

Online-Only Supplemental Material

Trauma-Informed Undergraduate Medical Education: A Pathway to Flourishing with Adversity by Enhancing Psychological Safety. Whitaker, R.C., Payne, G. B., O'Neill, M. A., Brennan, M. M., Herman, A. N., Dearth-Wesley, T., & Weil, H. F. C. DOI: 10.5334/pme.1173

Section S1. Stress in medical education: sources and implications

Medical students often face unrelenting performance pressure and high stakes evaluation inside a strict hierarchy with intense peer competition and long work hours. They also witness ubiquitous inequity within healthcare, have almost daily engagement with patients and colleagues who are suffering, and are known to experience significant moral injury [1, 2]. This constellation of factors in medical education is not new, but we now understand that it can induce in students a state of threat physiology, which limits students' self-regulation, growth, and learning [3]. This constellation of factors can also limit the time or setting for restoration, reflection, and integration of their experiences.

The evidence and impact of this structural adversity in medical education may lead to the poor mental health of medical students [4], which, even when not manifesting as depressive symptoms, may manifest as languishing rather than flourishing [5]. Many medical students are still in a sensitive period of brain development and face the challenges of emerging adulthood, including emancipating from their family of origin, forming identity, creating and sustaining romantic partnerships, and building families of their own [6].

Section S2. Conceptual basis of flourishing with adversity as an outcome of the Life Experiences Curriculum (LEC)

We use the term flourishing to refer specifically to eudaimonic (or psychological) well-being [7-9]. The most distinguishing feature of this multi-dimensional construct is living with a sense of purpose in which one's activities are carried out in accordance with ongoing awareness and acceptance of one's unique abilities (talents or gifts) and limitations [10]. Thus, flourishing reflects the processes of self-realization (understanding who we are) and self-actualization (becoming who we are) [11]. Because this characterization of psychological functioning does not exclude or require the self-appraisals of life satisfaction or happiness, central to hedonic well-being [7, 8], flourishing as eudaimonic wellbeing is compatible with the reality of life's adversities and traumatic experiences [12]. Ryff's Psychological Well-Being Scale [9] is the most widely used measure of flourishing and assesses six dimensions: purpose in life, self-acceptance, positive relations with others, personal growth, environmental mastery, and autonomy (**Table S1**). These dimensions distinguish flourishing with adversity from coping or resilience [13], terms often used to describe physicians who manage to function amidst adversity. Flourishing with adversity is also different from post-traumatic growth [14] because flourishing does not require the adversity to be traumatic.

The goal of flourishing with adversity is well-matched to the circumstances of medical school. Most students arrive with a keen sense of purpose and some awareness of the unavoidable adversity in caring for those facing suffering and loss. In working with patients and in choosing their field of practice, students must identify their gifts and limitations, which are shaped by their own life experiences, including adversities or traumas. At the same time, the system of medical education has avoidable adversities, which can be traumatic insofar as they result in ethical erosion, moral distress, or a sense of loss and betrayal [15-17]. Thus, for medical students, like their patients, we posit that flourishing with adversity can occur and does so in the biopsychosocial context of human development, impacting health and well-being across the lifespan.

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Based on our epidemiologic studies, we have established the potential importance of safe and secure relationships in the ability to flourish with adversity [18-20]. We have further posited that flourishing with adversity occurs as individuals develop relational capacities by experiencing relationships in which they feel safe and seen [21]. In LEC, our intention as faculty is to model the relational capacities we are trying to cultivate in the students. As medical students develop these capacities, they can enter into their relationships and experiences, inside and outside of work, in a way that helps them flourish, better discerning their own strengths, limitations and the kind of physician they wish to become—learning who they are and becoming who they are.

In LEC, we believe that the practice of safe, relationship-based reflection increases relational capacities through more than faculty modeling. The practice allows students to integrate experiences and processes (psychological and even physiological) that are often separated in the teaching and practice of medicine, such as the separation between feeling and thinking, past and present, personal and professional, nature and nurture, self and other, and healer and patient. Consistent with the goal of flourishing with adversity, the reflection in LEC is not just about managing stress and adversity but also about exploring the nature of call [22, 23] and the search for self-transcendent purpose that often brings students to the field of medicine. This search is often shaped by the opportunity for students to reflect on how their life experiences have shaped their talents and the meaning they might derive in using them in medicine. We focus on students' assets and positive experiences and not just on their limitations and distress. For some students, there is the opportunity to safely explore how certain adaptations to their own adverse life experiences [24] may also be the basis of certain strengths, such as empathy and attunement, which when accepted and managed can be gifts for patients and colleagues rather than personal liabilities.

Section S3. The Columbia-Bassett Program and the development of the Life Experiences Curriculum

We developed LEC within the Columbia-Bassett (CB) Program [25]. CB was developed by one of us (HW) and began in 2010 as a medical education track within Columbia University's Vagelos College of Physicians and Surgeons. Approximately 10 students admitted each year to the medical school are also admitted to the CB track through a separate application. A defining feature of the track is the longitudinal integrated curriculum during the major clinical year of training, when students complete their core clinical rotations. These rotations occur in a rural healthcare system in central New York State (Bassett Healthcare Network), where the students have the opportunity for longitudinal care experiences with patients and longitudinal learning experiences with their clinical preceptors. In this way, both receiving care and learning to give care occur in relationships over time. From its inception, CB had intentions that are reflected in LEC, such as recognizing the adversity inherent within healthcare and medical education, emphasizing the high prevalence and negative impact of adverse childhood experiences, prioritizing students' psychological safety, and cultivating students' self-awareness and self-acceptance.

The formal development of LEC began in December 2015 with a symposium at Bassett Medical Center (Cooperstown, NY) entitled, "Compassionate Healing of Root Causes." Thought leaders on the biopsychosocial impacts of trauma provided perspectives to CB clinical faculty

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and clinical-year students about how best to teach medical students to care for people who might be impacted by traumatic life experiences. The invited presenters included Bessel van der Kolk, MD (developmental trauma), Sandra L. Bloom, MD (organizational trauma), Bruce S. McEwen, PhD (developmental neurobiology of stress), and Robert C. Whitaker, MD, MPH (developmental origins of flourishing). The symposium generated themes that have endured as core principles in LEC, such as the following: flourishing and adversity can coexist; positive and traumatic life experiences occur in the biopsychosocial context of human development and impact health and well-being across the lifespan; and trauma to individuals and organizations reduces psychological safety and that safety must be restored for healing. Beyond the discussions at the 2015 symposium, there was no formal needs assessment that informed the development of LEC. Although students participated in that symposium and have provided ongoing feedback during LEC implementation, they were not otherwise involved in the development of LEC.

In January 2018, three of us (RW, AH, and TDW) joined CB to develop a research program that would further inform the development of LEC by focusing on how relationships in healthcare, education, and human services can promote well-being by being more responsive to people's life experiences. The early work of that research program involved the evaluation of a six-session (15-hour) course, called Enhancing Trauma Awareness, using a randomized trial involving 96 early childhood education professionals [26, 27]. This course and others were developed by Lakeside Global Institute (2024) (North Wales, PA) for various professionals in education and human services.

Both the content and process of LEC were informed by these Lakeside courses and the almost 25 years of experience accumulated by Lakeside in developing and administering its trauma-training courses to those in various helping professions outside of healthcare. We selected content for LEC that we deemed most appropriate for medical students. We began with the seminal work of our 2015 seminar speakers on the topics of developmental trauma [28], organizational trauma [29], the developmental neurobiology of stress [30], and the developmental origins of flourishing [18]. We then examined the available literature at that time on trauma-informed medical education (for example: [31-33]). We also consulted best practices emerging from the work of the National Collaborative on Trauma-Informed Health Care Education and Research. In addition, we reviewed the literature on trauma-informed care (TIC) in relevant settings outside medical education (for example: [34, 35]). Finally, all three LEC co-leaders (RW, MO, MB) undertook further training in TIC. One of us (RW), a pediatrician, participated in a three-course certificate program (75 hours) through Lakeside Global Institute [36], and two of us (MO and MB), both psychiatrists, took a two-day course (16 hours) through McLean Hospital (Belmont, MA).

Since LEC implementation began, we have continued to monitor the emerging literature in trauma-informed medical education [37], including the development of competencies for students and faculty regarding TIC in undergraduate medical education [38]. Medical schools have developed trauma-informed medical education curricula that address topics such as the clinical skills of history-taking [39] and physical examination [40, 41]. These topics have not been our focus because they are addressed elsewhere in Columbia's medical school curriculum. Content of these emerging curricula have included topics we address in the LEC pre-clinical seminar sessions (**Manuscript Table 1**), such as the following: the Substance Abuse and Mental Health Services Administration's (2014) definition of trauma and the six-part approach to TIC,

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adverse childhood experiences, biopsychosocial consequences of trauma, and application of these principles to clinical encounters [42, 43]. Other authors have also emphasized the importance of addressing students' psychological safety and acknowledging students' own traumatic experiences [31, 44], but they do not describe specific strategies.

Section S4. The rationale for prioritizing psychological safety in the Life Experiences Curriculum

The learning and clinical environments in medical education and healthcare can confront students with events and circumstances that are emotionally charged, evoke feelings of vulnerability and shame, and are sometimes even traumatic. Therefore, establishing psychological safety, the first principle of trauma-informed care [45], is the major priority of our process in LEC. Without psychologically safe spaces for students to reflect and express their thoughts and feelings, the natural tendency is to persist in defending against them. While this can initially be adaptive, particularly in unsafe environments, defenses may inhibit growth and integration and become maladaptive in the long run.

Safe spaces for reflection and sharing about the content of the LEC curriculum, clinical encounters, and the systems of medical education and healthcare can allow both students and faculty to integrate their past and ongoing experiences. Given the opportunity to reflect regularly throughout medical school within a caring community of classmates and teachers, in which psychological safety is established over time, students may be able to experience, tolerate, express, and learn from certain thoughts and feelings that might otherwise be suppressed. In addition, psychological safety optimizes openness to new experiences, including learning new material that may also be emotionally challenging and otherwise avoided. Safety enhances curiosity about the unknown and creativity around the fundamental challenge of flourishing in the face of ubiquitous adversity. By experiencing and naming the felt sense of safety, students are able to embody it and cultivate it in their relationships with their patients and colleagues.

Section S5. Future directions

As the scientific evidence increases about the nature, impacts, and treatment of traumatic life experiences, there will be increasing pressure to add content to trauma-informed medical education. It is our view that attention to process will remain more important than adding content. For example, we have much to learn about how best to increase students' awareness and compassion for their own life experiences and not just those in their care. Accordingly, we see the greatest future possibility for LEC in working with students to build a "communal and relational field of caring support" that yields "sustainable and inclusive compassion" [46 p1346]. This means that the community built in LEC can serve as a collective secure base to which its members can return when faced with adversity and that the community includes anyone wishing to receive care as a starting point for giving care. To be included means overcoming the challenge, faced by many physicians, of feeling worthy to receive care as well as give care. Our experience to date is that this may involve overcoming blocks to self-compassion and reflective functioning, some of which may be related to developmental trauma [47, 48]. While there is emerging evidence about approaches to overcoming such blocks in those with mental health disorders [49], it is not clear to us as yet if or how this evidence might be applied to medical students in the context of LEC [50]. Building communities of care in healthcare will require a

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cultural shift away from caregiving as independent and individual to interdependent and collective. Moving away from our perceptions of the “solo self” [51 p24] and towards communities of care and support may be “the relational starting point” [46 p1347] for not only preventing burnout in medicine but for cultivating the ability to flourish with adversity.

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Table S1. Proposed LEC evaluation outcome measures

Construct	Instrument	Sample Items
Primary outcome: Relational capacity score^a		
Self-awareness: Mindfulness	Five Facet Mindfulness Questionnaire, Short Form (15-items, 5 subscales, 3 items each) (Baer et al., 2006; Baer et al., 2008; Gu et al., 2016) [52-54]	<ol style="list-style-type: none"> 1. Observing: “I pay attention to sensations, such as the wind in my hair or sun on my face.” 2. Describe: “Even when I’m feeling terribly upset I can find a way to put it into words.” 3. Acting with awareness: “I find myself doing things without paying attention.” (reverse-scored) 4. Non-judging: “I think some of my emotions are bad or inappropriate and I shouldn’t feel them.” (reverse-scored) 5. Non-reactivity: “When I have distressing thoughts or images, I “step back” and am aware of the thought or image without getting taken over by it.”
Self-acceptance: Self-compassion	Self-Compassion Scale, Short Form (12-items, 6 subscales, 2 items each) (Raes et al., 2011) [55]	<ol style="list-style-type: none"> 1. Self-kindness: “When I’m going through a very hard time, I give myself the caring and tenderness I need.” 2. Self-judgment: “I’m intolerant and impatient towards those aspects of my personality I don’t like.” (reverse-scored) 3. Common humanity: “When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.” 4. Isolation: “When I fail at something that’s important to me, I tend to feel alone in my failure.” (reverse-scored) 5. Mindfulness: “When something painful happens I try to take a balanced view of the situation.” 6. Over-identified: “When I fail at something important to me I become consumed by feelings of inadequacy.” (reverse-scored)
Other-awareness: Empathy	Interpersonal Reactivity Index (14-items, 2 subscales, 7 items each) (Davis, 1980; Pulos et al., 2004) [56, 57]	<ol style="list-style-type: none"> 1. Perspective-taking: “When I’m upset at someone, I usually try to ‘put myself in their shoes’ for a while.” 2. Empathic concern: “I often have tender, concerned feelings for people less fortunate than me.”

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Construct	Instrument	Sample Items
Other-acceptance: Compassion	Compassion Scale (16-items, 4 subscales, 4 items each) (Pommier et al., 2020) [58]	1. Kindness: “If I see someone going through a difficult time, I try to be caring toward that person.” 2. Common humanity: “I feel it’s important to recognize that all people have weaknesses and no one’s perfect.” 3. Mindfulness: “I pay careful attention when other people talk to me about their troubles.” 4. Indifference: “I think little about the concerns of others.” (reverse-scored)
Secondary outcome: Flourishing Score^b		
Purpose in life	Psychological Well-Being Scale (7-item subscale) (Ryff, 1989) [9]	“I have a sense of direction and purpose in life.”
Self-acceptance	Psychological Well-Being Scale (7-item subscale) (Ryff, 1989) [9]	“In general, I feel confident and positive about myself.”
Positive relations with others	Psychological Well-Being Scale (7-item subscale) (Ryff, 1989) [9]	“I enjoy personal and mutual conversations with family members and friends.”
Personal growth	Psychological Well-Being Scale (7-item subscale) (Ryff, 1989) [9]	“I think it is important to have new experiences that challenge how you think about yourself and the world.”
Environmental mastery	Psychological Well-Being Scale (7-item subscale) (Ryff, 1989) [9]	“I am quite good at managing the many responsibilities of my daily life.”
Autonomy	Psychological Well-Being Scale (7-item subscale) (Ryff, 1989) [9]	“I judge myself by what I think is important, not by the values of what others think is important.”

a. See [21] for method of constructing the relational capacity score from the 57 items across 4 instruments and 17 subscales.

b. See [18] for method of constructing the flourishing score from the 42 items across 6 subscales.

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