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Advancing the deliberate implementation of the concept of sustainability and its alternatives in physical therapy research, practice, and education

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ABSTRACT

Background: Sustainability has become a ubiquitous imperative across all sectors of society, including healthcare. Building on the broader discourse on sustainable development, sustainability is used in relation to social, ecological, and economic concerns with varying degrees of emphasis and often related to a sense of durability.

Objective: To provide a detailed analysis of the concept of sustainability in current physical therapy literature and advance its deliberate future implementation.

Methods: Setting out from a critical exposition of prevalent models of sustainability, we conducted a critical discourse analysis to (1) examine the implementation of the concept of sustainability in physical therapy academic literature and (2) critically evaluate its hitherto use in light of the broader discourse surrounding sustainability.

Results: Our analysis identified a focus on the cost-effectiveness of healthcare interventions, and the use of so-called “weak” and “strong sustainability” models in the physical therapy literature. Other models and the broader critical discourse surrounding sustainability are only gradually finding their way into physical therapy literature.

Conclusion: Physical therapy lacks comprehensive exploration of both general and profession-specific understandings of sustainability. Nuanced engagement with sustainability and its alternatives is necessary to ensure its meaningful implementation in physical therapy research, education, and practice.

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Physiotherapy; sustainability; sustainable development; discourse analysis; planetary health; sustainable healthcare

Introduction

Mounting social and ecological crises have made evident the need for what the United Nations (UN) have described as nothing less than “Transforming our world” in its “2030 Agenda for Sustainable Development,” a transformation further defined as “system-wide . . . fundamental change in technological, economic and social organization of society, including world views, norms, values and governance” (UN, 2015; UNEP, 2021). Ever since the 1987 publication of the World Commission on Environment and Development “Our Common Future” report, but especially since the publication of the UN Agenda 2030, *sustainability* has been pronounced the yardstick for transformation to be implemented by “all countries and all stakeholders” (Brundtland, 1987; UN, 2015). Underpinning this imperative for healthcare is the recognition that worsening social and ecological conditions are having increasingly dramatic effects on the health of people around the world.

Recent decades have seen an exponential increase in research, education and practice efforts and publications in the nascent fields of sustainable healthcare, planetary health, One Health, EcoHealth and others (Amuasi, Lucas, Horton, and Winkler, 2020; Charron, 2012; Walpole, Barna, Richardson, and Rother, 2019; Webb et al., 2023; Whitmee et al., 2015). Resonant developments can now gradually be observed in physical therapy, as sustainability and sustainable development are considered in relation to different topics relevant to the profession (Banerjee and Maric, 2021; Ibáñez, de las Mercedes Franco Hidalgo-Chacón, Sánchez-Romero, and Cuenca-Zaldivar, 2022; Maric and Nicholls, 2019, 2020; Narain and Mathye, 2019; Palstam et al., 2022; Palstam, Andersson, Lange, and Grenholm, 2021). Across these efforts, however, differences in the use of the concept of sustainability are also apparent.

Because of its manifold and interchangeable use, *sustainability* has also been described a “floating

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signifier,” a concept at risk of becoming meaningless because it can be and is used to imply any variety of different meanings (Vandeskog, Heggen, and Engebretsen, 2021). Across public, political, and academic discourses, “the term generously envelops everything it seems to get in touch with, from social issues, economics, and healthcare, to tourism, building materials, and laundry detergent” (Losleben, Maric, and Gjørnum, 2023). This ambiguity impedes the meaningful implementation of sustainability and enables it being co-opted in ways contrary to its ambitious aspirations (Engebretsen et al., 2016).

To counteract these risks in the implementation of sustainability, our study addresses the following research question: How is sustainability conceptualized in the academic physical therapy literature thus far, and how do these understandings reflect the broader discourse surrounding sustainability outside the profession?

The present article sets out from a critical exposition of some of the prevalent conceptions of sustainability and some lesser known but highly relevant alternative notions. This represents the theoretical context and background against which the hitherto use of sustainability in physical therapy is analyzed. A critical discourse analysis (Jäger, 2015) of three recent physical therapy publications that employ the concept of sustainability then provides insight into the ways in which sustainability is conceptualized in the profession so far, focusing on a) linguistic and stylistic devices, b) beliefs and assumptions about sustainability, and c) consequences for the implementation of sustainability resulting from different understandings. In the discussion, these findings are contrasted against the broader discourse surrounding sustainability, alongside a range of critical recommendations for the deliberate implementation of sustainability in physical therapy research, practice and education.

Theoretical context and background: prevalent conceptions of sustainability

The emergence of the concept of sustainability shows a varied mix of influences shaping the use of the concept over time (Purvis, Mao, and Robinson, 2019). The ecological sciences have played an unquestionable role in the early shaping and use of sustainability, principally referring to “the ability of a given ecosystem to maintain its essential functions and processes over time” (Cielemecka and Daigle, 2019). Through different pathways, the concept increasingly entered mainstream public discourse in the 1980s in a form that removed its primary ecological focus, in favor of its use in relation to

various economic and social concerns, or a generalized use in the sense of durability (Engebretsen et al., 2016; Meadows, Meadows, Randers, and Behrens, 1972; Purvis, Mao, and Robinson, 2019; Ziai, 2017).

The conflation of sustainability and sustainable development

The blending of concerns and relative dilution of its ecological focus saw a significant progression in the WCED 1987 Brundtland commission report (Brundtland, 1987). The report’s influential definition of sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” remains the principal definition underpinning the newer UN Agenda 2030 Sustainable Development Goals (UN, 2015; Brundtland, 1987). Given the influence of their international voice and platform, the Brundtland report and the UN Agenda 2030 have escalated the muddying of the concept via their conflation of sustainability and sustainable development.

Already by name, it should be clear that sustainable development centers on a particular type of development, rather than providing a definition of sustainability in itself. Because persistently dominant notions of development are grounded in Western or global northern notions of social, cultural, and, importantly, economic development, sustainable development has also been critiqued for several decades now (Demaria, Kothari, Salleh, and Escobar, 2023). One of the fundamental points of this critique is that economic growth and development, and the capitalist systems they are part of, are inextricably tied to the colonialist erosion of arguably lesser developed societies and ecosystems for the generation of economic surplus (Banerjee, 2003; Connelly, 2007; Esteva and Escobar, 2017; Telleria and Garcia-Arias, 2022; Ziai, 2017). Taken seriously, this critique implies that sustainable development contradicts the ecological origin of sustainability with its focus on ecosystem durability and additionally contradicts its own social aspirations by perpetuating and exacerbating structural and global inequalities.

Three dimensions of sustainability

Despite this conflation and resulting interchangeable use, the sustainable development discourse has given rise to three basic models of sustainable development that have strongly influenced, if not defined, how sustainability is now understood across the disciplines. They include the three-pillar model, the Venn-

diagram, and the concentric circle models (Connelly, 2007; Lombardi, Porter, Barber, and Rogers, 2011; Purvis, Mao, and Robinson, 2019).

In their simple, visual form, the three-pillar model considers ecology, economy, and society as separate pillars of sustainability, needing equal fulfillment for sustainability to be achieved (Figure 1). The three-pillar model is closely related to the Venn-diagram that similarly depicts ecology, economy, and society as three core dimensions of sustainable development (Figure 2). While the Venn-diagram model tries to imply their mutual interactions, however, it also identifies sustainability as achieved in a place of balance between these dimensions. Like a roof balanced on three pillars, the ideal balance of the Venn-diagram is represented in their overlapping center “zone of sustainability” (Connelly, 2007).

Both the Three-pillar and Venn-diagram model have been criticized for promoting a “weak sustainability” model. This is characterized by foregrounding economy (ultimately understood in terms of free-market-based economic growth) as equally fundamental for sustainability as ecology (Du Pisani, 2006; Lombardi, Porter, Barber, and Rogers, 2011; Washington et al., 2017; Williams and Millington, 2004). Both models are also

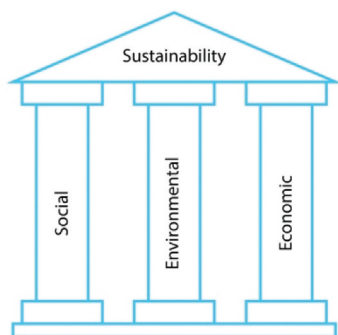


Figure 1. Three-pillar model (adapted from Purvis, Mao, and Robinson, 2019).

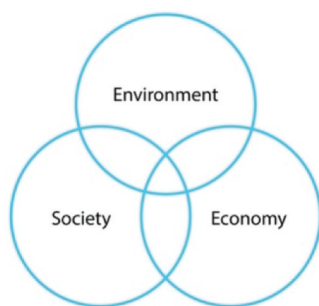


Figure 2. Venn-diagram model (adapted from Purvis, Mao, and Robinson, 2019).

closely associated with the Brundtland report and UN Agenda 2030 resonant emphasis of these three dimensions as the core of what needs to be balanced to achieve sustainable development (Robinson, 2004).

The contrasting idea underpinning “strong sustainability” models then is to emphasize and depict ecology as the indispensable foundation and outer limit on which human society depends, and the latter, in turn, as the ground for economy or economic systems (Lombardi, Porter, Barber, and Rogers, 2011). Lombardi et al. visualize this in nested or concentric circle models, including a variation in which economy is additionally depicted as part of society rather than a distinct dimension (Figure 3). This is to emphasize that economic systems are social phenomena (rather than independent realities) that can be changed in service of greater sustainability (Lombardi, Porter, Barber, and Rogers, 2011; Purvis, Mao, and Robinson, 2019).

In recent years, the strong sustainability model has found meaningful support in the research and debate surrounding “planetary boundaries” and the recognition of ecological limits to human development (Rockström et al., 2009, 2023; Steffen et al., 2015). The notion of planetary boundaries has also influenced recent planetary health discourse, which, influentially promoted by the Planetary Health Alliance, is explicitly grounded on the notion that “our health depends on our environment” (PHA, 2024). This strong ecological grounding of planetary health has also found further justification and expression in research and practice at the intersections of health and surging environmental crises like climate change, biodiversity loss, global land-systems change, and others (Romanello et al., 2022; Stanhope, Breed, and Weinstein, 2022; Talukder et al., 2022).

Despite its denomination as strong, however, the ecological focus of strong sustainability and its application in health and other areas have also been criticized for various reasons. First, the principal foregrounding of ecology in strong sustainability and its applications is

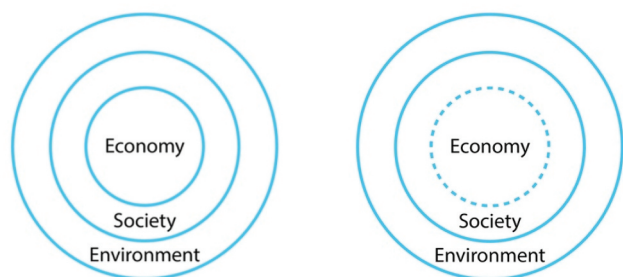


Figure 3. (a) and (b) “Nested” or concentric circle models (adapted from Purvis, Mao, and Robinson, 2019).

highlighted as being grounded in the same focus on human interests and benefits that are also present in weak sustainability models. This anthropocentrism, in turn, is widely argued to be one of the root causes that has enabled debasement, exploitation and destruction of other species and ecosystems driving global environmental disasters (Alaimo, 2012; Bourban, 2021; Maric and Nicholls, 2021; Washington et al., 2017). It is therefore questionable whether such anthropocentrism can be a feature of the meaningful definition and implementation of sustainability.

Closely related to this, the strong sustainability model is also argued to rely on a false and unjust understanding of nature as an empty, untouched wilderness, devoid of humans and so distinct from culture and human society (where both of the latter are predominantly defined in Western terms). Combined with its denigration as resource, this image of untouched nature has been instrumental to European colonialism in the 16th century and continues to justify the appropriation, extraction, and exploitation of natural resources until today (Ghosh, 2015; Grove, 1995; Martinez, 2003; Pezzullo and Sandler, 2007; Purdy, 2015). What is excluded in this image, however, are the indigenous peoples that have lived on these lands for millennia and remain instrumental to their high degree of biodiversity and ecosystem integrity until today (Maezumi et al., 2018; Raygorodetsky, 2018; Stephens et al., 2019; Tavares, 2016; Walker et al., 2020).

The plight of indigenous people in relation to conceptions of nature and sustainable development has been even more complex insofar as colonialism has required their exclusion from both nature and culture, or humanity. Indigenous people's exclusion from nature (via its misrepresentation) justified the illegitimate appropriation of lands and natural resources claimed to have previously been uninhabited. The claim that indigenous people lacked culture and were undeveloped additionally justified their exclusion from culture and humanity, and with that, their exploitation, extraction, and enslavement as natural resources. Among many others, Ghosh (2015) and Kara (2023) provide vivid description and analysis of these historical processes and the way in which they continue under neocolonial guises until today, including by way of sustainable development and the green transition.

The difficulty with the strong sustainability model, then, is that it potentially upholds a false distinction between the environmental and social dimensions of sustainable development. This risks perpetuating the exploitation of nature and people as resources, and the exclusion of social and cultural concerns inseparable from questions regarding ecosystem sustainability. It

also highlights that the early sense of sustainability as exclusively concerned with ecosystem maintenance over time (on which the strong sustainability model is grounded) is overly reductive where it excludes human-ecosystem coexistence and lays the ground for the use of sustainability to be used in the generalized sense of durability.

Alternative models

While the planetary health, sustainable healthcare, and general sustainability discourse are increasingly trying to do justice to the complex interactions between environment and society, it is also here that alternatives to sustainability become interesting insofar as they try to circumvent the pitfalls of anthropocentrism and balance social and ecological dimensions in fundamentally different ways. Longstanding development critique has, in many ways, been a successor or sibling of the critique of colonialism, with significant influences from previously colonized parts of the world like Africa, Asia and Latin America. Consequently, "alternative concepts of what a good society looks like and alternative practices of [social] organising" (Ziai, 2017) often draw on critical, de-, and postcolonial theories to emphasize the need for decolonizing sustainability and sustainable development, and drawing on traditional and indigenous knowledges to illustrate alternatives (Campos Navarrete and Zohar, 2021; Gram-Hanssen, Schafenacker, and Bentz, 2022; Vásquez-Fernández and Ahenakew Pii Tai Poo Taa, 2020).

Better known examples of such alternative conceptions include Indian *Swaraj* (Demaria and Kothari, 2017), Latin American "Buen Vivir" (Acosta, 2017; Gudynas, 2011, 2019); South African "Ubuntu" (Shumba, 2011; Van Norren, 2020, 2022), and others (Ziai, 2017). Though there are critical distinctions relative to the specific eco-sociocultural context in which each of these concepts and associated modes of living are situated, there are also shared characteristics and resonances between them that distinguish them from the predominant sustainable development models. Some of these include a high-degree of situatedness in their ecological (bioregional), social, cultural context; an emphasis of relationality and non-anthropocentric worldviews marked by fundamental human-nature entanglement (in some cases also expressed via the recognition of rights of nature and attribution of personhood to rivers, mountains, ecosystems, etc.); inter-generational and interspecies care and partnership; the emphasis of community and communal self-governance; an appreciation of plurality and plurality of ways of living well (as opposed to universally valid

notions of development); as well as economic diversity and, indeed, alternative notions of property, common goods, sharing, trade, etc. that cannot simply be subsumed under the notion of economics (ibid.).

Further alternative concepts to sustainability that either draw on or resonate with the latter concepts and characteristics, include conviviality (The Convivialist International, 2013, 2020; Gutiérrez Rodríguez, 2020), commoning (Er, 2023; Singh, 2017), pluriversality (Escobar, 2017), posthumanist and relational sustainability (Cielemęcka and Daigle, 2019; Walsh, Böhme, and Wamsler, 2021; West, Haider, Stålhammar, and Woroniecki, 2020), the somewhat more recent surge of efforts around degrowth and postgrowth (Hickel, 2020; Schmelzer, Vetter, and Vansintjan, 2022), and long-standing thought concerning the good life (Rosa and Henning, 2017).

These alternative concepts and models carry another central critique of sustainability and sustainable development with them, implicitly expressed in their high degree of situatedness in their eco-sociocultural and community context, and the appreciation of plurality at different levels: The critique of the colonizing practice of universalizing standardization, of developing and advancing universal notions of sustainability and transformation that are or should be equally valid for all, everywhere around the world. A ready counterexample to this is the difference in responsibility for ecological breakdown by different nations around the world and the way this suggests differing requirements in transformation (Hickel, O'Neill, Fanning, and Zoomkawala, 2022). What alternative concepts and models argue for then is that sustainability and transformation should always be vernacular, contextually defined and negotiated considering ecological, social, cultural, historical, political, etc., differences (Cielemęcka and Daigle, 2019; Ghosh, 2015; Hoop, de Loeber, and Essink, 2022).

This is not to say that alternative concepts and associated modes of living do not come without their challenges (Nirmal and Rocheleau, 2019; Ziai, 2017). Yet they are grounded in at least equally long traditions of thinking and living as sustainable development, with arguably less detrimental eco-social effects, if not several thousands of years of proof-of-concept. Insofar as they encompass alternative modes of living and not just alternative modes of managing people and planet, they highlight precisely that it is dominant ways of living and social organization, including indefinite economic growth, sustainable development, and the histories, presents, and futures that go with them, that have proven themselves unsustainable given the social and ecological peril they engender, and are thus in need of fundamental transformation. Together, this makes alternative concepts and

models at least equally as worthy of deliberate consideration in any serious effort to study and implement sustainability, also in the context of health and care, and physical therapy research, practice, and education.

The increasing mention of sustainability in physical therapy

Recent years have seen some initial mention of the concepts of sustainability and sustainable development within the physical therapy literature. This has included its mention in relation to sustainable undergraduate education (Crosbie et al., 2002), sustainability education (Maric, Groven, Banerjee, and Michelsen, 2021), environmental sustainability (Ibáñez, de las Mercedes Franco Hidalgo-Chacón, Sánchez-Romero, and Cuenca-Zaldivar, 2022; Lister et al., 2022), the sustainability of therapeutic approaches (Flynn et al., 2021), sustainable development and the Sustainable Development Goals (Cezón Serrano et al., 2023; Maric and Nicholls, 2020; Narain and Mathye, 2019; Palstam et al., 2022; Palstam, Andersson, Lange, and Grenholm, 2021; World Physiotherapy European Region, 2022a, 2022b), active transport (Toner, Lewis, Stanhope, and Maric, 2021), posthumanism and eco-philosophies (Maric and Nicholls, 2021; Richter and Maric, 2022), and climate change and general environmental disruption (CSP, 2022; Maric and Nicholls, 2019; Stanhope, Maric, Rothmore, and Weinstein, 2021; World Physio, 2023). In addition to these publications, several new national and international groups have formed that refer to sustainability, often at the intersections of health and environment, and in resonance with the broader international sustainable healthcare and planetary health movement (Shaw et al., 2021).

To gain detailed insight into the different ways in which sustainability is conceptualized in the profession at this early stage, we conducted a critical discourse analysis of three recent physical therapy publications that employ the concept of sustainability, set in relation to a range of the broader discourse surrounding the term both within and outside of the profession. With this, we aim to facilitate more nuanced engagement and deliberate implementation of sustainability and its alternatives into physical therapy research, education, and practice.

Methods

Epistemological background

Critical discourse analysis is a well-established qualitative research methodology that has further developed

a wide variety of approaches broadly included under its banner (Catalano and Waugh, 2020; Machin and Mayr, 2023). In the present study, we implemented a critical discourse analysis following Siegfried Jäger's (2015) approach. Jäger's critical discourse analysis is based on the works of the French philosopher and historian Michel Foucault and his hermeneutic approach to controversial societal issues (Diaz-Bone, 2023). Foucault postulates that social reality is structured through historically evolved discourses. According to Foucault (1996), such discourses are mediated by subjects but not produced by them, partly because discourses always have a historical perspective which, therefore, is always influenced by more than individual subjects (Jäger and Jäger, 2010).

Building on this, Jäger assumes that individuals or smaller groups of people are able to shape public discourse and thereby gain interpretive authority and social power through (communicative) actions (Jäger and Meier, 2009). Social reality, however, arises from a variety of historically evolved discourses in which the individual is only ever a mediator of the discourse while simultaneously being influenced by it. Thus, subject, discourse, and social reality do not stand in a direct connection to each other (Foucault, 1996). There is, rather, a mutual constitution of discourses with different subject, or discourse positions (Jäger and Jäger, 2010). These discourse positions operate within a framework of the sayable, which distinguishes them from unspeakable positions. Once something becomes sayable, it acquires the status of a discourse position (Jäger and Zimmermann, 2010).

According to Jäger (2015), discourses manifest themselves, among other things, in relevant public statements of media, artistic, or oral nature. The individuals who express themselves on a matter thereby claim interpretive authority regarding a specific discourse position. It is this interpretive authority that results in their influence of a discourse and social reality, in the present case, the discourse of sustainability and resulting social reality, opinions, practices, etc.

Access to material

The selection of appropriate texts and a multi-stage analysis process of critical discourse analysis enables researchers to identify and conceptualize otherwise hidden or unexamined perspectives communicated by opinion-leading experts (discourse carriers) and communication platforms (e.g. professional and academic journals) in an area of interest (Jäger and Meier, 2009).

To conduct our study, we conducted a search using the keywords “sustainability,” “physical therapy” and “physiotherapy” in titles and abstracts of articles on relevant databases to identify articles with different perspectives on the topic of sustainability that could represent the breadth of discourse surrounding the concept within the physical therapy academic literature. The search took place in autumn 2022 and spring 2023 and was limited to articles no older than 2 years. The final selection was based on the extensive expertise of the authors in this field. All authors have been involved in sustainability and planetary health in both academic and practical contexts for many years and are among the international leaders in this field with a significant overview of its development to date. Diversity of discourse positions represented by the included articles played a crucial role in their final selection.

Following review of the research results, we identified and decided to include three relevant articles with opinion-forming character representing different positions regarding sustainability, published in scientific journals and relevant to physical therapy for detailed discourse analysis. The three articles include Flynn et al. (2021) publication on “The sustainability of upper limb robotic therapy for stroke survivors in an inpatient rehabilitation setting,” Palstam, Andersson, Lange, and Grenholm (2021) “A Call to Include a Perspective of Sustainable Development in Physical Therapy Research,” and Maric, Groven, Banerjee, and Michelsen (2021) “Essentials for sustainable physiotherapy: Introducing environmental reasoning into physiotherapy clinical decision-making.” These articles are referred to as article A, B, and C, respectively, in the results section, in the order in which they were introduced here.

According to Jäger, articles of the selected type represent so-called specialized discourses, that is, discourses in which opinion leaders promote different perspectives on a specific topic (Jäger and Meier, 2009). They provide important material for analysis because such specialized discourses and the positions they promote have the potential to become dominant in opinion formation. In the present case, this implies particularly their potential to shape opinions and the everyday implementation of sustainability among practicing physical therapists, physical therapy researchers, educators, learners, and professional representatives.

Analytic process

In the analysis process, discourse carriers, their discourse positions, and the discourse strands (i.e.

substantive arguments within the discourse) contained therein were delineated by selecting the texts to be analyzed. Through the identification and contrasting of discourse strands, underlying beliefs and assumptions of discourse carriers were revealed, such that they could be reflected on critically, alongside the way they shape social opinion and corresponding social structures and practices (Jäger, 2015). By challenging the interpretative authority of discourse carriers, critical discourse analysis allows for the reconsideration of taken-for-granted understandings of various concepts and the practical consequences they have for people's thinking and actions (Catalano and Waugh, 2020; Machin and Mayr, 2023). In the present case, the focus was on understanding sustainability in the academic literature of physical therapy and the implications this could have for its implementation in physical therapy.

In the present study, the four standardized steps of Jäger (2015) critical discourse analyses were followed in the analytic process. The steps include 1) structuring the discourse, 2) analyzing the discourse strands, 3) detailed analysis of discourse fragments, and 4) drawing conclusions about discourse positions and levels.

To begin with, individual sections of the articles were examined with a view to discourse strands containing conceptual interpretations of sustainability represented in them. These were then further divided into discourse fragments (Jäger, 2009), that is, individual subtopics or sub-aspects. In a next step, it was investigated how the discourse fragments connect with each other to form the previously identified discourse strands. Specifically, within the discourse fragments, linguistic, stylistic, and content-argumentative means were identified that are used to convey the author's (discourse) position.

These discourse positions (the ideological beliefs and assumptions about a specific topic, here, sustainability) and their respective discourse levels (social sites of discursive activity, or consequences that specific discourse positions have for implementation) were extracted from the identified discourse strands and their constitutive discourse fragments. This process was initially carried out for each article individually to create a comprehensive picture of the authors' discourse positions. Subsequently, the discourse positions of the selected articles were compared to each other to contrast their respective positions against the background of the previously described broader, historical sustainability discourse and models outside of the physical therapy literature. All steps of the analytic process were initially conducted by one author (the same for all three articles) and then reviewed, discussed and agreed upon by all authors.

The results of our analysis are presented in the next section, followed by a discussion of how other physical therapy literature incorporating sustainability aligns with or deviates from the positions represented in the analyzed articles and the broader discourse on sustainability.

Results

The findings from our critical discourse analysis are presented here in three sections, focusing on the analysis of linguistic and stylistic devices, beliefs and assumptions, and their consequences for the implementation of sustainability.

Linguistic and stylistic devices related to sustainability

All three articles can be grouped under the broad umbrella of scientific writing, being published in peer-reviewed academic journals. They are also written by authors active in academia, based in countries of the global north. In itself, their scientific, or academic nature, already suggests a certain interpretive authority, building on the notion that the elaborate means of generating and evaluating knowledge employed in science elevates its statements and findings over mere opinion. Physical therapy (the profession, discipline, practice, etc.) corroborates such authoritative claims insofar as it seeks to ground its identity and practice self in the scientific evidence it generates. Scientific texts are therefore more likely to have a consequential bearing on how central concepts are understood and operationalized in research, practice, and education.

The three texts differ in the extent to which they are closer or further away from dominant, positivist understandings of science and the interpretive authority commonly attributed to it. Though there has been change and resistance to the dominance of positivist science in medicine, healthcare and physical therapy, positivist science still plays a defining role in the profession and continues to shape its theory and practice (Nicholls et al., 2023). Taken from this perspective, Article A has the greatest potential to shape the understanding and implementation of sustainability the most because it is the only one of the three that recounts a positivist, quantitative research project, and follows the still dominant (IMRAD) structure of scientific articles (a requirement still held by the majority of physical therapy scientific journals). This is further substantiated in Article A through its use of technical, medical, scientific, and statistical jargon, as well as its exposition of

quantitative data in text, tables, and illustrations to support its arguments.

Given their publication in academic journals, Articles B and C also come with an extent of interpretive authority, but their classification and structure of a “point of view” and “professional article” diminishes their interpretive authority somewhat relative to Article A and situates their arguments as sitting closer to informed opinion. Their use of more narrative structures, everyday language, and frequent use of the pronoun “we” further presents them as an expression of the authors’ subjective opinions and roles in shaping their arguments, in contrast to as opposed to what is communicated as scientific knowledge in Article A. For this reason, the positions Article B and C present on sustainability remain more open to further debate and interpretation, while the position purported in Article A risks being interpreted in a more absolute way. While the risk across to advance the implementation of partial, and at worst, even undesirable understandings of sustainability and their operationalization is shared across all three articles, it should be clear that this risk is greater with Article A due to its stronger claim on interpretive (qua scientific) authority.

Beliefs and assumptions about sustainability

Each of the three analyzed articles advances a different position on sustainability, the problems that underpin it, and the solutions required to achieve sustainability. Article A presents a study that concludes on identifying robot-assisted upper limb therapy as an arguably sustainable treatment intervention for stroke survivors in inpatient rehabilitation settings. It employs the term sustainability frequently (more than Article C), from the title through its conclusions. In the introduction to the article, and with reference to evidence-based practice, sustainability is defined as “the continued use of an intervention over a period of years to achieve desired health outcomes” (p. 7522). In the same paragraph, this definition of sustainability is further expanded to include economic concerns due to the “significant financial outlay associated with the procurement and implementation of these robotic devices” (ibid.).

Based on this definition, sustainability was measured across two separate points in time, by identifying how many patients used the technology in question, how often they used it over a course of treatments, and the total amount of time it was used by each patient (p. 7523). The implementation of robot-assisted therapy in the context of the article is presented as “best-practice” but this claim is not supported by any literature. If best-practice necessitates the acquisition of

corresponding devices, the research project ultimately tried to establish whether the device used for robot-assisted upper limb therapy was used often enough and for long enough to justify the high economic costs associated with its procurement, implementation, and maintenance; and therewith, forego the significant economic burden of “technology abandonment” (p. 7525).

Article A’s position does not explicitly embrace inter-related ecological and social concerns, and there is no evidence of their implicit consideration. While patient outcomes and healthcare costs (very localized for one institution) are undeniable social issues, no explicit connection is made to broader concerns, like, for example, how reduced healthcare costs and better patient outcomes might increase social inclusion or reduce the environmental footprint of healthcare services. Article A thus ultimately promotes an understanding and implementation of sustainability as cost-effectiveness over time, combined with a sense of techno-solutionism implied in its focus on resource-intensive healthcare technologies. Considering the broader discourse on sustainability, this represents a questionable understanding and implementation of sustainability that disregards both the extensive critique of a predominant emphasis of economic concerns and the critique of techno-solutionism as a panacea for sustainability transformations (Sætra, 2023).

Articles B and C also share the long-term (durability) perspective of Article A but differ quite significantly from it through their much greater emphasis of social and ecological concerns. Already in its title, Article B explicitly calls for the inclusion of “a perspective of sustainable development in physical therapy research” (Palstam, Andersson, Lange, and Grenholm, 2021). At the outset, this locates it within that part of the broader discourse on sustainable development and its tripartite focus on ecology, society, and economics. Among a range of instances throughout the article, its affiliation to this discourse is clearly evidenced in its employment of “the widely used definition of sustainable development first described in the 1987 UN report” (ibid., p. 1).

This comes with all the problems associated with what has been critiqued as a weak sustainability model, including the conflation of sustainability with a certain kind of development (as evident in the formulation “sustainable development is development . . .”), and the tendency to give equal importance to ecology, society, and economics. The latter problem can also be observed in the argued for model for “measuring the value of health care” (ibid., p. 2). In this model, “outcomes for patients and populations” are evaluated against a “triple bottom line,” consisting of environmental, social, and financial impacts (ibid., p. 3).

It should be clear that the tripartite model of sustainable development advanced in Article B marks a considerable distinction to the model of sustainability advanced in Article A. Though more broadly referring to physical therapy research in general, this is rightly noted by the authors of Article B in their argument that physical therapy research has, thus far, mainly focused on “evaluations of treatment outcomes, sometimes also involving measures of health economics” (ibid., p. 2), that is, “cost-effectiveness” (ibid., p. 3). The distinct advancement relative to the concept of sustainability promoted in Article B then is that ecological and social concerns are included in the evaluation of healthcare services at all.

It should also be noted that Article B stresses particularly the inclusion ecological dimension through its repeated foregrounding of climate change, biodiversity loss, greenhouse gas emissions, and concepts like the planetary boundaries or tipping points. In contrast, the social and economic dimensions are brought into focus in only one paragraph each after the introduction of the sustainability evaluation model. Implicitly, this emphasis on ecology also brings the articles’ understanding of sustainability (or sustainable development) somewhat closer to strong sustainability models. Yet, its repeated explicit grounding in the sustainable development discourse and its defining literature never allows it to depart from the problems of the latter. The resulting issue is that physical therapy, through the implementation of this model of sustainability, risks advancing unjust notions of development and associated, exploitative economic models that have historically undermined social and ecological causes and continue to do so until today.

Like the former, Article C also invokes the SDGs to support the implementation of sustainability into physical therapy (Maric, Groven, Banerjee, and Michelsen, 2021). But both before and far more frequently than doing so, the article has a clear environmental focus, beginning with its title “Essentials for sustainable physiotherapy: Introducing environmental reasoning into physiotherapy clinical decision-making” and continuing all the way through its conclusion (ibid.). In difference to Article B that has its focus on physical therapy research, Article C is mainly focussed on clinical practice. But like Article B, it also argues for the additional inclusion of sustainability concerns into a central element of physical therapy, specifically, the inclusion of “environmental sustainability” considerations into clinical reasoning and decision-making processes.

The focus on environmental sustainability is a deliberate choice by the authors of Article C, grounded in the explicit critique of the tripartite model of

sustainable development, to which an entire subsection of the article is devoted (ibid., p. 56). Here, the authors align themselves with the principal assumption underpinning strong sustainability models, namely, “to ground our striving toward sustainability in the understanding that human health, societies, and economies depend on a planetary ecosystem that enables and supports them and so position environmental sustainability as a fundamental endeavor” (ibid., p. 56). Throughout the remainder of the article, and in line with similar points in Article B, this is followed up by arguments revolving around the reduction of the environmental footprints of health systems and physical therapy services, and how such efforts might be integrated into physical therapy.

The explicit mention of “the colonial and capitalist model of development-through-economic-growth” (ibid., p. 56) further corroborates Article C’s clear position, aligned with strong sustainability models. Though the article foregrounds environmental sustainability as a concern that should be primary to economic ones, it does not offer, are considerations of specific economic alternatives that might align more closely with its ecological focus, like doughnut economics (Raworth, 2017), ecological economics (Brand-Correa et al., 2022), or others. The measurement of social footprints of healthcare services and, in this sense, social sustainability is also touched on in a final paragraph, implying, but not fully developing, a more comprehensive eco-social model of sustainability. The model of sustainability presented in Article C thus also comes with a range of shortcomings, including the need for better integration of social dimensions, economic alternatives, a somewhat anthropocentric focus on human health and environmental sustainability, and the lack of consideration of alternative models to sustainability.

Consequences for the implementation of sustainability

The analysis of beliefs and assumptions about sustainability expressed across the three articles in focus of our analysis made evident a variety of consequences these would have for the implementation of sustainability. Article A is an applied research project focused on clinical practice and advocates both for the use of rehabilitation technology and, principally, the implementation of sustainability via the measurement of cost-effectiveness. If sustainability was defined and implemented in this sense, there would be a considerable risk that ecological and social dimensions would remain unconsidered in physical therapy and, thus, prevent physical therapy research, practice, and education

from contributing to the fundamental eco-social transformation required today.

Article B presents a substantial corrective to this as it advances the balancing of ecological, social, and economic concerns to improve health outcomes. Yet insofar as it advances the promotion of sustainable development in and via physical therapy, the article also advances the propagation of all the problems that come with the arguments for sustainable development, including the disregard of decades of critique and development of alternatives to it. Article C is grounded in one such critique as it foregrounds the recognition of ecology as the foundation for human life and health, and with this, a privileging of environmental sustainability (via reduction of the environmental footprint of health-care and physical therapy).

Discussion

The practical implications that all three articles put forward are expressions of their underpinning beliefs and assumptions about sustainability. But more importantly, the analysis of the solutions to challenges of sustainability advanced in these three articles corroborates what the analysis of their linguistic and stylistic devices highlights. This is ultimately a central point of critical discourse analysis and theory applied to the present focus (Catalano and Waugh, 2020; Diaz-Bone, 2023; Jäger, 2001; 2015; Machin and Mayr, 2023): That our beliefs and assumptions about sustainability and the way we communicate them hold power in that has practical consequences for physical therapy research, practice, education, and policy, and via the social status of the health professions, potentially beyond them, for health systems, and even the public. The models of sustainability we advance can affect what, for example, research time, activity, and money are invested in amid the growing efforts to implement sustainability across all sectors. They can affect how the currently over 1,917,615 physical therapists around the world (World Physiotherapy, 2022), understand and respond to the complex health, social, and ecological challenges we are facing today, as well as the extensive number of colleagues not organized under this umbrella, and the countless patients and nonphysical therapy colleagues we work with on a daily basis.

The shortcomings of the different sustainability models and the way they are employed in the literature, and their practical implications, or consequences for implementation of sustainability in physical therapy, make evident the need for attention to detail, nuance, and further development in our employment of the notion of sustainability. One important aspect herein

is a professional responsibility in recognition of the effect that the terms we use, the means we define them with, and our resulting practices can have on our own community and beyond it. In the context of the discourse around sustainability, however, the potentially even more important reason for deliberation is that we risk advancing models of sustainability that run directly counter to the fundamental transformation of dominant ways of living and social organization that we need today. Following our analysis, this is particularly the case when we communicate cost-effectiveness for sustainability (Article A) or advance the implementation of the internationally sanctioned weak sustainability with its equation of ecology, society, and economics (Article B). But even the use of the strong sustainability model (Article C) comes with its challenges and needs more nuanced interweaving of social dimensions with its strong ecological focus.

Though we isolated three relevant articles for detailed analysis in our study, several other physical therapy-related publications featuring notions of sustainability and sustainable development have been released, in at least three different languages, before, during and since our analysis. Among these is an article titled “sustainable undergraduate education and professional competency” makes no further mention of the concept and focusses on questions around what should or should not be included in physiotherapy undergraduate curricula, thus adding to the misleading, arbitrary use of the term (Crosbie et al., 2002). Other efforts focused on education are more clearly focused on implementing the concept and concerns of sustainability in physiotherapy education, alongside themes like the SDGs, planetary health, environmental education and more, placing them broadly between weak and strong sustainability positions (Cezón Serrano et al., 2023, Maric et al., 2021, 2021; Swärdh, Brodin, Pettersson, and Palstam, 2024). Increasing publications related to active transport could also be argued to sit along this line (Chapman and Larsson, 2019; Toner, Lewis, Stanhope, and Maric, 2021).

The authors of Article B have published a follow-up article that largely advances the same model of sustainability as in the article analyzed in more detail here (Palstam et al., 2022). This thread is also picked up in two recent documents issued by World Physiotherapy European region concerned with the “Harmonisation of Sustainable Development Goals Within the Profession” and their implementation in European physical therapy education (2022a; 2022b). Aligning somewhat more with strong sustainability a range of publications foreground the implementation of “environmental sustainability” and “environmental stewardship” (APTA, 2020;

Baier, Richter, Maric, and Höppner, 2023; Ibáñez, de las Mercedes Franco Hidalgo-Chacón, Sánchez-Romero, and Cuenca-Zaldivar, 2022; Lister et al., 2022) and the better understanding of the role of the environment to human health, functioning, and therapeutic interventions (Busk et al., 2023; Maric, Griech, and Davenport, 2022; Stanhope, Maric, Rothmore, and Weinstein, 2021; Stanhope, Weinstein, and Stokes, 2023; Vibholm, Christensen, and Pallesen, 2022). In different ways, the severity and importance of foregrounding ecological calamity have been argued for by Jones as early as 2009 and more recently found its way into official statements by World Physio and the Chartered Society of Physiotherapy (CSP, 2022; Jones, 2009; World Physio, 2023).

Notable exceptions from publications matching the sustainability models represented in the articles analyzed in detail in our study include Narain and Mathye (2019) “Do physiotherapists have a role to play in the Sustainable Development Goals? A qualitative exploration.” This interview study highlights the potential role of physical therapists in addressing social and health issues like gender equality, inclusive primary education, child mortality, and maternal health. The study also touches on economic and ecological dimensions but its strong focus on social issues (in relation to health) sets it apart from other literature invoking the concept of sustainability or the SDGs (ibid.). This is worth noting considering a more generally increasing interest in social issues and their effects on health in the physical therapy literature, albeit without explicit reference to the notion of sustainability (Davenport et al., 2023; Maloney and Middleton, 2023; Nicholls et al., 2023).

Another exception includes articles representing early explorations into more recent eco-philosophies and posthumanism in relation to planetary health, sustainability, the SDGs, and physical therapy (Banerjee and Maric, 2021; Maric and Nicholls, 2021; Nicholls, 2020; Richter and Maric, 2022). While indigenous knowledge systems and decoloniality are already informing planetary health, sustainability, and sustainable development discourses for several years (Jones, Reid, and Macmillan, 2022; Prescott et al., 2018; Ratima, Martin, Castleden, and Delormier, 2019), this is not the case in the context of physical therapy. In the physical therapy literature, there are only few engagements with indigenous knowledge systems and alternative notions to societal transformation (Lurch et al., 2023; Nicholls, 2021; Smith et al., 2020), but even in those cases, they are discussed without explicit reference to sustainability or their discussion as alternative models to sustainability. Finally, most physical therapy articles

published within this broader discourse, including those featured in our analysis, are published in English, and advance largely Western perspectives on sustainability. The deliberate exploration of alternative models and the associated, longstanding critique of sustainability and their practical implications thus remains a widely open, urgent field of inquiry in physical therapy.

Conclusion

Our analysis highlights three main understandings and uses of sustainability in the current physical therapy literature, including a focus on the cost-effectiveness of healthcare interventions (potentially classifiable as economic sustainability); the use of the internationally sanctioned weak sustainability model that proposes and gives equal value to ecology, society, and economics as the three dimensions of sustainability; and the use of strong sustainability models that privilege the ecological dimension because of its fundamental importance to life and health on earth. Because of the different consequences these understandings have for the implementation of sustainability in physical therapy research, practice, and education, and the complexity of the discourse implied in and surrounding them, we argue for more deliberate engagement with sustainability to prevent its aspirations from washing out and the notion of sustainability being co-opted for contradictory purposes.

More deliberate engagement with sustainability would imply advancing highly dynamic, vernacular, strong sustainability approaches that recognize human dependence on the earth’s ecosystems while integrating the complex interconnections within nature and culture, ecology and (human) societies in a wide variety of different contexts. Doing so would also require engagement with eco-social transformation in a way that surfaces the potential, complexities, and ambivalences of sustainability and its alternatives (Engebretsen et al., 2023; Ferreira, 2017). And it would imply driving “system-wide . . . fundamental change” (UN, 2015; UNEP, 2021) in a way that would move healthcare and physical therapy away from indefinite economic growth and sustainable development as organizing principles; and with this, away from anthropocentrism, racism, colonialism, individualism, patriarchy and capitalism as central “worldviews, norms, values and governance” models (ibid.) that underpin currently dominant, unsustainable forms of human living and social organization, given the social and ecological peril they engender. Engagement with all of the latter also both indicates and exemplifies the wholesale transformation of

physical therapy that would come with the deliberate implementation of sustainability in its practice, research, and education, as a profession that has only recently begun to acknowledge the importance of the social and ecological dimensions of health.

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