

Who holds the key to recovery? The relevance of health locus of control in physiotherapy

Alessandra N Garcia¹, Brian Neville¹, Valerie E Joseph², Marco Barbero³, Adam English⁴

¹Department of Physical Therapy, Campbell University, Lillington, North Carolina - USA

²Department of Psychology, Campbell University, Lillington, North Carolina - USA

³Rehabilitation Research Laboratory 2rLab, Department of Business Economics, Health and Social Care, University of Applied Sciences and Arts of Southern Switzerland, Manno - Switzerland

⁴Department of Christian Studies, Campbell University, Lillington, North Carolina - USA

ABSTRACT

Health locus of control (HLC) is a key psychological construct that influences how individuals perceive control over their health and engage in rehabilitation. This masterclass provides an overview of HLC and its relevance to physiotherapy practice. Drawing from social learning theory (SLT), HLC reflects the extent to which individuals attribute health-related outcomes to internal or external factors. Evidence suggests that HLC is associated with health behaviors, treatment adherence, patient-provider communication, and rehabilitation outcomes. Individuals with a more internal HLC believe that their health outcomes are largely shaped by their personal actions and behaviors. In contrast, individuals with a more external HLC, characterized by the belief that health outcomes are primarily determined by factors outside one's control, such as healthcare providers, luck, fate, genetics, or environmental circumstances, may rely more heavily on external guidance or contextual factors. However, these relationships are complex and influenced by cognitive, emotional, social, cultural, and environmental processes. Following an educational and clinically oriented masterclass article format, we outline how validated instruments may be used qualitatively to inform clinicians' perspectives on patients' HLC, and emphasize the importance of adopting a holistic and dynamic perspective. Rather than viewing HLC as a fixed trait, it is conceptualized as a context-dependent and potentially modifiable process that evolves through experience, interaction, and therapeutic dialogue. Finally, HLC is situated within the broader shift toward psychologically informed physiotherapy. Implications for education and professional development include preparing clinicians to recognize and respond to patients' control beliefs, strengthening the therapeutic alliance, and supporting individualized, patient-centered care.

Keywords: Health locus of control, Patient-centered care, Physiotherapy

Introduction

Consider the following hypothetical clinical scenario: a 54-year-old patient recovering from a rotator cuff repair arrives at her follow-up appointment, frustrated. Despite consistent attendance in therapy, she feels "nothing is changing." When asked how much she believes her actions influence her recovery, she shrugs and says, "It depends on what my therapist does." This simple exchange captures a critical yet often overlooked aspect of rehabilitation: the belief in one's personal control over health outcomes. Encounters like this might be familiar to many physiotherapists. They reveal how two people with similar health conditions and access to the same care can experience recovery in very different ways,

shaped not only by physical factors but also by their underlying beliefs about control and responsibility.

For instance, one patient may ask detailed questions, eager to understand each exercise, regain function, and resume meaningful activities. At the same time, another hesitates, waiting for instruction and doubting whether improvement is truly in their hands. Such cognitive beliefs about control and responsibility in the rehabilitation process can shape individuals' engagement in therapy and influence how they respond to empowerment efforts designed to promote self-management and autonomy (1).

Patient empowerment refers to a dynamic process in which individuals actively engage in their own care, exercising autonomy and shared responsibility in health-related decision-making (1,2). Evidence suggests that empowerment initiatives enhance self-management across a variety of populations and cultural contexts (1,3). Core belief systems offer theoretical grounding for how patient empowerment can lead to sustained behavior change (1). One such belief is self-efficacy (SE), drawn from Bandura's social cognitive theory, which reflects an individual's belief in their ability to

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Corresponding author:

Alessandra N. Garcia

email: alessandra.garcia.pt@gmail.com

accomplish behavioral goals (4). Bandura extends the concept of personal agency to the interdependent efforts of collective efficacy (CE) (5,6). CE is a shared belief between people that they have the collective agency to achieve a desired outcome (5,6). Another is health locus of control (HLC), derived from Rotter's social learning theory (SLT), which concerns an individual's belief that their health outcomes are determined by their own actions versus external influences (7). Consistent with the masterclass format, this article aims to provide insight and perspective on current physiotherapy practice by bringing HLC into clearer focus within the context of physiotherapy. Specifically, this masterclass aims to: 1) define HLC and outline its theoretical foundations; 2) summarize the evidence linking HLC to health outcomes, health behaviors, patient-provider communication, and rehabilitation outcomes; 3) describe approaches for gaining insight into HLC in physiotherapy practice; 4) examine how a holistic and dynamic understanding of HLC can inform tailored, patient-centered physiotherapy care; and 5) explore the role of HLC within the evolving trajectory of the physiotherapy profession, including its implications for education and professional development.

What is HLC, and where does it come from?

The concept of *locus of control* (LoC) was introduced in 1966 by American psychologist Julian B. Rotter, who is widely recognized for formulating SLT (7). This construct refers to individuals' beliefs about the degree to which the outcomes in their lives are determined by their own actions, as opposed to external factors beyond their control (7). Theoretically, LoC is tied to cognitive expectancies, past learning (i.e., reinforcing or punishing consequences), and perceptions of outcome control. People who attribute outcomes to their personal efforts are described as having an internal LoC, whereas those who perceive events as influenced by chance, fate, or powerful others exhibit an external LoC (7). LoC operates on a spectrum and is both cross-sectional (e.g., generalizes across situations) and context-dependent (e.g., sensitive to specific situational meaning cues) (7-9).

According to Rotter's research and in alignment with the theoretical SLT framework, LoC is developed through reciprocal interactions between internal perception and environmental factors (7, 9-11). Rotter argued that LoC expectancies are most adaptable in novel or ambiguous situations (7). Thus, notable and dominant early environmental influences drive LoC development, namely, parents (7,11). Parenting characteristics (e.g., reinforcement contingency, encouragement of independence, and parental involvement and warmth), early stressful life events (e.g., parental death or divorce), and home environment (e.g., degree of conflict, financial challenges, socioeconomic disadvantages) are all correlative antecedents for LoC (11-16). It is important to note that parent-related correlative connections vary when making cross-cultural comparisons. Samples from Western cultures dominate extant literature (15,16). In line with SLT, concepts of self, perception, relational patterns, and behaviors are inextricably connected to one's culture. Thus, something as simple as a child's perception of parental support will differ cross-culturally, as will (and does) the correlative nature

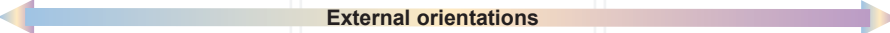
of LoC antecedents (15,16). Further, most research focuses on childhood as the most formative time for LoC development; however, LoC is not considered a trait (7,8,15). Though there is limited research on changes in LoC expectancies over the course of adulthood, existing longitudinal research supports LoC as an evolving characteristic (13). Much in the way LoC operates within the coexistence of being both context-dependent and cross-situational (7-9), it has also been found to be relatively stable, yet malleable (13,17). Nowicki et al. (17) found that spousal relationship quality, presence of illness within spousal relationship, finances, job stability, and lifestyle factors (e.g., smoking, choice of housing) correlate with individual changes in LoC during adulthood.

Taken together, LoC is adaptable and consequently most influential on behavior when a situation is novel or dynamic in nature (7,8,10,16). As such, building on Rotter's framework, other American psychologists later introduced the concept of HLC, adapting the theory to the health domain (18,19). They proposed that control beliefs are domain-specific and, in the context of health, defined HLC as the extent to which individuals perceive their health outcomes to be under their own influence versus determined by external factors (18,19).

Within the HLC construct, individuals hold different orientations regarding who or what determines their health outcomes (Fig. 1) (1,18,20). Those with a stronger internal orientation believe that their behaviors, attitudes, and lifestyle choices play a central role in maintaining or restoring health. Within external orientation, individuals with a powerful others *orientation* attribute control to external figures such as healthcare professionals, family members, or caregivers, whose influence or authority they rely on. Conversely, chance orientation reflects the belief that health is largely governed by fate, luck, or circumstances beyond personal control. Finally, a God orientation reflects the belief that one's health and life decisions are influenced by religion or a higher power. Together, these orientations provide valuable insight into the diverse ways people engage with health care and rehabilitation (1,21).

How is HLC associated with health, health behaviors, patient-provider communication, and rehabilitation outcomes?

Since its introduction more than six decades ago, the application and relevance of the HLC construct have expanded substantially (22), establishing it as a core concept in health psychology and behavioral medicine. The HLC construct now provides a theoretical foundation for understanding variations in health behaviors, treatment adherence, and recovery outcomes (18,19). The studies summarized below highlight the multifaceted role of HLC in shaping outcomes within physiotherapy and across broader healthcare contexts. Importantly, these associations should not be interpreted as establishing an inherently preferable HLC orientation; clinically, the more meaningful distinction may be whether patients perceive health outcomes as at least partly contingent on personal actions, collaborative care, or contextual supports, rather than as wholly non-contingent or fatalistic.

	INTERNAL	POWERFUL OTHERS	CHANCE	GOD ORIENTATION
	 I believe my health depends on me and my actions.	 I believe my health depends on the support and guidance of others.	 I believe my health depends on unpredictable events	 I believe my health depends on a higher power
				
 WHO HAS CONTROL?	• Me	• Doctors • Family members • Healthcare professionals	• Luck • Chance • Fate	• Environment • Destiny • Providence
 KEY FEATURES	• Personal responsibility • Proactive behaviors • Greater self-efficacy • Active engagement	• Trust in others • Authority dependence • Looks for approval • Seeking reassurance	• Sense of uncertainty • Fatalism • Lower sense of control	• Spiritual trust • Acceptance • Reliance on faith • Higher guidance
 TYPICAL THOUGHTS	"If I take care of myself, eat healthy, and exercise, I stay well."	"My physiotherapist knows what is best for me."	"Whether I recover or not is mostly a matter of luck."	"A higher power guides my recovery."
 TYPICAL BEHAVIORS	• Active involvement in rehabilitation • Self-management and healthy habits • Consistent adherence to recommendations	• Seeking guidance from healthcare professionals • Frequent reassurance seeking • Strong treatment adherence	• Inconsistent engagement in health behaviors • Reduce preventive involvement • Passive approach to recovery	• Use of prayer or spiritual practice • Seeking support from faith communities • Faith-based coping strategy
 PT APPROACH	• Encourage participation • Support self-management	• Promote shared decision-making • Provide clear guidance	• Highlight achievable actions • Reinforce sense of influence	• Acknowledge spiritual beliefs • Respect faith-based coping

Health locus of control orientations are not mutually exclusive and may evolve through therapeutic experiences and contextual factors

FIGURE 1 - Orientations of HLC.

HLC and health/health behaviors

A systematic review (20) of 50 studies investigated how HLC constructs may influence individuals' responses to general health and health behavioral interventions. The authors found that a higher internal HLC is generally associated with better health outcomes, largely due to greater SE, which promotes beneficial behaviors such as medication adherence,

preventive practices, and engagement in healthy activities. More specifically, individuals with higher internal HLC are more likely to engage in healthy dietary behaviors, reduced smoking, lower alcohol and substance use, consistent birth control practices, and weight management efforts. These patterns are consistent with the premise that individuals with a more internal HLC perceive their actions as influencing

health outcomes and demonstrate greater engagement in behaviors aimed at maintaining health.

On the other hand, a higher chance HLC was associated with less favorable health behaviors and outcomes (e.g., increased smoking), as individuals were less likely to engage in preventive actions. Individuals with a higher powerful others HLC were more likely to engage in preventive behaviors, particularly when the influence came from physicians or other healthcare professionals. However, when friends and family were perceived as the primary “powerful others,” the outcomes were inconsistent, showing positive dietary patterns when family members modeled healthy eating, but also contradictory behaviors such as lower vaccination rates, greater social contact, and excessive physical activity, suggesting that these influences were not always aligned with medical recommendations.

At a broader level, HLC may also influence how individuals engage with healthcare systems, representing a more complex or “macro-level” form of health behavior. Evidence from large-scale empirical studies suggests that individuals with a more internal orientation tend to use healthcare services more proactively and efficiently, and are associated with better health status and lower healthcare expenditures, whereas those with a more external orientation may rely more heavily on external care or exhibit less optimal utilization patterns (23).

Although certain health behaviors, such as smoking, have been associated with clinical outcomes among patients referred for physiotherapy, relationships observed in broader healthcare settings may not transfer directly to musculoskeletal rehabilitation (24). Therefore, evidence from non-physiotherapy settings may support the theoretical relevance of HLC and generate hypotheses, but it should not be interpreted as direct evidence that equivalent associations occur in physiotherapy populations.

HLC and rehabilitation outcomes

A systematic review (25) of 13 studies examined the influence of HLC on the effectiveness of physiotherapy interventions among adults aged 65 years and older with chronic pain conditions (e.g., knee, low back, and neck pain), as well as among individuals who had undergone knee and hand surgeries. The authors found that a stronger preoperative internal HLC was significantly associated with lower pain intensity and better functional outcomes following knee replacement surgery, whereas a lower internal HLC was linked to greater dissatisfaction with rehabilitation after surgery. Similarly, among individuals with chronic knee osteoarthritis, higher internal HLC was associated with less pain and perceived disability. Among individuals with low back pain, a stronger internal HLC was associated with greater SE in pain management and greater improvements in physical function, whereas a predominantly external HLC was linked to a greater perception of disability, a higher prevalence of depression following physiotherapy or chiropractic treatment, and less favorable outcomes after multidisciplinary care. No associations were found between HLC and pain intensity after hand surgery.

Across-sectional study (26) of 507 patients aged 18-70 years with musculoskeletal disorders attending a physiotherapy

clinic found that those who attended physiotherapy regularly reported lower levels of internal HLC compared to those who did not attend consistently. Younger patients perceived greater internal control and felt their lives were less influenced by chance than did older adults. Patients with lower educational levels exhibited a stronger external HLC. These findings may be interpreted through several possible lenses. For instance, individuals who attended physiotherapy more regularly might have experienced greater symptom severity or functional limitation, which could lead them to perceive recovery as dependent on professional care rather than personal action, thereby lowering internal HLC. In addition, the structure of physiotherapy encounters, often emphasizing clinician-directed interventions, may unintentionally reinforce a sense of external control, particularly when self-management strategies are not central to treatment.

Further evidence underscores the complexity of the relationship between HLC and rehabilitation outcomes. For example, recent observational data in patients with chronic low back pain indicate that HLC may not significantly predict changes in pain intensity, functional ability, or global perceived effect, despite overall clinical improvement following treatment (27). Notably, although a small proportion of patients showed changes in their HLC orientation over time, the majority remained stable, suggesting that control beliefs may require targeted or specific interventions to be meaningfully influenced and may be less likely to shift in familiar or long-standing situations, such as chronic conditions. This apparent variability highlights the complexity of the relationship between HLC and rehabilitation outcomes.

Rather than acting as a simple determinant of clinical change, HLC may influence how patients interpret their condition, engage with treatment, and adapt to their symptoms. Supporting this perspective, research in geriatric rehabilitation suggests that individuals with a stronger internal LoC report more positive perceptions of physical aging and greater orientation toward personal growth, whereas external control beliefs are associated with more negative appraisals of decline (28). Together, these findings suggest that the impact of HLC on rehabilitation outcomes is likely mediated by cognitive, emotional, and behavioral processes, as well as by the nature of the therapeutic approach itself, helping to explain why similar interventions may lead to different outcomes across patients.

HLC and patient-provider communication

HLC plays a key role in shaping how patients engage in clinical communication and relate to healthcare providers. Control beliefs influence how individuals position themselves within the clinical interaction, including how responsibility for health is distributed between patient and clinician. A systematic review (22) investigating the impact of LoC on patient-provider communication reported several findings among older adults residing in assisted living facilities. Those with a higher internal HLC were more likely to request referrals from their primary care provider, whereas those with a higher chance HLC were less likely to confront a healthcare provider when dissatisfied with their care. These distinct associations illustrate how different HLC dimensions may

shape specific aspects of communication and help-seeking behavior. Among patients with cancer, those who believed their illness was controlled by a higher power preferred to receive less detailed health information, whereas patients with a high internal HLC expressed a preference for interacting with an empathetic clinician rather than a distant or emotionally burdened expert. The belief in divine control may shape preferences for less detailed communication as a form of spiritual trust.

Qualitative evidence from oncology settings suggests that many patients and caregivers continue to perceive physicians as authoritative figures, reflecting a more external orientation toward control (29). In this context, delegating decisions to the clinician may represent a contextually appropriate way of engaging in care, rather than a lack of involvement. Conversely, individuals with a stronger internal HLC may view the clinical encounter as a space for more active participation and shared decision-making (29). These differences are reflected in distinct communication styles. Patients with a more internal HLC tend to adopt a proactive approach, seeking information, asking questions, and engaging in decision-making processes, whereas those with a more external orientation may prefer to rely on clinician expertise, place greater trust in professional direction, or selectively engage with health information (22). At the same time, a stronger internal HLC may occasionally lead some individuals to resist professional recommendations or prioritize self-directed decisions, whereas individuals with a more external orientation may demonstrate greater openness to clinician guidance and structured therapeutic support. Importantly, this does not necessarily indicate passivity, but rather different expectations about roles and responsibilities within the therapeutic relationship.

Taken together, these findings challenge a universalist approach to healthcare communication, in which all patients are assumed to prefer similar levels of information, autonomy, and involvement in decision-making (22). Assessing HLC may help clinicians better understand these preferences and tailor their communication and decision-making approaches accordingly (22). The potential value of tailoring communication is further supported by associations between communication difficulties, dissatisfaction with care, and poorer health outcomes. For example, in a cross-sectional study conducted among adults in a primary care setting, individuals reporting dissatisfaction with their healthcare provider or difficulty communicating their concerns were more likely to report worse health status (30). Notably, such challenges appeared more frequently among individuals with a more external LoC, suggesting that control beliefs may influence not only how patients communicate but also how effectively they are able to engage in clinical interactions and convey their needs (30).

How can physiotherapists assess HLC in practice?

Exploring HLC may help physiotherapists better understand how patients attribute influence and responsibility for their health outcomes. The following section describes two widely used research instruments for assessing health-related control beliefs.

The Health Locus of Control (HLC) Scale (31) (Table 1) was developed in 1976 by Wallston, Wallston, Kaplan, and Maides. The scale was designed as a unidimensional measure of individuals' beliefs about the extent to which their health is determined by their own actions versus external factors. The 11-item Likert-type scale distinguishes between two orientations: individuals with higher scores (health externals) tend to attribute their health outcomes to influences beyond their control, such as luck, fate, or powerful others. In contrast, those with lower scores (health internals) perceive their health status as primarily shaped by their own behaviors and lifestyle choices. The scale demonstrated acceptable test-retest reliability, internal consistency, and evidence of construct, concurrent, and structural validity.

Despite demonstrating acceptable measurement properties, Wallston et al. acknowledged certain limitations of the original HLC Scale, particularly its unidimensional structure and the inconsistency of internal reliability coefficients across different populations. The single continuum of internal versus external control did not adequately capture the complexity of external influences. To address these shortcomings, the authors developed the Multidimensional Health Locus of Control (MHLC) Scale (18,32). The initial versions, Forms A and B (18) (1978) (Table 2), were designed to assess general health beliefs, whereas Form C (32) (1994) (Table not available in the original publication) was later introduced as a condition-specific measure for individuals managing particular health conditions. Forms A and B each contain 18 items distributed across three subscales: internal, powerful others, and chance. Form C retains the same number of items but expands the structure to four subscales: internal, chance, doctors, and other people. Importantly, the MHLC does not provide a single overall score. Instead, each subscale is scored independently, allowing individuals to present simultaneous high or low levels across different control orientations. Across studies (18,31,32), the MHLC Scale demonstrated evidence of acceptable internal consistency, construct validity, and multidimensional structure, supporting its widespread use for assessing health-related control beliefs in health psychology, behavioral medicine, and rehabilitation research.

Although the HLC and MHLC scales have demonstrated psychometric validity for research use, they have not been validated as diagnostic or screening tools for guiding decisions about individual patients. In clinical practice, their domains may instead serve as an informal conversational framework to prompt qualitative exploration of patients' control beliefs and support individualized communication, goal setting, and motivational strategies.

What does a holistic and dynamic approach to HLC mean for physiotherapy care?

While clustering HLC into internal and external orientations can be heuristically helpful, this approach may unintentionally oversimplify the dynamic, diachronic, and variable character of control beliefs as they are lived and expressed in clinical care. Beliefs about how much control one has over one's health change with time, experience, education, and life circumstances. Physiotherapists need to be aware of the

TABLE 1 - HLC scale items (31)

Items	Direction
If I take care of myself, I can avoid illness.	I
Whenever I get sick, it is because of something I've done or not done.	I
Good health is largely a matter of good fortune.	E
No matter what I do, if I am going to get sick, I will get sick.	E
Most people do not realize the extent to which their illnesses are controlled by accidental happenings.	E
I can only do what my doctor tells me to do.	E
There are so many strange diseases around that you can never know how or when you might pick one up.	E
When I feel ill, I know it is because I have not been getting the proper exercise or eating right.	I
People who never get sick are just plain lucky.	E
People's ill health results from their own carelessness.	I
I am directly responsible for my health.	I

I = internally worded. E = externally worded. The scale is scored in the external direction, with each item scored from 1 (strongly disagree) to 6 (strongly agree) for the externally worded items and reverse-scored for the internally worded items.

layered, situational, and developmental beliefs about health and the drivers of health. A patient's beliefs about the efficacy of physiotherapy may be linked to previous experiences with rehabilitation, or a family member's experience, or biological, "embodied" factors, like pain tolerance or perceived energy level (33). For instance, if a patient suffers from low-iron anemia, she may experience persistent fatigue and perceive a limited ability to influence rehabilitation outcomes, leading her to feel that recovery is largely beyond her control. Once the anemia is addressed, these perceptions of personal agency and control may shift accordingly. HLC is a snapshot in time of conscious and unconscious attitudes, some of which are deeply internal and neurologically structured, and some of which are familial, cultural, and shared.

A physiotherapist has the opportunity to help patients verbalize, acknowledge, and understand their own HLC, while also supporting the development of healthier, more proactive attitudes and outlooks. If a physiotherapist can listen to, draw out, and facilitate a patient's discovery of their own HLC, then that person can orient care, resources, and motivational encouragement appropriately. Remembering that *therapeia*, the Greek root for "therapy," means "service," the physiotherapist's goal is not to dissuade a patient from their HLC, but to be of service by dialoguing about options, sharing information, and working towards better mobility and independence. As the twentieth-century philosopher Hans-Georg Gadamer proposes, "dialogue between doctor and patient must rather be seen as part of the treatment itself and as something which remains important throughout the entire process of making a recovery" (34). Overwhelmingly, across medical disciplines, Gadamer's proposition on the

importance of the doctor-patient relationship finds empirical support. Furthermore, it aligns with the theoretical underpinnings of CE, proposed by his intellectual contemporary, Bandura. Though framed on a group level, CE highlights the role of joint effort, resilience, resourcing, and regulating in achieving outcomes, emphasizing the key role of collective belief about team capacity (5,6). As such, physiotherapists who refuse to acquiesce to the notion that a patient's HLC is fixed, ingrained, and unchangeable can begin to model appropriate interventions through intentional, informative, and dialogical conversations that foster a greater sense of agency and hopefulness. Patients who develop a better internal LoC assume more self-awareness, SE, and agency (35-37).

Importantly, adopting a holistic view of HLC does not require privileging one orientation over others. Instead, multiple health loci need to be acknowledged and not ignored. Likely, multiple health loci exist concurrently within the physiotherapist-patient relationship. Physiotherapists can help patients recognize that random chance, genetic probabilities, and situational happenstance do impact health outcomes and life expectancy. A genuine appreciation for the very real role that luck plays can help reduce a patient's feeling of blind fatalism ("What's the point of therapy if it's all just a roll of the dice?") and misplaced personal guilt ("The accident is all my fault; I don't deserve to get well.") (38). Physiotherapists also have an opportunity to remind patients of the many ways that well-being can be shaped by others external to oneself—family, faith communities, friends, employers, mental health professionals, and medical providers. Sometimes these groups support health-promoting behaviors, whereas at other times their beliefs and norms may influence decisions such as vaccine hesitancy (39). Given these supports, pressures, and influences, personal agency takes on greater significance and becomes more complex and contextually layered than initially suspected (40). Physiotherapists can therefore help patients develop a flexible understanding of control that recognizes meaningful sources of influence and contingency.

One framework that offers a helpful lens for understanding how agency, meaning, and social context interact in health is the "Five Causes of Life," articulated by Gunderson, Cochrane, and colleagues. This framework frames individual agency as one of the "five causes of life," along with social connection, holistic and self-aware coherence, determined hope, and intergenerational intergenerativity (41-43). A sense of personal control and freedom depends on the ability to make coherent meaning of one's health. Likewise, coherence and the capacity for hope depend on social and familial support, which are built and sustained over time. Causes of life are not only essential to promoting healthy outcomes, but they also define health and healthiness for individuals and communities. In that sense, they set the conditions and parameters for an individual's and even a community's LoC. In physiotherapy, these domains may serve as conversational prompts rather than as a separate HLC assessment tool. For example, when a patient expresses that recovery is primarily determined by chance, the Physiotherapist might explore actions within the patient's influence, people who can provide support, how rehabilitation connects with meaningful goals, and realistic reasons for hope.

TABLE 2 - Multidimensional health locus of control (MHLC) scales (Forms A and B) (18)

Form A	Form B
Internal HLC	
1. If I get sick, it is my own behavior which determines how soon I get well again.	1. If I become sick, I have the power to make myself well again.
6. I am in control of my health.	6. I am directly responsible for my health.
8. When I get sick, I am to blame.	8. Whatever goes wrong with my health is my own fault.
12. The main thing which affects my health is what I myself do.	12. My physical well-being depends on how well I take care of myself.
13. If I take care of myself, I can avoid illness.	13. When I feel ill, I know it is because I have not been taking care of myself properly.
17. If I take the right actions, I can stay healthy.	17. I can pretty much stay healthy by taking good care of myself.
Powerful Others Health Locus of Control (PHLC)	
3. Having regular contact with my physician is the best way for me to avoid illness.	3. If I see an excellent doctor regularly, I am less likely to have health problems.
5. Whenever I don't feel well, I should consult a medically trained professional.	5. I can only maintain my health by consulting health professionals.
7. My family has a lot to do with my becoming sick or staying healthy.	7. Other people play a big part in whether I stay healthy or become sick.
10. Health professionals control my health.	10. Health professionals keep me healthy.
14. When I recover from an illness, it's usually because other people (e.g., doctors, nurses, family, friends) have been taking good care of me.	14. The type of care I receive from other people is what is responsible for how well I recover from an illness.
18. Regarding my health, I can only do what my doctor tells me to do.	18. Following doctor's orders to the letter is the best way for me to stay healthy.
Chance Health Locus of Control (CHLC)	
2. No matter what I do, if I am going to get sick, I will get sick.	2. Often I feel that no matter what I do, I am going to get sick.
4. Most things that affect my health happen to me by accident.	4. It seems that my health is greatly influenced by accidental happenings.
9. Luck plays a big part in determining how soon I will recover from an illness.	9. When I am sick, I just have to let nature run its course.
11. My good health is largely a matter of good fortune.	11. When I stay healthy, I'm just plain lucky.
15. No matter what I do, I'm likely to get sick.	15. Even when I take care of myself, it's easy to get sick.
16. If it's meant to be, I will stay healthy.	16. When I become ill, it's a matter of fate.

Scores for each MHLC subscale are calculated by summing the corresponding items rated on a 6-point Likert scale ranging from 1 ("Strongly Disagree") to 6 ("Strongly Agree"); no overall MHLC total score is calculated. In the original MHLC Forms A and B, each subscale contains six items (score range: 6–36). Item numbers refer to their original position within the questionnaire. Forms A and B are parallel versions of the same instrument with slightly different wording, developed to reduce response bias and facilitate repeated assessments over time.

How does HLC fit into the trajectory of the physiotherapy profession, and what are the implications for education and professional development?

The profession of physiotherapy has been evolving away from the traditional biomedical model and towards psychologically informed practice (PiP) for more than a decade (44). This relatively recent approach integrates physical, behavioral, and psychological interventions to reduce pain-related disability, representing a "middle way" between narrowly focused biomedical principles and more cognitive-behavioral approaches originally developed for mental health treatment (44,45). Psychologically informed physical therapy (PIPT), an integration of traditional physiotherapy treatments (e.g., manual therapy, exercise) with cognitive-behavioral treatments (e.g., pain coping skills), is considered a physiotherapist-specific subset of PiP. PIPT approaches that were developed initially to address pain-related conditions with treatment goals for reducing disability (45) may

provide guidance on greater inclusion of HLC in physiotherapy training.

First, though, it may be useful to briefly consider the development of beliefs and health models from student to clinician in this context. Bientzle et al. (46,47) found that physiotherapy professionals had and developed more sophisticated epistemological beliefs (i.e., about the structure and accuracy of knowledge) than students for biopsychosocial and biomedical domains. Physiotherapy students and professionals were also oriented more biopsychosocially than biomedically, to the extent that further biopsychosocial maturation demonstrated likely measurement ceiling effects in students and professionals alike (46,47). With regard to HLC, student physiotherapists studied by Eachus (48) indicated overall similarity with the public in that they showed higher scores on internality and relatively lower scores on chance and powerful others (i.e., "pure" internals). Given such limited data on HLC beliefs in physiotherapy students, conducted prior to the widespread transition to doctoral-level

physiotherapy education in the United States, the evidence for HLC relevance to health outcomes exceeds our knowledge of HLC beliefs in physiotherapy students, faculty, and clinicians. However, during the recent shift towards PiP, we can see that the attitudes and beliefs of physiotherapy students are malleable, and that educational interventions can lead to positive changes in physiotherapy students' attitudes and beliefs, particularly in the context of pain (49,50).

From an education and professional development perspective, it is important to note the distinction between clinicians' understanding of their own frameworks for thinking (i.e., biopsychosocial orientation and, more specifically, HLC orientation) and how to assess and respond to patients' therapeutic health concepts (i.e., biomedical vs. biopsychosocial) or HLC profiles. The relevant concept of SE may provide a key lesson here. In studying SE for home exercise programs, Picha et al. found that, although physiotherapists considered SE important for patient adherence to home exercise programs, many indicated barriers to assessing patient SE, such as not knowing how or what to do with the resulting information (51).

Thus, while students and clinicians appear to value a biopsychosocial approach, the challenge lies in the operationalization and competent application of constructs such as HLC and SE. In other words, endorsement of the values underpinning the biopsychological model does not automatically translate into clinical skills based on psychological constructs. Fortunately, educational interventions for PiP can lead to improvement in adherence to PIPT behaviors within domains of interpersonal effectiveness, autonomy, collaboration/SE, active listening, and positive expectations (49). Each of these domains theoretically supports skill-building in attunement to CE within the physiotherapist-patient relationship. An HLC-informed inclusion in PIPT would similarly equip students and clinicians to recognize the patient's pattern of attribution and respond appropriately. This might mean supporting autonomy in a patient with a profile of high internal HLC and high SE, providing performance feedback that promotes SE in patients with high internal HLC but low SE, building shared decision-making in a patient with high powerful others HLC, or fostering agency in a patient with high chance HLC. Recognizing the distinction of when psychological factors, such as HLC, are modifiable or stable empowers the clinician to determine when, and the extent to which, HLC may be information for clinical reasoning rather than a target for change. Brief, targeted educational intervention can not only increase knowledge and positively change beliefs and attitudes (49,50), but it can also increase behavioral competency in these domains (49). Additionally, roadmaps to address challenges to implementation have been recommended (45,52,53).

Guidance on clinical implementation for PiP already provides useful insight, particularly as it relates to the importance of communication (52,53). PiP emphasizes the development of effective communication between clinicians and patients, based on authentic and dynamic conversation consistent with patient-centeredness, rather than on didactic patient education (52). This emphasis on the importance of dialogue as meaningful communication, as previously noted, can be a key part of building a therapeutic alliance. In that same spirit, clinical implementation relies on patient-centeredness, not

rigid prescription of techniques (52,53). The strengthening of patient-provider therapeutic alliance appears not only to have a positive impact on functional outcomes, but may also be an important mediator of change (52), along with such alternative biopsychosocial mechanisms as trust, confidence, and motivation (54).

Outlining this relevant trajectory of the profession leads to several implications for the continuum of professional development across entry-level DPT education, clinical education experiences, and post-professional training. First, extending our knowledge of student, faculty, clinician, and setting- or condition-specific patient HLC profiles longitudinally would provide insight into the HLC construct within the context of the profession's shift towards a more biopsychosocially oriented approach (e.g., PIPT). This emphasis would bring HLC closer to being on par with the extent of evidence on SE in the rehabilitation literature. Second, since biopsychosocial beliefs and attitudes in the context of physiotherapy education appear dynamic (47) and responsive to educational intervention (49,50), a reasonable and logical next step would be incorporating HLC into, and extending where necessary, the educational infrastructure in DPT programs and post-licensure professional education.

Third, as PiP promotes guided self-management, achieving competence in recognizing, assessing, and addressing HLC (and SE) will likely require experiential training in addition to the didactic training (45,49,52). Fourth, barriers to implementation (e.g., clinician confidence, time constraints) may be partially mitigated through effective initial and subsequent training. While there is no consensus on how PiP training should be delivered, particularly with the addition of HLC, there is convergence around core components of PiP training (52), and evolving our approach to biopsychosocial components via intentional management using validated tools will advance the profession. Integrating HLC into the profession's increasing inclusion of PiP is a natural fit in our progression towards patient-centeredness. The goal is not to produce physiotherapists whose aim is to increase every patient's internal HLC; rather, it is to train clinicians to recognize a patient's HLC profile (as well as their own) and adapt their approach accordingly to be mindful of the provider-patient HLC dynamic, strengthen the therapeutic alliance, and improve patient outcomes.

Conclusion

Current literature suggests that HLC is a critical construct in healthcare, particularly within rehabilitation processes, where it meaningfully shapes patient engagement, adherence, and outcomes. Rather than representing a peripheral psychological variable, HLC can be understood as a core dimension through which patients interpret their condition, their role in recovery, and the potential impact of therapeutic interventions. Importantly, there is no inherently "right" or "wrong" HLC orientation. Internal and external LoC each reflect ways in which individuals make sense of health and illness within their personal, social, and cultural context. For this reason, the clinical challenge is not necessarily to correct patients' beliefs, but to explore them thoughtfully through

validated HLC questionnaires and structured clinical dialogue, understand their complexity, and recognize how they are continuously mediated by experience, symptoms, and interaction with healthcare providers.

Revisiting the clinical vignette introduced at the beginning of this paper, the patient who attributes her recovery primarily to the Physiotherapist does not simply display a maladaptive belief to be changed. Instead, her perspective can be seen as a dynamic and context-dependent orientation that may evolve over time. A physiotherapist informed by an HLC framework would explore these beliefs through dialogue, acknowledge their underlying rationale, and use them as a starting point to identify realistic opportunities for involvement, collaboration, and influence within rehabilitation while respecting the patient's reliance on professional expertise.

There are no simple or a priori solutions to managing HLC in practice. As a system of beliefs about control, HLC is inherently dynamic, can shift across the course of rehabilitation, and is shaped by biological, psychological, and social factors. However, when appropriately understood and integrated into care, HLC can act as a powerful lever to maximize the effects of physiotherapy interventions. This requires moving beyond static categorizations and engaging with HLC as a modifiable and relational process.

From a practical standpoint, several considerations can support physiotherapists in integrating HLC into everyday practice. First, HLC should be actively explored rather than assumed, recognizing that patients' beliefs about control are often implicit and context-sensitive. Second, physiotherapists should avoid privileging a single orientation and instead acknowledge the coexistence of multiple loci of control. Third, clinicians should not foster internal control as an end in itself. Instead, they should support a flexible and realistic sense that health outcomes may be influenced by personal actions, collaborative care, and contextual supports, while also acknowledging genuine limits, uncertainty, and chance. Communication and therapeutic alliance may play a central role in shaping how patients perceive control, responsibility, and engagement during rehabilitation.

Finally, physiotherapists must develop specific communication skills to address HLC effectively, as the way in which information is shared, options are framed, and autonomy is supported plays a critical role in shaping patients' beliefs about control. In this sense, integrating HLC into PIPT practice may help clinicians better tailor communication, therapeutic alliance, and self-management strategies to individual patients' control beliefs. In this perspective, HLC is not simply a characteristic that patients bring into rehabilitation, but a process that is continuously negotiated within the therapeutic relationship. Recognizing and working with this process allows physiotherapists to deliver more responsive, individualized care and to enhance both functional outcomes and patients' sense of agency.

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