience. A modest but statistically significant rank-order correlation was observed, further qualifying the Benatti Model and our survey instrument (which was aligned with its anchors) as a meaningful measure of resilience in adult professionals. Finally, we also asked all participants an open-ended question: "Please describe one thing that you find most useful to boost your resilience." The top 10 responses were: exercise, people, connection, family, self, meditation, friends, pause, purpose, and sleep. We were pleased to note that all of these strategies fit into one of the Benatti Resiliency Anchors: Well-being, Self-awareness, Brand, Connection, and Innovation. These five anchors have been integrated into leadership coaching, with applications of the model and case studies reviewed previously.[2]

We found it inspiring that there were so many diverse responses to boost resilience as we believe there is not one exact formula to boost resilience for every individual, but we do need to have daily strategies in all five anchors. In the Well-being anchor, we had many supporting strategies, including self-care, relaxation, not overworking, mindfulness, unplug, stay calm, gratitude, hydration, nutrition, walking, breathe, spirituality, journaling, day off, and mini-breaks. The Well-being anchor focuses on strategies that support our physical, emotional, and spiritual health. It is of interest that ~85% of survey respondents did not choose "always" for two questions in the Well-being anchor that were focused on "nutrition" and "stress management." This reinforces the value of the diverse strategies identified through the open-ended question as important resilience boosters. In the Self-awareness anchor, we had additional supporting strategies, including reflection, purpose, empathy, failure, growth mindset, and optimism. The Self-Awareness anchor focuses on clarifying one's purpose, mindset, and understanding one's personality type to be able to flex in different situations.

In the Brand anchor, we had recognition, success, credibility, experience, self-confidence, feedback, clear job expectations, and preparedness. The Brand anchor focuses on knowing your unique strengths or attributes and being aware of your career impact and reputation. In the Connection anchor, we had supportive peers, support, supportive leadership, and mentorship. The Connection anchor focuses on cultivating relationships and being available for individuals that recharge us and support our career. In the Innovation anchor, we had publishing, planning, ted talks, learning, time-management, and problem-solving. The Innovation anchor focuses on introducing new challenges, interests, or competencies into our lives and careers, so we stay recharged and resilient. The strategies identified in the Innovation anchor are a testament to the value of the work of professional organizations like ASCPT that nurture scientific networks and communities and encourage member scientists and leaders to engage via a variety of scholarly and leadership-oriented avenues. Although the Well-being anchor had the majority of resiliency boosters, it was promising that so many individuals are boosting their resilience by strategies in the other anchors as well.

Although the primary focus of the present analysis was to assess the practice of resilience at the individual level, we posit that the resulting strategies for boosting resilience should be nurtured at the organizational level. This will enhance resilience of individual colleagues, ultimately strengthening organizational resilience and preventing burnout. Examples of resilience-boosting organizational strategies include mentoring programs, sabbaticals, support of continuing education and professional development, nurturing of active engagement in interdisciplinary and cross-functional research, and encouragement of externally facing ambassadorship in professional organizations. Not paying attention to resilience at the organizational level as a key leadership competency can lead to burnout, and adversely impact engagement, productivity, and sustainability.

Resilience is not about working harder to get through challenges and bounce back.[41] This strategy often results in signs of burnout in one's career. Resilience is being able to move forward during change and challenging times by focusing on our well-being, self-awareness, connection, personal brand, and innovation, so we have the energy needed to thrive in both our careers and personal lives. In summary, our survey yielded actionable insights on the practice of resilience and represents the first application of mindful integration of the Benatti Resiliency Model for crowdsourced research in this area of leadership development. We trust that these data and our reflections as well as the open-ended feedback we have displayed in a resilience word cloud (Figure 6) provide useful awareness

of this key leadership competency and strategies to maximize it to enhance productivity, fulfillment, and excellence in the work of our readers.

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CONFLICT OF INTEREST

The authors declared no competing interests for this work.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.