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### Space perception, movement, and insight: attuning to the space of everyday life after major weight loss

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## Space perception, movement, and insight: attuning to the space of everyday life after major weight loss

### Abstract

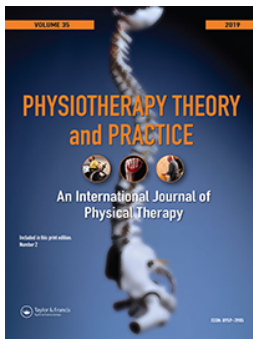
Physiotherapists are well placed to help people adjust and engage meaningfully with the world following major weight loss. Recent research indicates that the body size a patient has lived with for years can continue to affect movement and perception even after largescale weight loss. This article explores this discrepancy in depth from the perspective of phenomenology and space perception and through the concepts of body image, body schema, and affordances. It draws on an empirical example in which a nautical engineer described his lived experience of returning to work following bariatric surgery and the discrepancies he experienced while adjusting to his new situation, particularly when moving his smaller body around the ship's engine room, previously inaccessible to him. Analysis of this empirical example suggests that transitions in weight and size following bariatric surgery are both highly explicit in awareness (i.e., body image) and outside awareness (i.e., body schema). Major weight loss can open up new affordances and possibilities of being in the world, but only after adjustments in body image and body schema. The article suggests ways in which such insights can contribute to physiotherapists' clinical development and practice when working with patients undergoing major weight loss.

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PROFESSIONAL THEORETICAL ARTICLE



## Space perception, movement, and insight: attuning to the space of everyday life after major weight loss

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### ABSTRACT

Physiotherapists are well placed to help people adjust and engage meaningfully with the world following major weight loss. Recent research indicates that the body size a patient has lived with for years can continue to affect movement and perception even after largescale weight loss. This article explores this discrepancy in depth from the perspective of phenomenology and space perception and through the concepts of body image, body schema, and affordances. It draws on an empirical example in which a nautical engineer described his lived experience of returning to work following bariatric surgery and the discrepancies he experienced while adjusting to his new situation, particularly when moving his smaller body around the ship's engine room, previously inaccessible to him. Analysis of this empirical example suggests that transitions in weight and size following bariatric surgery are both highly explicit in awareness (i.e., body image) and outside awareness (i.e., body schema). Major weight loss can open up new affordances and possibilities of being in the world, but only after adjustments in body image and body schema. The article suggests ways in which such insights can contribute to physiotherapists' clinical development and practice when working with patients undergoing major weight loss.

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Body Image; Body Schema; Phenomenology; Space Perception; Major Weight Loss

## Introduction

How our body moves in everyday life does not require explicit awareness of the body or a specific language, and is not easy to access experientially or to describe (Gallagher, 2005; Øberg, Normann, and Gallagher, 2015). As a result, the relationship between body and environment may be difficult to express and explore. However, research indicates that major weight loss and a significantly changed body may stimulate a state of wonder, an openness to engage in reflective dialogues concerning the moving body and its relation to the immediate surroundings (Natvik, Gjengedal, Moltu, and Råheim, 2015; Natvik, Gjengedal, and Råheim, 2013; Warholm, Øien, and Råheim, 2014).

Empirical findings have shown that moving one's body through the space of everyday life after rapid and major weight loss can evoke a sense of ambivalence connected to the changing body. A sense of discrepancy between the large body now gone and the present slimmed-down body seems to be experienced. An example is that of the person who, after undergoing

major weight loss, encounters someone in the corridor and reacts by pressing themselves to the wall, although there is plenty of space for both to pass. What makes such a person move and act as if he is still large?

Such empirical findings and questions have inspired us to pursue a theoretical exploration of the relationship between the body and the environment following bariatric surgery. Given the complexity of this relationship and the fact that it is not fully understood, the current study draws on phenomenological concepts to attempt a better understanding of the experienced spatial meanings of the body.

Understanding spatial aspects related to a changing body is particularly relevant for physiotherapy, with its focus on the moving body as the core of health and well-being (World Confederation for Physical Therapy, 1999). Physiotherapists are in position to help people find ways to engage bodily and meaningfully in the world (Nicholls et al., 2016). In the relatively novel context of bariatric surgery and weight loss management, however, physiotherapy thus far has been mainly utilized to promote lifestyle changes (Frerichs,

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Kaltenbacher, Van De Leur, and Dean, 2012; Groven, Råheim, and Engelsrud, 2015; King and Bond, 2013; Snodgrass et al., 2014).

By exploring the perceived sense of discrepancy between the considerably changed and smaller body and the environment of everyday life, the current article seeks to stimulate fresh thinking and approaches within physiotherapy about how to support patients who have undergone major weight loss. We begin with a brief overview of the relationship between body and environment as viewed from the perspective of phenomenology, and introduce some key concepts. We move on to explore existing studies which use a variety of theoretical and methodological approaches to explore related phenomena. Specifically, we present a rich example from an in-depth interview with a participant in an empirical study: a description of lived experience from an individual who had lost large amounts of weight after bariatric surgery (Natvik, Gjengedal, Moltu, and Råheim, 2015). We then analyze and discuss this example through the phenomenological concepts of body image, body schema, and affordances (Gallagher, 2005).

### **The phenomenology of body image, body schema, and affordances**

Phenomenology describes the complex content of body image as “a system of perception, attitudes, and beliefs pertaining to one’s own body” (Gallagher, 2005). This concept of body image focuses on perceptions of, and beliefs and emotional attitudes about the body when for example we perceive our own bodies and those of others. Body image is sensitive to both culture and personhood, and the emotional aspects surrounding it seem to affect perceptions, and vice versa (Gallagher, 2005). For example, negative attitudes, prejudice, and discrimination toward bodies that differ from the norm in terms of size (weight stigma) are known to affect large persons’ health and well-being, including their body image (Puhl and Heuer, 2009).

Body schema has been defined as “a system of sensory-motor capacities that function without awareness or perceptual monitoring” (Gallagher, 2005). Body schema therefore involves the tacit, nearly implicit performances and processes involved in maintaining or changing posture, movement, and the lived body’s dynamic everyday interaction with the environment; it embraces the processes that collectively attune the body to its physical and cultural environment.

Body image and body schema, while two distinct concepts, also interact and are coordinated on the experiential level (Gallagher, 2005). One does not normally need continuous awareness of one’s body, but in

some situations perceptual body awareness does occur. For example, when a physiotherapist wants to observe my posture, I intentionally direct my own awareness to it, perhaps by trying to stand on the floor in a relaxed and natural manner. When directing attention to my body, this awareness contributes to the perceptual body image and interacts with body schematic processes, but the awareness itself is not the body schema (Gallagher, 2005). Merleau-Ponty (2012) emphasized the interconnection between habits and body schema, arguing that acquiring a habit implied a reworking and renewal of the body schema, and not merely a change of cognitive processes or product of consciousness.

Environment includes the experienced features of the surroundings we perceive, such as substances, surfaces, objects, and places (Gibson, 2015). Gibson (2015) stressed the mutuality of person and environment; an environment is an environment for someone who perceives it, and hence is different from mere physical surroundings. He created the term affordances to describe what the environment offers the acting person and the complex interplay between environment and person. He suggested that to perceive the environment is to perceive what it affords; its possibilities for action. Accordingly, affordances depend both on the: (1) skills and the bodily capacity of the person who perceives and acts; and (2) environment. Hence, perceived affordances rely on the tacit features of the body schema (Gallagher, 2005). The notions of body image, body schema, and affordances are relevant to describing the dynamic relation between person and environment, and help dissolve artificial divides between physical structures and human behaviors.

### **Person and environment, lived body and lived space**

In phenomenology, the relationship between body and environment and how this relationship plays out in everyday experience is termed lived space. Lived space refers to how we move, perceive, and engage with things and structures in everyday life and the meanings that attach to such movements, perceptions, and engagements. According to Merleau-Ponty (2012), the lived space of one’s own body is situational. As we inhabit space and time as lived bodies, situational spatiality refers to the “hold my body has on the world” (Merleau-Ponty, 2012). Our experience of space is the pre-reflective intertwining between the body and its immediate surroundings, and hence the experience of being oriented in the world (Landes, 2013). Our existence is spatial in the sense that spaces or environments can be understood in a taken-for-granted sense: As human beings, we

are always and already located somewhere, always connected to the world around us, a world that is experienced as already there (Heidegger, 2007). This means that interacting with the environment is something we do mostly without noticing. When we do notice this interaction, there is often a connection to an unexpected event that has somehow interrupted our taken-for-granted being in the world.

Space as we live it involves distances, locations of persons and things, and a seamless intertwining with actions in everyday life as we depend on, all the while trusting our bodily movements and skills. This means that while the concept of space goes beyond what is mathematically measurable it also concerns those dimensions (Heidegger, 2007, 2013). People relate to relative distances and depths, to what is in front of them, to the left of them, and so forth. They also relate to compass directions, grasping that, for instance, North remains north no matter which way one is facing (Gallagher and Zahavi, 2012).

Merleau-Ponty (2012) suggested that on classic cognitivist conceptions of space perception, the size of objects might help us to calculate the dimensions of our surroundings, such as depths, distances, and changes of place. A better starting point is to regard the body as actively and intentionally directed toward its surroundings, as something that skillfully copes with things and pragmatically “knows how” to encounter the environment. For instance, when visiting someone’s house for the first time we draw on lived experience. We embody a repertoire of familiar and directed movements and actions when entering new rooms “whose field and scope I know in advance and my surroundings as the collection of possible points for this power to be applied” (Merleau-Ponty, 2012). When walking through a door in the new house, we take it for granted that there is a floor on the other side. The body knows how to encounter the environment, and the intertwining between body and environment is just always there. In the case of a house under construction, however, there might be no floor on the other side of the door, and its absence might result in our tripping over or falling down. Here, the first sensation of the absent floor and of falling would be a bodily experience; the relationship between body and environment becomes extremely explicit. Typically, however, action does not simply unfold in space; rather, space is brought up through intentions and actions (Landes, 2013). Depending on my pragmatic interests, and my intentions, an object that is located objectively 100 m away may be far (my reading glasses) or near (the only oasis in a very large desert).

Lived space relates to embodied meaning. In situations involving illness, high body weight, or breathlessness during activity, climbing stairs no longer seems just

a matter of getting from one level to the next; rather, it involves careful planning and perhaps the search for solutions (e.g., an elevator) to avoid discomfort, pain, and sweat (Carel, 2008; Rugseth, 2011). If the illness passes, climbing stairs probably will revert to being an embodied activity of everyday life, one that does not require planning, attention, and effort.

In the context of illness or bodily changes such as major weight loss after surgery, everyday movements and bodily sensations that were typically performed or felt as a silent background for one’s existence now seem to come to the fore. Specifically, the lived experiences of altered bodies following surgically induced weight loss offer rich terrain for an exploration of the relationship between body and environment.

### **Body size, body image, and body schema after weight loss**

Scientific research on the relationship between experiences of moving one’s body and encountering the spaces of everyday life after weight loss remains thin on the ground. However, some relevant insights are offered by studies of related phenomena. Several studies suggest that a negative body image may persist after successful weight loss, with those who have lost weight continuing to experience distress and emotional vulnerability connected to body weight and appearance (Annis, Cash, and Hrabosky, 2004; Cash, Counts, and Huffine, 1990). Coining the term phantom fat to describe this phenomenon, Cash (1994) and Schwartz and Brownell (2004) likens the concern people continue to feel about their weight and their ongoing dissatisfaction with their body after major weight loss to body image experiences suffered by patients following limb amputations. Cash (1993) defines body image as primarily an attitudinal or affective concept: “one’s psychological experience of the appearance and functioning of one’s body.” That body image may be cognitive rather than physical is borne out by empirical research, which suggests that people who have been overweight are less likely to acquire a positive body image than those who have never been overweight (Schwartz and Brownell, 2004).

In a case study, Guardia et al. (2013) described issues relating to body image and body schema (without defining these concepts) in a woman who had lost 60 kg in one year during behavioral treatment for binge eating disorder. Although aware of her major weight loss, she expressed body image dissatisfaction and disturbances in situations involving particular movement tasks. During an experiment that involved her passing through a narrow passage no wider than a



door, the woman moved as if she were still large. Guardia et al. (2013) argued that this resulted from her central nervous system lagging behind in the matter of updating her body schema following weight loss; when she moved, her body schema was not attuned to her present weight situation.

Van Der Hoort and Ehrsson (2014) and Van Der Hoort, Guterstam, and Ehrsson (2011) argue that one's body size is very important for one's perception of the environment. Based on variants of "full body illusion" experiments, they have explored the relationship between perception of one's body and external space, and suggest that altering body size may imply altering perception of size and distance of objects in the environment (Van Der Hoort and Ehrsson, 2014; Van Der Hoort, Guterstam, and Ehrsson, 2011). An individual's body size and spatial experience of the environment seem to relate to one another in specific ways.

### Working in the engine room—an example of lived experience

"Carl", a specialized nautical engineer, underwent bariatric surgery and went on to lose more than 100 kg. It was only when he returned to work that he became aware of the changes he had undergone and the adjustments his altered size now made necessary. When he was interviewed as a participant in our empirical study (Natvik, Gjengedal, Moltu, and Råheim, 2015), seven years had passed since his surgery. Carl described the problems he had experienced as he had moved his altered body about in his working environment:

I work on a ship with small, narrow spaces and the engine room is very cramped, which means, "I can't get down there, I can't go through, I can't go under and I can't pass. This doesn't work, and I can't make it. I can't get down there..." I have these thoughts, and I make clever shortcuts to work my way around the problems. That's my way. I'm the boss, so I can send one of the lads in. One day one of them says "I don't know how the hell to fix this." I say to him, "Wait, I'll come and help you out." Oh! What happens here? I can just walk right in! I'm really startled! This has been my job for 30 years, and I know when I can get in to do my job and when I have to do things another way. I know what works and what doesn't. Suddenly, none of that counts anymore. What I know is now worthless to me. My access problems are gone and I need to make incredibly big adjustments to catch up with my present situation. I must reinvent my ways of doing things and start all over. I need to think very differently and set aside my old ways of doing my job. I pull myself together and try to forget all about me not getting in or passing through this or that space. This is terribly hard work. It's an enormous change and just small details of everyday life. One day, we anchor on the

Ivory Coast. I'm alone, and have plenty of time to do my job. I say to myself "OK, now I'll try this out. Today, I'll find out where I can get in." I crawl about everywhere; I try out every possible way of inspecting the machinery, thinking "Oh! Does that work? Really? What the hell!" Finally, I'm all the way down at the bottom of the boat, right next to the engine. "I have no hindrances anymore!" I am surprised, shocked, and pleased with myself.

### Analysis—connecting lived experience and theoretical concepts

This section begins with a descriptive analysis of Carl's experience as presented above. His account is then explored through the theoretical lenses of body image, body schema, and affordances.

For Carl, his large body was gone and the cramped engine room had become accessible. In his everyday activities, he experienced his new access to his immediate surroundings as a series of unused possibilities. A typical working day involved navigating an environment of restricted, narrow spaces that large bodies cannot enter. Carl's habitual movements and ways of relating to the engine room had not adapted in line with his weight loss, so that his embodied knowledge and working skills appeared as restrictions. Carl had therefore not fully experienced and made use of the flexibility connected to moving his considerably smaller body within the restricted spaces of his work environment. He had a continuing sense of not being able to enter tight spaces. However, when he started experimenting by trying to move into spaces that were once closed to him, he experienced success. When he moved, his lived body could indeed respond.

No longer able to rely on his old work habits and experience, Carl lacked central aspects of the experiential foundation for his professional practice. Profound, meaningful habits seem to have been lost along with his large body, and incongruities in his professional practice became apparent. Once Carl became aware of this, his embodied experiences underwent a new beginning. He worked to mediate and change the interplay between himself and his immediate surroundings by experimenting and playing with his new body size in tight places. He explored every new possibility, passing through every narrow opening and moving wherever he possibly could in the engine room. Through this simultaneous search of the engine room and his own body size, Carl discovered that old limits and restrictions had gone along with his weight loss. This insight added new meanings to his habitual working practice, and he became more explicitly aware of possibilities and limitations related to his body in the environment.

Carl's discovery of hindrances connected to his (now gone) large body evoked surprise, confusion, frustration, and in the end satisfaction. His explorative, active encounter with his old working environment seemed to play a vital role in enabling him to incorporate the absence of restrictions and re-situate his present body in its immediate surroundings. For Carl, moving in and through a meaningful space revealed the dynamic relationship between body and environment. As his body altered, his lived space altered, as well. Through his moving body, this meaningful interconnection became accessible in experience, and played a part in establishing his embodied self as considerably smaller.

After Carl's major weight loss, not performing certain actions and movements showed up as an irrelevant and less useful strategy at work. His habitual way of dealing with the cramped engine room suddenly underwent a shift in meaning; from being a creative and necessary solution it now appeared ineffective, unnecessary, and strange. Despite his major weight loss, he continued to encounter the engine room in old, habitual ways. Both his body image and his body schema were still framed in terms of his large body. As the large body could not get into the engine room, Carl had found ways of dealing with problems that did not involve him actually entering the room.

Both body image and body schema are actively involved in shaping our spatial perceptions. In Carl's case, these bodily aspects remained connected to his (formerly) large body, leading him to avoid even attempting to enter the engine room. However, once Carl became aware of his actual (new) body size and the fact that he had still not entered the engine room, a reconstitution of the perceptual aspect of body image was enabled. Furthermore, before this adjustment, affordances connected to this specific environment appeared as different, in the sense that Carl's skills were required in the engine room but he could not enter and do the job with his own hands; to use his competence, he had depended on his colleagues' bodies and capacities. Following the adjustment to Carl's body image, however, the engine room, although not a new environment, gained new value and meaning. New affordances started to emerge.

Carl's large body had been out of line with cultural ideals surrounding weight and also the capacity of skilled workers. His lack of awareness of the new capabilities opened up by his smaller body may be connected with the capacities and incapacities associated with his old, large body. In other words, body image may have been both a result of experiences and a starting point for experiences. Carl's habitual ways of working had developed in relation to his large body and

its shortcomings. The absence of certain habits and movements and the practice of not entering the engine room had become part of Carl's working style. Hence, he had not incorporated certain pragmatic affordances connected to the engine room into his body schema.

Body schema typically allows active integration of positions and actions that are purposeful when persons interact with the environment. It also renders unnecessary any reflexive, conscious monitoring and awareness of one's body in everyday life. However, perceptual information from and about the environment, such as its dimensions and the locations of things, is necessary to deal appropriately with that environment (Gallagher, 2005). That is, both agency, and what the person can do relate to body schema.

Carl had found ways to interact with the engine room without entering it. Highly skilled and experienced, he had put his knowledge to work through his younger colleagues. Although the engine room had never been incorporated into his practice, his work mates' bodies had in a sense become extensions of his. Lacking direct perceptual and embodied experience of the engine room, Carl functioned with a body schema expressed in terms of what he could not do. As the body schema helps us to interact with the environment in an appropriate way, body-schematic problems can interrupt intentions of movement, disturb motor control, and even create a sense of depersonalization (Gallagher, 2005).

Carl's realization that he had not entered a tight space despite now being able to do so startled him. He passed through a state of confusion before beginning his active exploration of the new affordances offered by the engine room. This active exploration seemed deeply meaningful and a way to incorporate movement in this environment into his body schema. In Gibson's words: "to perceive the world is to co-perceive oneself" (2015).

When he at last entered the engine room, Carl did so intentionally. His focus was on conscious, reflexive monitoring of himself and his body in this new encounter. It seemed necessary for him to make the movements and change of positions involved in his navigating the engine room the subject of his consciousness. He entered the room to change movements that had previously been impossible to real possibilities; to switch from actions he did not intend to do to actions he actually conducted. However, it was not primarily thoughts and feelings about the engine room and the own body that guided his positions and movements or helped him encounter this environment. Instead it was his active, intentional body. Awareness of bodily action itself did not direct his actions; rather, his



actions were guided by a certain intentional project, which was to enter and work in the engine room (Gallagher, 2005). His body awareness when first entering the engine room and starting to move about was an accessory to his pragmatic interests.

For a long time after his bariatric surgery, Carl needed to engage in the world in a different way. His sense of what his body now looked like and could do seemed to lag behind the reality of his body. This meant that when he entered the engine room he had to be attentive: he needed to focus on moving his body about in that specific environment. The sense of what we look like (including our body size), and our beliefs about, and attitudes towards, the body can be understood as long-term aspects of body image. Operating silently, they affect not only our body percept but also our movements and spatial perception of the world (Gallagher, 2005). By exploring the relation between himself and the engine room through movement, Carl discovered tacit aspects related to his body image and body schema, and sought to make adjustments. In this practical context, body image and body schema intertwined. The intertwining is also evident from a theoretical perspective: to the extent that a person becomes aware of what the body schema silently accomplishes, this awareness becomes part of the body image (Gallagher, 2005).

### Insights and concluding remarks

The empirical example tells of one individual's struggle to fully comprehend his own (changed) body size. His experience suggests that while body size may undergo a dramatic alteration following bariatric surgery, the new body may not readily adapt to the lived environment or to new affordances now available. The body size an individual has lived with for years may continue to affect their movements and perception of the world, despite the weight loss they have undergone.

Carl's experience also shows how remaining attuned to a prior body size when moving and acting, rather than attuning to the new body size, reveals discrepancies and evokes new feelings and thoughts in relation to self, body, and environment. Transitions in weight and size following bariatric surgery can be experienced with explicit awareness; as it functions in the body image, but also partially out of awareness, particularly in regard to body schema. Major weight loss can open up new affordances and fresh aspects of one's being in the world, but only after adjustments have been made to body image and body schema.

Viewed through the lens of phenomenology, Carl's efforts in the engine room emerge as a simultaneous process of incorporating new actions and movements into his body schema and of reworking his body image.

The reworking of his body image is essential for the process of updating his body schema, and vice versa. For Carl, incorporating a dramatically changed body size while handling a familiar environment demands an active, intentional, and conscious approach that eventually leads to new body-schematic habit formation.

However, it does not follow that every individual will be able to adapt immediately or even progressively to their new situation, or that their interactions with the environment will adjust automatically. Although major weight loss provides access to new environments, entering such environments requires adjustments that involve both body image and body schema. Here, a direct focus can be useful. As the example and analysis reveal, moving an altered body through the spaces of everyday life can give fresh insights into the relationship between person and the environment, and help us better understand the interplay of body image and body schema and their connection to spatial perception.

Understanding issues related to movement, body schema, body image, and the perception of space that persons may encounter in everyday life after bariatric surgery or major weight loss is important for several reasons. First, such insights are useful for those who have undergone substantial weight loss. Second, physiotherapists who by profession are uniquely positioned to initiate, support, and follow up such processes can only benefit from a richer understanding of the issues. With their expertise in rehabilitation, lifestyle changes, and movement, physiotherapists draw on human beings' capacity for development and change (World Confederation for Physical Therapy, 1999).

Changes in the dynamic relationship between body image, body schema, and perception of the environment intertwine with thoughts and emotions. In other words, largescale weight loss involves emotions and thoughts, although they are not necessarily explicit and may express themselves in various ways. Intended and major weight loss is strikingly visible, attracts attention and raises positive expectations. As a result, it is important for physiotherapists to be aware of, and sensitive to, the ambivalence that often surrounds such processes. On the basis of this knowledge, physiotherapists can confirm that emotional reactions and ambivalence are normal aspects of largescale weight loss, ones that an individual has to live through and process as part of embodying a new body size.

In other words, physiotherapy with patients following bariatric surgery needs to go beyond simply facilitating lifestyle changes. It has a key role to play in untangling the confused mass of discrepancies concerning the changing body that individuals often experience after major weight loss.

By initiating the exploration of lived body size and its connection with the immediate surroundings, physiotherapists can facilitate the process of adjustment between the “weight lost” person and their environment. In order to facilitate this process, physiotherapists need to ask open questions about the experience of massive weight loss and own body in movement, and encourage patients to explore movement across various situations and contexts. Although lifestyle advice and physical activity have an important role to play, issues with body image and body schema require a different approach. Exploring an individual’s changed situation through movement requires emphasis on their experiential dimension, including thoughts, emotions, and reflections, as well as their bodily functioning.

As health professionals engaged in a wide variety of movement systems and practices, physiotherapists possess the necessary knowledge, experience, and creativity to use and create appropriate exercises and interventions: for example, exercises orienting to awareness about an individual’s own body in movement, its physical boundaries, heaviness and lightness, strength, stability, and capacity. Theoretical insights derived from phenomenology and the cognitive sciences have much to contribute to physiotherapy’s engagement with weight management and adaptation issues following bariatric surgery or major weight loss more generally. With their awareness of the resourcefulness and development capabilities of their patients, and with their rich experience of adjusting movements and environments to different situations and bodies, physiotherapists are particularly well placed to apply new approaches, always in dialogue with patients, colleagues, and researchers. By acknowledging the persistence of embodied experience connected to a patient’s formerly large body, and by encouraging that patient to explore their new body as it moves in different situations of everyday life, physiotherapists have much to offer those getting to grips with life after major weight loss.

## Declaration of Interest

The authors declare no conflict of interest.

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