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## Q2 Science &amp; Society

3 Targeting Mindsets, Not  
4 Just TumorsQ4 Q3 Sean R. Zion,<sup>1</sup>  
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9 **Mindsets – beliefs about the nature and workings of things in the world – are a critical but relatively understudied variable that can influence psychological well-being and physiological health in patients with cancer. Precise, targeted psychological interventions aimed at shifting patient mindsets have the potential to transform supportive care in oncology.**

20 The hallmark of the cell is its remarkable capacity for division and growth. Cancer thrives on hijacking and unleashing this power, driving the uncontrolled growth and spread of abnormal cells throughout the body. Halting the spread of these malignant cells has been the focus of oncology for decades. Recent years have witnessed a dramatic shift in the landscape of anticancer therapies, from largely toxic and only moderately effective chemotherapeutic agents towards more precise and targeted therapeutics like kinase inhibitors, monoclonal antibodies, and immunotherapy [1]. Thanks in large part to these advances, today two-thirds of all patients with cancer will live for at least 5 years after their diagnosis [2].

38 However, cancer is more than just a physical disease. The psychological and social impact can be relentless, presenting challenges not just at diagnosis but throughout treatment and even well into recovery [3]. Unfortunately, this can often spiral negatively and lead to catastrophic thinking processes that can drive depression and anxiety, which are 2–3 times

more common in patients with cancer than in the general population [4]. However, these negative psychological ramifications are not an inevitable response to the diseased state of the body. Two patients with the same type and stage of cancer may look very different psychologically: while one patient's catastrophic thoughts propel them into depression and anxiety, another clinically indistinguishable patient may view it as an opportunity for positive change.

There are a number of factors that influence how a patient responds to a diagnosis of cancer, manages the ongoing challenges of treatment, and navigates their post-treatment life, including interactions with their care team, social support, coping style, personality, and socioeconomic status [5]. However, a key, but often overlooked, factor is the mindsets that patients hold. Mindsets are beliefs about the nature and processes of things in the world (Figure 1). Not necessarily true or false, mindsets are simplified understandings of what is possible or likely. People have mindsets about many things in life (e.g., 'intelligence is malleable', 'healthy foods are disgusting', 'statins are effective'). When it comes to cancer, mindsets about the meaning of illness and the capability of their bodies are particularly important.

### Is Cancer a Catastrophe or an Opportunity?

In the face of a cancer diagnosis, some people might think 'this is a catastrophe'. This view is not entirely unfounded as both cancer and cancer treatment can present considerable challenges. However, like the cancer itself, the mindset that 'cancer is a catastrophe' can take hold and spread, permeating all aspects of a patient's life. A patient who has the mindset that cancer is a catastrophe may find themselves stuck in an exhausting cycle of rumination and worry. They may retreat from social roles and activities they

previously enjoyed. Burdened by the frustrations and uncertainty that this mindset directs the patient's attention to, they may not be motivated to take an active role in managing their own medical care. 51

More adaptive mindsets are possible. Some people adopt the mindset that 'cancer is manageable' and some may even view cancer as an opportunity. These mindsets will also permeate a patient's life, operating in ways that can become self-fulfilling. The mindset that 'cancer can be an opportunity' can shift a patient's perspective towards meaning making, foster a renewed appreciation for life, inspire personal growth, or motivate important lifestyle changes like eating well and getting exercise. Viewing cancer as an opportunity does not mean that cancer itself is a good thing or that battling it is easy, but rather that the experience of cancer can be a catalyst for positive change that would not have been possible otherwise. 70

### Is My Body Working For or Against Me?

A cancer diagnosis may also evoke concerns about one's own body. Patients may ask themselves: is my body working against me? Some patients initially adopt the mindset that their body is an adversary and their own cells have turned against them. This selective interpretation shifts attention towards physical symptoms and side effects, which are interpreted as a signal of the body's adversarial nature. These patients may seek unneeded treatments or request unnecessarily strong medications because they perceive their body as inherently incapable. This impact of this mindset may spread far beyond the boundaries of treatment, increasing fear of cancer recurrence months or years down the road. 90

However, there are other, more useful ways for a patient to think about one's body after a diagnosis of cancer. Patients 93

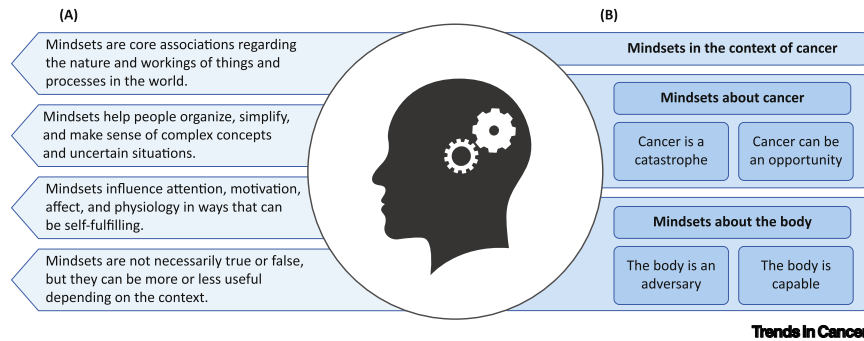


Figure 1. What Are Mindsets and How Do They Work? (A) Facts about mindsets. (B) Key mindsets that matter in the context of cancer.

94 can adopt the mindset that their body is  
 95 capable, strong, and naturally resilient.  
 96 This mindset orients patients towards  
 97 signals that their body is handing cancer  
 98 well rather than towards the symptoms  
 99 of illness and side effects of treatment.  
 100 It may motivate patients to engage in  
 101 health-promoting physical activities during  
 102 their treatment rather than avoid them  
 103 out of fear that their body is unable  
 104 to handle any undue stress. Critically,  
 105 adopting and maintaining this mindset  
 106 may help patients manage the fear of  
 107 cancer recurrence that can emerge after  
 108 the end of active treatment – a time  
 109 during which some patients may feel  
 110 that their body is particularly vulnerable  
 111 to a recurrence of cancer [6].

112 **Targeting Mindsets through**  
 113 **Psychologically Wise Interventions**

114 A patient’s mindset is not contingent on the  
 115 objective clinical reality of their cancer.  
 116 Above and beyond disease status, these  
 117 mindsets relate to physical functioning,  
 118 social functioning, perceived health, and  
 119 quality of life [7]. Even more importantly,  
 120 mindsets can be changed. Just as more  
 121 precise, targeted, and tolerable treatments  
 122 for cancer have emerged in the field of  
 123 oncology, similarly advanced interventions  
 124 are emerging in psychology. Encouraging  
 125 research on the psychological sciences of  
 126 ‘wise intervention’ has found that mindsets  
 127 are an especially useful target for interven-  
 128 tions because they can be changed fairly

easily, and these changes confer significant  
 downstream impacts [8].

Although these interventions have not yet  
 been investigated in patients with cancer,  
 encouraging evidence of their efficacy has  
 been demonstrated in other disciplines.  
 For example, short film clips presenting re-  
 search on how stress can be useful (versus  
 detrimental) to employees evokes a ‘stress  
 is enhancing’ mindset that, in turn, leads to  
 positive changes in motivation, mood, and  
 physiology (e.g., regulation of cortisol, in-  
 creased DHEAS) in the face of a stressor  
 [9,10]. Brief classroom workshops aimed  
 at establishing the mindset that ‘intelligence  
 is malleable’ (versus ‘fixed’) in students  
 leads to sustained motivation and im-  
 proved academic performance in mathe-  
 matics over time [11]. In a randomized  
 controlled trial of oral immunotherapy for  
 children with life-threatening peanut aller-  
 gies, framing information about symptoms  
 and side effects as ‘a sign of treatment  
 efficacy’ (as opposed to an ‘unfortunate  
 byproduct’) made patients less anxious,  
 reduced serious adverse events, and  
 heightened treatment efficacy (as mea-  
 sured by higher levels of IgG4) [12].

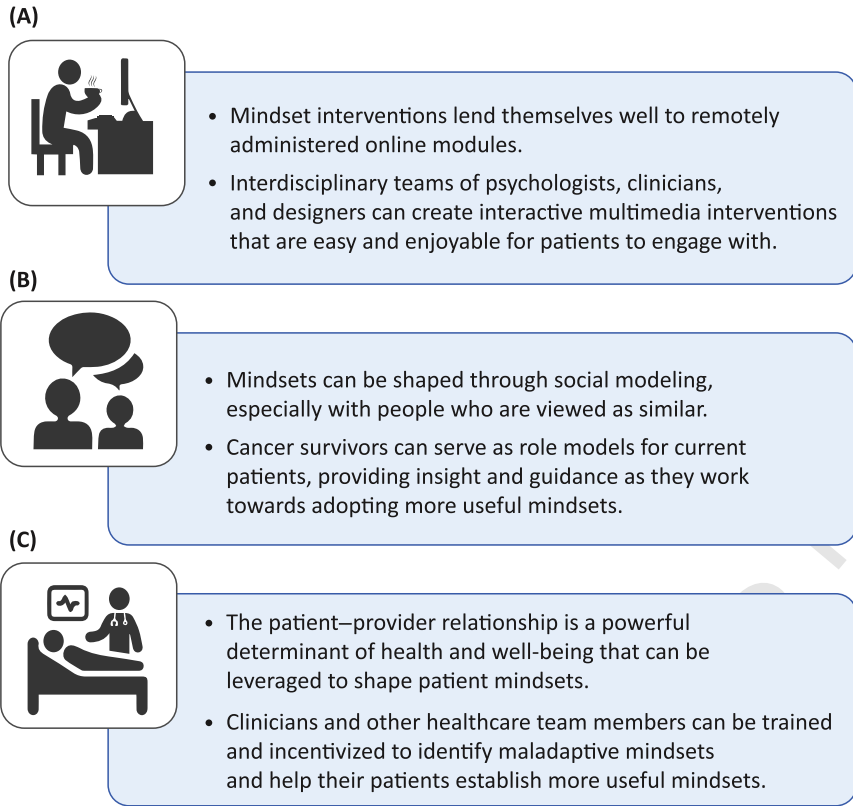
Just as more precise cancer treatments  
 have become widely available, it is time for  
 wise psychosocial interventions to become  
 the standard of supportive care in oncology.  
 More diffuse psychosocial interventions in-  
 cluding mindfulness-based stress reduction

(MBSR), cognitive behavioral therapy (CBT),  
 and psychoeducation, among others, have  
 been applied in the context of cancer.  
 These interventions provide proof of princi-  
 ple that focusing on the psychological and  
 social elements of the cancer experience  
 can alter both functional and disease-  
 specific outcomes [13]. However, these in-  
 terventions can be burdensome, requiring  
 in-person access to a team of specialized  
 care providers, like psychologists or social  
 workers, thereby restricting access and  
 increasing costs. By contrast, precisely  
 targeted, well-timed, and relatively brief  
 mindset interventions are both time- and  
 cost-effective, amenable to remote ad-  
 ministration or other means of dissemina-  
 tion that do not add a burden to an  
 already strapped patient or healthcare  
 team.

**A Call to Action**

There are a number of ways that mindsets  
 could be more effectively leveraged to  
 benefit patients with cancer (Figure 2).  
 First, by packaging these interventions  
 into digital toolkits or online modules, pa-  
 tients can access effective psychological  
 interventions from the comfort of their  
 own homes where they may be most re-  
 ceptive to them [14,15]. Second, we can  
 empower current and former cancer pa-  
 tients to help to shift the cultural conversa-  
 tion around cancer. In sharing their own  
 experiences, these potential role models  
 can provide insight into the importance of  
 adopting useful mindsets during the can-  
 cer experience. Finally, we can leverage  
 the power of the patient–provider relation-  
 ship and train patient care teams to identify  
 patients who hold maladaptive mindsets –  
 like the mindset that cancer is a catastro-  
 phe or that the body is an adversary –  
 and help these patients establish more  
 adaptive mindsets.

Much like the growth and spread of ma-  
 lignant cells in the body, similarly malig-  
 nant mindsets can cast a shadow over  
 the lived experience of the patient. As



**Trends in Cancer**

**Figure 2. Strategies for Implementing Mindset Interventions in Oncology.** (A) Use remotely administered online modules. (B) Utilize the experience and insight of cancer survivors. (C) Leverage the patient–provider relationship to shape mindsets.

177 we strive to target these malignant cells patients as they navigate their cancer  
 178 with the latest cutting-edge treatments, experience.  
 179 we should simultaneously strive to pro-  
 180 vide equally precise treatments for the  
 181 psychological and social ramifications  
 182 of the illness. We hope this Science &  
 183 Society article serves as an inspiring call  
 184 to action for granting agencies, medical  
 185 institutions, and the healthcare establish-  
 186 ment to recognize the potential of precise  
 187 psychological interventions, like those  
 188 that target mindsets, to better support

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