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**Moving with my Story: exploring the relationship between Narrative
Identity and the Bodily Self in Depersonalization Experiences**

Alberto Colombo

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Dissertação orientada por:

Prof. Ana P. Pinheiro

Dr. Anna Ciaunica

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The contents of this dissertation thesis reflect the perspectives, work, and interpretation of the author at the moment of thesis submission. This dissertation may have incorrections, both conceptual and methodological, that were identified after the moment of submission. Therefore, any usage of its contents should be done with caution. By submitting this thesis, the author declares that it is the result of their own work, that it contains original contributions and all sources used are explicitly recognized, cited along the text, and enlisted in the References. The author also declares this work does not include any information that is under copyright protection.

Resumo

A autoconsciência, o sentimento subjetivo de ser um “eu” encarnado, é uma característica fundamental da mente humana. A identidade narrativa, definida como o conjunto internalizado de auto-narrativas entrelaçadas que integram o passado, o presente e o futuro de alguém, tem sido considerada a principal fonte de autoformação desde a virada “linguística” na filosofia. No entanto, abordagens narrativas fortes podem ignorar a importância do corpo na determinação da autoconsciência. Ao concentrar-nos na natureza corporal das interações sociais e na relacionalidade intrínseca dos fundamentos corporais da nossa autoconsciência, a abordagem “incorporada” e “enativa” proporciona-nos a possibilidade de fundamentar os aspectos narrativos da individualidade na sua raiz corporal primária. Partindo dessa premissa, este trabalho explora a relação bidirecional existente entre a identidade narrativa e os aspectos corporais do self. A experiência corporal restringe a nossa identidade narrativa na medida em que os nossos hábitos, estruturas corporais e disposições guiam o nosso processo interpretativo narrativo. Além disso, como as narrativas autobiográficas são contadas por um corpo, através de um corpo e sobre um corpo, elas também moldam a nossa experiência corporal. Na verdade, a identidade narrativa atua como uma estrutura de conhecimento que carrega normativamente hábitos e padrões comportamentais, levando-nos a agir e apelando ao desempenho, moldando, em última análise, as nossas emoções.

A relação bidireccional entre aspectos corporais e narrativos do self adquire particular relevância no caso da despersonalização, uma condição angustiante em que os indivíduos se sentem desligados do seu corpo e do mundo. Apesar de sua alta prevalência, esta condição ainda é pouco compreendida. Em particular, a identidade narrativa e as suas características permanecem pouco estudadas na despersonalização. O objetivo deste projeto era começar a preencher esta lacuna de conhecimento. Nós nos concentramos na consciência dos indivíduos de terem histórias definidoras do “eu” (ou seja, histórias que definem a própria identidade) e no nível de coerência das próprias narrativas. Em particular, nos concentramos em três tipos de coerência: 'coerência temporal' (isto é, a capacidade percebida de ordenar cronologicamente os eventos na memória autobiográfica), 'coerência causal' (isto é, a capacidade percebida de encontrar conexões significativas entre os eventos em memória autobiográfica) e 'coerência temática' (ou seja, a capacidade de perceber temas e padrões definidores do “eu” no próprio passado). Acredita-se que estes representem tipos progressivamente mais avançados de coerência global e níveis cada vez mais sofisticados de raciocínio autobiográfico. Supôs-se que os indivíduos que experimentavam níveis mais elevados de despersonalização tinham identidades narrativas menos coerentes e uma menor consciência de terem narrativas definidoras do “eu”. Isto porque, à luz da estreita relação bidireccional entre os aspectos corporais e narrativos do self, esperava-se que a autoconsciência corporal anómala característica da despersonalização correspondesse a uma ruptura da identidade narrativa dos indivíduos.

Um segundo objectivo do projecto foi investigar os efeitos de uma modulação sensório-motora específica, envolvendo a modulação dos sons dos próprios passos, nas representações corporais, nos estados emocionais e nos sintomas de despersonalização. Um conjunto significativo de pesquisas filosóficas, neurocientíficas e psicológicas demonstrou de fato que as representações corporais são maleáveis e continuamente atualizadas por informações multissensoriais recebidas durante as interações corporais com o ambiente. Em particular, trabalhos anteriores mostraram que a modulação em tempo real dos sons produzidos pelos próprios passos durante a caminhada modifica as representações corporais e pode levar a padrões de marcha mais ativos e a estados emocionais mais positivos. Assim, quisemos testar se uma tarefa dinâmica pode aumentar o sentido de encarnação e de presença em pessoas que sofrem de despersonalização, reconectando-as aos seus corpos e recuperando

uma sensação de imersão no aqui e agora. Esperávamos encontrar diferenças entre os grupos no que diz respeito ao efeito da tarefa nos estados emocionais e na percepção corporal, destacando diferenças nos processos de integração sensório-motora. Também esperávamos que o nível de sintomas de despersonalização experimentados no momento mudasse dependendo da modulação dos sons dos passos nos participantes com níveis mais elevados de despersonalização. Para explorar ainda mais a relação entre os aspectos narrativos e corporais da autoconsciência, foi dada especial atenção à forma como a identidade narrativa influencia os efeitos observados da tarefa.

Os nossos resultados sugerem que a despersonalização está associada a uma diminuição da “coerência temporal”, que representa o nível mais baixo de raciocínio autobiográfico. A percepção do tempo é uma característica fundamental da autoconsciência, pois um senso de temporalidade, ou consciência temporal, está na raiz de nossa experiência consciente de ser um agente encarnado. Alterações na autoconsciência têm sido relacionadas a distorções na percepção do tempo. Em nosso presente estudo, encontramos uma alteração do senso diacrônico (ou seja, dependente de um senso de continuidade ao longo do tempo) do eu. Nossos resultados são complementares aos achados anteriores relatados na literatura e ajudam a caracterizar ainda mais a despersonalização. Os nossos resultados podem ser explicados por referência ao sentido de desapego das próprias memórias e das próprias experiências típico em casos de despersonalização. Possivelmente, os nossos resultados também representam uma distinção adicional entre a despersonalização e outros transtornos dissociativos. No que diz respeito à modulação sensório-motora considerada, observaram-se diferenças interessantes entre indivíduos com níveis elevados ou baixos de despersonalização. Indivíduos com níveis mais altos de despersonalização experimentaram mais emoções negativas e sentiram-se mais fracos em geral durante a tarefa. Também tiveram uma experiência menos vívida, em linha com a redução característica da sensação de presença na despersonalização. Como pode ser logicamente esperado, descobriu-se que os participantes que normalmente experimentam níveis mais elevados de despersonalização experimentam níveis mais elevados de sintomas de despersonalização durante a tarefa.

No entanto, não encontramos evidências de que a modulação sensório-motora considerada afete os sintomas de despersonalização dos indivíduos. Isto poderia ser parcialmente explicado pelo fato de que ouvir os próprios passos representa uma situação incomum que pode aumentar a atenção explícita. Isto pode dificultar, em vez de facilitar, a sensação de estar imerso no aqui e agora. Quanto à influência da identidade narrativa nos efeitos da tarefa sobre a representação corporal e a autoconsciência dos indivíduos, descobriu-se que a 'consciência' narrativa influencia a capacidade percebida de localizar os pés enquanto caminha, e que o nível de 'coerência temporal' influencia o nível de surpresa experimentado. Estes são resultados pouco claros que precisam de ser explorados para compreender os laços que ligam estas variáveis. A nossa poderia, portanto, ser considerada uma investigação preliminar e exploratória da relação entre as características estruturais da identidade narrativa e a maleabilidade do eu corporal.

As limitações deste estudo incluíram o número de participantes (N = 41), a distribuição desigual dos participantes entre os dois grupos e o espaço disponível limitado em que os participantes realizaram a tarefa. Melhorias na validade ecológica da tarefa são, portanto, necessárias e podem levar a resultados diferentes. Portanto, os resultados e análises aqui relatados devem ser considerados preliminares. Além disso, este trabalho concentrou-se em medidas explícitas de percepção corporal, estados emocionais e autoconsciência. Como a despersonalização é caracterizada por um sentimento de distanciamento do próprio eu e por uma dualidade observador-observado, poderíamos encontrar uma discrepância entre medidas explícitas e implícitas de representações corporais, estados emocionais e

autoconsciência. Medidas implícitas precisam ser incluídas para uma avaliação mais completa. Além disso, a investigação futura deverá também centrar-se noutras tarefas que tenham o potencial de aumentar o sentido de encarnação dos indivíduos na despersonalização e noutras condições caracterizadas por uma perturbação da autoconsciência. A relevância desta linha de pesquisa decorre da possibilidade de abrir caminho para potenciais novas abordagens terapêuticas sensório-motoras para pessoas que vivenciam distúrbios na percepção corporal e na autoconsciência.

Finalmente, como no nosso estudo nos centrámos nas características estruturais da identidade narrativa, a investigação futura deverá também centrar-se nos conteúdos das identidades narrativas e na flexibilidade das mesmas. Na despersonalização, o foco explícito intensificado em si mesmo e a inevitável atenção permanente aos próprios sintomas, juntamente com a sensação vivenciada de falta de sentido, podem fossilizar a identidade narrativa e restringir a possibilidade de exploração narrativa.

Palavras chave:

Identidade narrativa, Eu corporal, Despersonalização, Representações corporais, Modulação sensorial

Abstract

Self-awareness, the subjective feeling of being an embodied self or “I”, is a fundamental feature of the human mind. Narrative identity, defined as the internalized set of intertwined self-narratives integrating one’s past, present and anticipated future, has been thought to represent the main source of self-formation since the ‘linguistic’ turn in philosophy. This work explores the bidirectional relationship existing between the narrative and the bodily aspects of the self. This acquires particular relevance in the case of depersonalisation, a distressing condition in which individuals feel detached from their body and from the world. In spite of its high prevalence, this condition is still poorly understood. In particular, narrative identity and its features remain understudied in depersonalisation. The aim of this project was to start filling this knowledge gap. We focused on individuals’ awareness of having self-definitional stories (i.e., stories that define one’s identity) and on the level of coherence of one’s self-narratives. A second aim of the project was to investigate the effects of a specific sensorimotor modulation, involving the modulation of one’s own footstep sounds, onto individuals’ body representations, emotional states and depersonalisation symptoms. To further explore the relationship between narrative and bodily aspects of self-awareness, particular attention was paid to how narrative identity influences the observed effects. Our results suggest that depersonalisation is associated to a diminished ‘temporal coherence’, which represents the lowest level of autobiographical reasoning. As for the considered sensorimotor modulation, while interesting differences between individuals with high or low levels of depersonalisation were observed, we found no evidence that the considered sensorimotor modulation affects individuals’ symptoms of depersonalisation. However, this work focused on explicit measures of body perception and self-awareness. Implicit measures need to be included in order to have a more thorough assessment.

Keywords:

Narrative identity, Bodily self, Depersonalisation, Body representations, Sensory modulation.

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1. Introduction

1.1. Embodying the socially constructed narrative self

Our experience is typically characterized by a first-person perspective and by the sense that we are the subject around which experiences are centered and to which experiences are related and relevant (Gallagher, 2000; Newen, 2018; Ciaunica et al., 2021a,b). The quest for understanding what the self is has been a long-lasting endeavor as different theoretical accounts have attempted to respond to the question “who?”, distinct from the question “what?”. One way of looking at the self is to consider it a private, unchangeable, permanent entity or essence, prior to and independent of language and of the social and physical environment in which it is embedded. This is the so-called essentialist view (see Monteagudo, 2011; Rhodes, 2016). Reactions to this view came from various sources which considered the self an illusory construction crafted by either brain processes (see for example Metzinger (2009) with his “Ego Tunnel” hypothesis or “self-model theory of subjectivity”) or sociocultural ones.

Social constructivist approaches to cognition assigned to sociocultural influences the primary role in constructing the individual mind (see Markus & Kitayama, 1991; Olson, 1994; Wetherell & Maybin, 1996; Monteagudo, 2011). Instead of considering the self as the private, self-contained, independent source of experience whose constitution precedes social interactions, their sociological approach explains the self as the result of the historical, societal and cultural factors that scaffold our cognition. The self is seen as dialogical, distributed and constantly shaped and reshaped across the various daily small-scale social interactions embedded in the large-scale cultural and historical milieu. Far from being unitary and stable, the socially constructed self is a distributed, multiplicitous and paradoxically discontinuous ongoing project. For Bruner (2003), “there is no such thing as an intuitively obvious and essential self to know [...]. Rather, we constantly construct and reconstruct a self to meet the needs of the situations we encounter” (p.210).

The role of language in determining our intuitions and meanings became the predominant focus with the so called “linguistic turn” in philosophy, according to which any form of self-access, or self-knowledge, is mediated by language (see Rhodes, 2016; Monteagudo, 2011). The self becomes a product of discursive conventions and practices, thus losing its “epistemological priority” (Kerby, 1986). This post-modern and post-structuralist approach emphasizes the non-identity and difference at the origin of self-construction, thus rendering the self a “de-centered non-subject” (Rhodes, 2016; see also Freeman, 1998; Fox, 2014) whose linguistic construction can be deconstructed to reveal its emptiness.

The focus on narrative construction was a development of these paradigms. With roots in constructivism, postmodernism and literary studies, the proponents of the “narrative turn” attributed to language and, in particular, to self-narratives a primary role in the construction of both reality (Bruner, 1991) and self (Kerby, 1986; Ricoeur, 1991; Bruner, 2003; 2004; Schechtman, 2007; Monteagudo, 2011; Freeman, 1998; 2015; Cheng, 2022). The self is conceived not as a “pre-linguistic given that merely employs language, but rather as a product of language – what might be called an ‘implied subject’ of narrative utterances” (Kerby, 1986, p. 210). In a similar manner, Daniel Dennett (2014), by drawing an analogy with the theoretical abstraction of the center of gravity of an object, considered the self as a “center of narrative gravity”, as the “chief fictional character at the center” of one’s

autobiography (p.10). Ricoeur's (1991) introduction and elaboration of the notion of *narrative identity* indicates how "the narrative constructs the durable character of an individual" (p.77) and brings about the connectedness, the organization and the "unity of a life" (see also Schechman, 2007; 2012). Narrative construction is deemed necessary to grant continuity to the temporality of our experience by attributing meaning to the diversity of events (Venema, 2000).

However, considering the self merely as a linguistic and discursive production, as the grammatical subject of some utterances or as the fictional character of a story leaves out the pre-linguistic, experiential and embodied aspects of selfhood (Gallagher & Daly, 2018; Newen, 2018). Overfocusing on language-mediated self-knowing misses other embodied forms of self-knowledge (Neisser, 1988; Vervaeke et al., 2012; Vervaeke and Ferraro, 2013). The attribution of primacy to narrative sense-making might make us forget about the existence of a more primordial embodied meaning-making, grounded in the situatedness of our *being-in-the-world* (Vervaeke et al., 2012; Vervaeke and Ferraro, 2013; Andersen et al., 2022; Hovhannisyan & Vervaeke, 2022). Additionally, the self-other distinction precedes linguistic categorization and narrative construction as it begins to develop due to bodily processes (Gallagher, 2000; Farmer & Tsakiris, 2012), and possibly already in the womb (see Ciaunica, 2019; 2021a). The issue of disembodiment which affects some versions of the narrative approach is revealed by Schechtman's (2012) account of the user's avatar's identity in virtual worlds such as 'Second Life'.

By applying a narrative twist to the neo-Lockean dualist intuition of a disembodied, or disembodiable, psychological continuity - as opposed to biological continuity -, her "narrative self-constitution view" (NSCV) (Schechtman, 2007; 2012) is ultimately a disembodied one. While Locke considered personal identity as resting upon the continuity of conscious experience and memory (see Weinberg, 2011), without properly considering the embodiedness of the human organism, Schechtman focused on self-narratives and failed to recognize the primary role of the body in determining self-awareness. By focusing on the bodily nature of social interactions (Farmer & Tsakiris, 2012) and on the intrinsic relationality of the bodily foundations of our sense of self (Ciaunica & Crucianelli, 2019; Ciaunica, 2020; Ciaunica et al., 2021a,b; Asma, 2021), the embodied and enactivist approach affords us the possibility to overcome the narrowness of cerebrocentrism (Fuchs, 2020; Ciaunica et al., 2023; Northoff & Smith, 2023) and to ground the narrative aspects of selfhood onto its primary bodily root, while keeping some precious insights offered by constructivist perspectives.

1.2 The enactivist approach and the 'bodily self'

Opposing previous computational and functionalist accounts of human cognition (see Fodor, 1975; Putnam, 1980; 1999; Rescorla, 2015) and in allegiance to both the life sciences and the phenomenological tradition, the enactivist approach, the so-called third-wave cognitive science, rejects the cognitivist metaphor that equates the mind to a computer. Indeed, enactivism consists in a non-reductionist and comprehensive approach according to which "cognition is not a skull-bound process of symbol manipulation in relation to a pre-given world but rather a procedural and participatory act through which all meaningful worlds are brought forth" (Hovhannisyan & Vervaeke, 2022, p.342). This embodied turn in cognitive science sees cognition as performative and geared towards bodily regulation and ultimately self-preservation (Clark, 2013; Seth & Tsakiris, 2018; Wiese & Friston, 2021; Ciaunica et al., 2021b).

Under the influence of ecological psychology (see Gibson, 1977; Dings, 2019; 2021), organisms –and hence selves – are seen as autopoietical systems coupled to the environment in which they are embedded, in constant exchange with and adaptation to their niches (Fuchs, 2020; Hovhannisyann & Vervaeke, 2022; Northoff & Smith, 2023). Therefore, mind is not conceived as a representational system with “ideational content accessible to reflection” (Asma, 2021, p.2), but as primarily based upon motor-sensory-conative loops constituting a non-reflective “imperative” mode, which precedes abstract conceptualization. Accordingly, the tight structural and functional coupling between action and perception is emphasized (Legrand, 2006). The role of the situated body in determining self-awareness is thus highlighted. As Gallagher and Daly (2018) put it, “selves are more ‘in-the-world’ than ‘in-the-brain’, and they are in-the-world as-subject more so than as-object” (p.3).

Since talks about the self typically start from the experiential sense of being a subject, it’s important to understand the connection between bodily consciousness – i.e., conscious experience of the body - and self-awareness. By considering James’ dichotomy between “I”, i.e., the subject of experience, and “me”, i.e. the self experienced as intentional object (James, 1890, as cited by Legrand, 2006; see also Ciaunica et al., 2021c), Dorothee Legrand (2006) showed how our experience of our body does not merely correspond to an intentional perception of the body as object. As we are having an experience of an intentional object, including of our own body, our body is also and always the subject of the experience. Therefore, our body is not only experienced (object), but is also experiencing (subject). This dichotomy between “body-as-subject” and “body-as-object” is what Fuchs called the “body-body” problem (Fuchs, 2020). By carrying the same properties of the “I-as-subject” (Wittgenstein, 1958, as cited by Legrand, 2006) – i.e., indexicality and logical immunity to error through misidentification – the bodily experiencing or *experiencer* precedes identification and explicit objective descriptions or representations. The body is thus intrinsically constitutive of the self. In Legrand’s words, “(part of) the body is (part of) the self” (Legrand, 2006, p.103) and “the self at the bodily level is the body itself” (p. 108).

Now, the bodily experiencing is tacitly and “transparently” – i.e., not intentionally accessed – present in our typical experience, forming its background and constituting what has been called our “pre-reflective” sense of self (Ciaunica, 2021c). This form of self-awareness, or self-access, is not an explicit form of self-reference and is not attained through introspection, defined as explicit “inward attention” (Metzinger, 2003, p.366). It constitutes a direct, somatic and non-dual form of self-knowing, as opposed to explicit forms of self-knowledge, such as conceptual and propositional knowing (Neisser, 1988; Neisser & Fivush, 1994; Longo et al., 2008; Hidaka et al, 2021).

Ciaunica and colleagues (2021b) stressed the importance of the coupling between interoception and exteroception and the primacy of the “proximal senses” in constituting the “invisible roots of our sense of self and sense of presence in the world” (p.3). Taking a developmental perspective, “proximal sensory inputs”, including interoceptive, proprioceptive, tactile and olfactory inputs, are responsible for scaffolding a “transparent experiential background” (Ciaunica et al., 2021b, p.3). According to Damasio (2010), this experiential background is constituted by the “primordial feelings”, the bodily existential feelings of being alive in the world which give birth to a “protoself”. The minimal bodily self is thus grounded in the integration of multimodal and intrinsically affective sensorimotor processes (White, 2015; Tsakiris, 2017) and is more akin to a flexible and dynamical process rather than to a fixed entity (Pickering, 2013; Newen, 2018).

These bodily processes afford us a sense of embodiment, that is, the sense of being a situated bodily agent (Longo et al., 2008; Hidaka et al., 2021). Sense of embodiment is thought to have three

components: sense of body-ownership, sense of agency and sense of self-location (Longo et al., 2008; Hidaka et al., 2021). The sense of body-ownership refers to the sense that it is one's own body –or self – which is undergoing a certain experience (Gallagher, 2000). Sense of agency is instead “the feeling that I am in control of my own bodily actions, that I can leverage them to access and change the external world” (Ciaunica et al., 2022a, p.2), or the “sense that I am the one who is causing or generating an action” (Gallagher, 2000, p. 15). The multimodal sensorimotor integration responsible for our sense of embodiment also affords us a “sense of presence, i.e., the feeling that I am immersed and in direct touch with a real world here and now” (Ciaunica et al., 2021b, p.2). These bodily processes and experiences represent the basis upon which the narrative and conceptual aspects of the self are founded.

1.3 Narrative Identity

The concept of narrative identity refers to one's overarching and internalized self-narrative, constructed by connecting and integrating past, present and future through processes of mnemonic selection and interpretation (Ricoeur, 1991; Bruner, 1994; 2004; Schechtman, 2007; McAdams, 1995; 2008; McAdams & McLean, 2013; Dambrun, 2016; McAdams, 2018). One's narrative identity is not independent as individual self-narratives are molded by pre-existing cultural “master narratives” and are interknitted with the stories of the other social agents (Gergen & Gergen, 1988; Crowley, 2000; Bruner, 2004; Singer, 2004; Papacharissi, 2012; Bouizegarene et al., 2020; Cheng, 2022). Accordingly, Kate McLean (2016) described the self as “co-authored” since narrative identity is not the result of solo authorship: we disclose our stories to others who act as listeners and give us feedback, thus influencing our narrative constructions.

Starting from the premise, shared by post-structuralist accounts (see Fox (2014) and Olssen (2003) for a definition and characterization of post-structuralism) and by social role theory (see Freeman, 1998; Farmer & Tsakiris, 2012), that “structurally speaking, the self is not one, but many” (Dunlop, 2017, p.154), Dunlop proposes a model, the Narrative Identity Structure Model (NISM), in which these multiple selves are hierarchically organized. The multiple selves, circumscribed to certain social contexts, correspond to different micro-narratives called “contextualized life-stories” (Dunlop, 2017). Similarly to the Multiple Self-aspects Framework according to which the different aspects of one's self-concept influence each other through “affective spillover” (Collyer et al., 2018), the various micro-narratives are entrenched and overlapping. Dunlop proposes an integrative hierarchical model that unifies the different context-dependant self-narratives in a multi-leveled hierarchy in which micro-narratives are nested within macro-narratives. The top of the hierarchy would correspond to the “generalized life story”, allowing for cross-contextual continuity (Dunlop, 2017). The generalized life-story could be considered as the one and grand unifying self-story that, according to Crites (1971), each of us possesses. Ultimately, the self appears as multiplicitous, or multifaceted, and contextualized, but also as unitary.

With roots in early infant-caregiver dialogical interactions (Neisser & Fivush, 1994; Farmer & Tsakiris, 2012; McAdams & McLean, 2013; see also the work done by McGowan & Delafield-Butt (2022) and by Philippe Rochat (2003) on early infant-caregiver interactions and on the development of self-awareness at early stages), one's narrative identity begins to grow richer during adolescence, to be then dynamically updated across one's lifespan, in search for cross-contextual integration and unity (McAdams, 1995; 2008; McLean, 2008). There are individual differences in the level of integration of multiple contextualized self-narratives and in the level of cohesion of one's autobiographical memory,

as measured by the level of coherence of one's narrative identity. Importantly, higher levels of coherence have been correlated to higher levels of wellbeing and meaning in life and to a higher ability to cope with traumatic events (Bauer et al., 2008; Adler et al., 2016; Hallford & Mellor, 2017; Vanden Poel & Hermans, 2019; Dirghangi & Wong, 2022; Janowicz et al., 2022). Therefore, even if the idea of a unitary self is a sociocultural construction and in spite of Strawson's (2004) rejection of the "ethical narrativity thesis" – i.e., the idea that we ought to live through self-narratives – there is evidence to at least defend the normative hypothesis that it is good to aim for narrative coherence.

1.3.1 The intertwining of bodily self-awareness and narrative identity

According to the traditional narrative view, the unification of the self is operated through narrative self-construction and narrative sense-making. However, a deeper form of meaning-making and integration depends upon bodily functioning and upon our embodied situatedness in the world (see section 1.1 and 1.2). Narrative construction can be seen as a first step of explicit pattern representation and abstraction crafted from "self-definitional experiences", the building blocks of one's self-narratives (Dunlop, 2017). Therefore, bodily experience constrains self-narratives as the latter are told by a body, through a body and about a body (Heavey, 2015). Storytelling is indeed founded upon the lived bodily experience of the narrator as our habits, embodied structures and dispositions guide our narrative interpretive process. Narrative construction is therefore grounded in what Vervaeke called "perspectival", "participatory" and "procedural" forms of knowing and in the ecological process of "realizing [bodily] relevance" (Vervaeke et al., 2012; Vervaeke & Ferraro, 2013; Andersen et al., 2022). Dings (2019) defined as "narrative background" the corpus of narrative connections which meaningfully relate ourselves to objects, people and events in our life. Inhering concepts from ecological psychology, he explains how our narrative background is derived from our "affordance landscape", the experiential and enactive relational arena in which our cognition is embedded. Finally, Gallagher's Pattern Theory of the self explains how the self is a dynamic pattern composed of multiple components, whose interrelations are mirrored and reiterated in the narrative component (Gallagher, 2013; Gallagher & Daly, 2018).

While narrative identity is derived from experience, it also shapes experience in return. Indeed, self-narratives act as a knowledge structure that normatively carries habits and behavioral patterns, prompting us to act and calling for performance, ultimately shaping our emotions (Gergen & Gergen, 2006; Asma, 2021; Cheng, 2022). As guiding scripts, they infuse our lives with a relevance-based future direction and, by making one's body meaningful in our stories, they operate what Heavey (2015) called "narrative body construction". By changing our narrative background, explicit narrative deliberation guides self-engineering and modifies the meaningful connections between ourselves and the elements of our affordance landscape, especially when our behaviors are not adaptive anymore (Dings, 2019). For such reasons, narratives can be considered as psycho-technologies that help us realize meaning, in both senses of the term "realize". For Crites (1971), "the stories people hear and tell [...] shape in the most profound way the inner story of experience" (p.304). Another example of the effect of stories on experience is James Hillman's *Healing fiction* (1983). According to the post-Jungian analytical psychologist, the healing effects brought about by different psychoanalytic frameworks depend upon the structural coherence of their narratives. This effect of narratives is also explained in similar ways by Daniel Hutto's "Narrative Practice Hypothesis" (Hutto, 2008; Gallagher & Hutto, 2019) and by Ricoeur's (1991) notion of "refiguration" through narratives.

The consequence of this bidirectional relation is that narratives are not just explicitly and overtly produced when asked (task-dependent narrative production) and do not merely belong to a reflexive and propositional mode of knowing. On the contrary, we implicitly – and, in a way, transparently – carry and embody them as we behave. As the title of this thesis indicates, we “move with our stories”. This acquires even more relevance when considering the case of depersonalization, a distressing condition in which the sense of self is disrupted.

1.4 Depersonalisation

As we have seen in the previous sections, our typical daily experiences “seem to be tacitly accompanied by a sense of self – a sense of being an embodied agent within a world, among but distinct from others” (Ciaunica, 2022a, p.1). Depersonalisation/Derealisation Disorder (DPD) is a chronic psychopathological condition in which individuals experience a sense of detachment from one’s self and body (depersonalisation) and feel disconnected from a world that seems unreal (derealisation) (Sierra & Berrios, 1997; Sierra & David, 2011; Knappik, 2022). It has been classified as a dissociative disorder, even though the clinical and cognitive profile differs from the other dissociative disorders (Guralnik et al., 2007). Overall, the symptomatology is highly variable and complex, with symptoms occurring in various combinations (Knappik, 2022). Nonetheless, detachment from self has been considered the core symptom (Sierra & David, 2011; Knappik, 2022).

Recent epidemiological surveys suggest that transient episodes of depersonalisation are common among the general population, with an estimated lifetime prevalence of 26-74% (Hunter et al. 2004; Yang et al., 2023). Experiences of depersonalization are the third most common psychological symptom reported in the general population (after anxiety and low mood) and can be triggered by high stress, severe depression, traumatic life events or drug use (Simeon et al., 2003; Simeon & Abugel, 2006). These experiences, if transitory, might constitute an adaptive coping mechanism in the face of intense stress and physical exhaustion, but if they persist and develop into a chronic condition, it might indicate the insurgence of the clinical Depersonalisation/Derealisation Disorder (Ciaunica et al., 2021c). The prevalence of the disorder in the general population has been found to be up to 1.9 %, with higher rates for young adults and adolescents (Yang et al., 2023). Prevalence rates increase when considering populations with other disorders such as other dissociative disorders, anxiety, schizophrenia, borderline personality disorder, depression, or in population with history of interpersonal abuse (Yang et al., 2023). Remarkably, despite its high prevalence and the significant distress it triggers, its underlying mechanisms are still poorly understood and the diagnostic iter is still inefficient, partially due to the co-presence and overlap with other psychological conditions (Simeon and Abugel, 2006; Guralnik et al., 2007).

The different symptoms of depersonalization have been grouped by Sierra et al., (2005) along four dimensions: (1) ‘Anomalous Body Experience’, (2) ‘Emotional Numbing’, (3) ‘Anomalous Subjective Recall’ and (4) ‘Alienation from Surroundings’. The anomalous body experience presents four prominent and related components: (1) lack of body ownership, (2) feelings of loss of agency, (3) disembodiment feelings, and (4) somatosensory distortions (Sierra, 2009). Altered physiological and autonomic responses and abnormal processing of interoceptive information have been observed in patients with depersonalisation (Sedeno et al., 2014; Owens et al., 2015; Medford et al., 2016; Ciaunica et al., 2021c). Ferroni and colleagues (2023) have also found alterations in time perception, with higher levels of depersonalization corresponding to a lower capacity to locate events in time in relation to the present moment.

According to Gerrans (2019), the disruption of the constant flow of affective feelings, which typically pervades our cognition and marks the relevance for the subject, lies at the root of the complex symptomatology of depersonalisation. Ciaunica and colleagues (2021c; 2022a) describe the condition as deriving from the disruption of the transparency of one's pre-reflective sense of self and presence. As a result, individuals feel alienated from a reality that seems "flat" and "lifeless", as if there was a "veil" separating them from the world (Sierra & Berrios, 2000; Simeon & Abugel, 2006). They feel unreal themselves, as if they were "trapped inside their heads" and experiencing from the third-person perspective (Simeon & Abugel, 2006; Ciaunica et al., 2021b,c; 2022a; Knappik, 2022). The sense of givenness and naïve realism about both self and reality is lost and individuals' sense of agency is diminished, as the actions they perform feel mechanical and robotic (Simeon & Abugel 2006).

1.4.1 Depersonalization and Narrative Identity

Due to the tight bidirectional relationship between bodily and narrative aspects of the self, the anomalous bodily self-awareness characteristic of depersonalisation is expected to correspond to changes in individuals' narrative identity. According to Gallagher's "pattern theory of self" (Gallagher, 2013; Gallagher & Daly, 2018; Newen, 2018), the different components of the self are dynamically intertwined and modifications of one aspect (e.g. the "experiential", the "affective", the "intersubjective" or the "situated" aspect) tend to spill over to the other aspects (e.g. the "narrative" aspect). Narrative identity in depersonalisation is hence thought to mirror the self-detachment and the alterations that characterize the bodily aspects of the self.

This idea is strengthened by evidence indicating alterations of time perception in terms of perceived duration and flowing in depersonalisation (Ferroni et al., 2023) and by individuals reporting a sense of detachment from their own memories, thoughts and future plans and a lack of "plot" in their life (Ciaunica & Charlton, 2018; Ciaunica et al., 2021b). As a clear example: "Now I experience depersonalisation more of a lack of narrative; moments seem to melt away as soon as they have passed and life appears to pass as a series of unrelated frames. (...) You may be able to function, but creating a credible narrative for your life would be challenging" (Ciaunica et al., 2021b, p.9). And also: "I'm conscious, even as I write this, that I must have a functioning inner life; one which is capable of articulating this experience. But the capacity to knit it into any kind of meaningful narrative that I occupy and own is missing" (Ciaunica et al., 2021c, p.9).

Depersonalisation has been associated to impairments in visual and verbal short-term memory, due to deficits in early perceptual and attentional processes preventing the efficient encoding of new information (Guralnik et al., 2007). However, the ways in which depersonalisation affects autobiographical memory, especially in relation to the formation of self-narratives, are still understudied. Further reasons motivate their investigation. First of all, emotions act as a compass that guides not only our behaviors, but also the creation of our self-narratives (see Bluck & Habermas, 2000). Disruptions of affectivity drastically reduce the meaningfulness of one's actions and one's life in general. As a consequence, narrative formation, without the essential vivifying spirit carried by emotions and affective identifications, is likely to suffer consequences. Indeed, our sense of self and emotional states influence autobiographical memory recall (Bruner, 1994; Neimeyer & Metzler, 1994), which is in turn a fundamental process for the formation of self-narratives.

Furthermore, as social interactions and their meaningfulness are disrupted in depersonalisation and as narrative identity is dialogical and co-authored (Gergen & Gergen, 1988; McLean, 2016), the intrinsic relational character of one's narratives might be severely impacted. Self-narratives of different social agents are co-dependent and affected by one's sense of belonging to the embedding culture. The sense of detachment from the world experienced in depersonalisation negatively weights over such sense of belonging. Ultimately, chronic experiences of depersonalisation seem to empty one's affordance landscape of its relevance and, as our narrative background is the narrative side of our affordance landscape (see Dings, 2019), our narrative identity is unlikely to remain untouched. As affordances in the present are intertwined and nested in systems of diachronic concerns stretching far into both the past and the future with varying temporal extensions (see Dings 2021 and his expanded notion of "meaningful affordances"), then the meaninglessness of one's present affordance landscape is thought to corrode the whole web of one's narrative identity.

1.5 The study: investigating the relationship between narrative identity and depersonalisation

As the relationship between experiences of self-detachment in depersonalisation and narrative identity is understudied, the first aim of this research project was to investigate such relationship, with a particular focus on individuals' perception of having self-definitional narratives and on the coherence of their narrative identities. Individuals experiencing higher levels of depersonalisation were hypothesized to have less coherent narrative identities and a lower awareness of having self-definitional narratives.

A second aim of the study was to test the effects of a specific type of sensorimotor modulation onto body perception, emotional states and sense of self, comparing individuals with high and low levels of depersonalisation. A significant body of philosophical, neuroscientific and psychological research has indeed demonstrated that body-representations are malleable and continuously updated by multisensory information received during bodily interactions with the environment (Legrand, 2006; Tsakiris, 2017; Tajadura-Jiménez et al., 2015; 2017a). In particular, previous work showed that real-time modulation of the sounds produced by one's own footsteps while walking modifies body-representations and may lead to more active gait patterns and more positive emotional states (Tajadura-Jiménez et al., 2015; 2017b). Accordingly, we wanted to test whether such a dynamic embodiment-enhancing task may increase the sense of self and sense of presence in people experiencing depersonalisation, by reconnecting them to their bodies and by recovering a sense of immersiveness in the here and now. To this end, we used the well-validated 'Magic Shoes' paradigm (see section 2 below), adopted from Tajadura-Jiménez et al. (2015), in order to modulate the participants' footstep sounds and influence their body-representations and emotional states. We expected to find differences between the groups with regards to the effect of the task on emotional states and body perception, highlighting differences in processes of sensorimotor integration. We also expected the level of depersonalisation symptoms experienced in the moment to change depending on the modulation of the footsteps sounds in participants with higher levels of depersonalisation.

Particular attention was paid to whether one's narrative identity influences the effects of the task onto participants' sense of self and body perception. In light of the theorized connection between narrative identity and the bodily aspects of self-awareness, one's narrative identity is thought to influence bodily experience. A clear understanding of the extent to which one's narrative identity can influence somatosensory processes is still lacking as previous studies are scarce and focused on conceptual aspects of the self (Krol et al., 2020). This project aimed at contributing to the formation of the

missing knowledge. Our research also aimed at paving the way towards potential new therapeutic sensorimotor approaches for people experiencing disturbances in body-perception and self-awareness.

2. Materials and Methods

2.1 Participants

314 participants were recruited via the University of Lisbon mailing channels, social media, and flyers distributed in the university campuses. Initial prescreening for depersonalisation was conducted via an online survey (at the online platform “Qualtrics”) using the Cambridge Depersonalization Scale (CDS-29) (Sierra & Berrios, 2000). CDS-29 is one of the most frequently used diagnostic tools for DPD (Yang et al., 2023). It consists in a 29-item questionnaire that assesses the level of experiences of depersonalization in a period covering the last six months. Each item is rated on two independent Likert scales, one for frequency (range: 0-6) and one for duration (range: 1-4). The total score (ranging from 0 to 290) is obtained by summing the scores of all the items. Four subscales have been described: ‘Emotional Numbing’, ‘Anomalous Body Experience’, ‘Anomalous Subjective Recall’ and ‘Alienation from Surroundings’ (Sierra et al., 2005).

Participants were also asked to complete the “Awareness” subscale of the Awareness of Narrative Identity Questionnaire (ANIQ) (see section 2.3,d). Four additional screening questions taken from Adler and colleagues (2016) were added to the online survey and used as exclusion criteria: (1) ‘Do you have nightmares more than four times/ week?’; (2) ‘Are you taking antidepressants or antipsychotics?’; (3) ‘Are you suffering from seizure disorder?’; (4) ‘Do you see colors when listening to music?’. Other inclusion criteria included: (a) aged between 18 to 45 years old; and (b) without a history of neurological illness. The respondents who didn’t meet the inclusion criteria were excluded and the screened sample amounted to a final pool of 189 participants (Mean age=24.19; SD=5.52; Gender: 120 female, 67 male; 2 participant preferred not to disclose their gender). This online prescreening consisted in the first phase of the study. A correlation analysis was performed (see section 3.1) to investigate the relationship between individuals’ self-reported symptoms of depersonalisation in the previous six months (as measured by the CDS-29) and their awareness of having a narrative identity (as measured by the “Awareness” subscale of the ANIQ).

Following online pre-screening, 41 participants (29 females, 12 males; Mean age=23.8 years, SD=4.21) took part in the second phase of the study, involving an in-person experiment. Participants were divided in two groups depending on their CDS-29 scores: i) the ‘High DP’ group (CDS-29 scores \geq 50) (N=26); and (ii) the ‘Low DP’ group (CDS-29 scores \leq 20) (N=15). The use of these cut-off points is inherited from a well validated procedure developed by Kanayama et al. (2009) which ensures a meaningful distinction between the two groups (see also Ferroni et al., 2023). All participants gave their informed consent prior to the study and were fully debriefed after the study. The study has been approved by the Ethical Committee of the Centro Académico de Medicina de Lisboa (CAML), under the reference number Refa. No 87/22.

2.2 Design and Experimental Procedure

The in-person phase consisted in one experimental session in which participants performed the “Magic Shoes Walking Task” (MSWT), repeated three times (three trials). Each trial corresponded to a different sound condition (see section 2.2.1). After each trial (3 times in total), participants completed the body-visualization task (see section 2.2.2) and three questionnaires: (1) the “bodily feeling questionnaire”; (2) a version of the “Self-Assessment Manikin” (SAM) adapted from Bradley & Lang (1994; see Tajadura-Himénez et al., 2015); and (3) the Cambridge Depersonalization Scale - State version (CDS-S) (see section 2.3). Additionally, at the end of the whole session, participants also completed the full Awareness of Narrative Identity Questionnaire, in order to have a complete assessment of their narrative identity (see section 2.3,d). The session lasted approximately 1 hour in total (see figure 2.1).

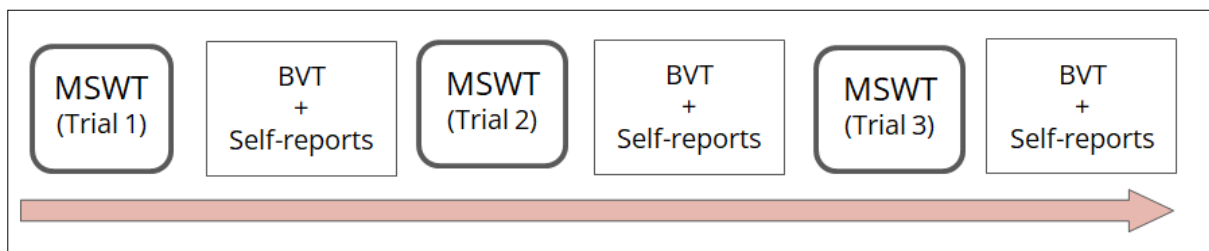


Figure 2.1: representation of the procedure (BVT stands for ‘Body Visualization Task’ and MSWT stands for ‘Magic Shoes Walking Task’). The pink arrow indicates the passing of time.

2.2.1 The Magic Shoes Walking Task (MSWT)

Participants are fitted with the ‘Magic Shoes’, a shoe-based sound device which dynamically modifies footstep sounds and provides auditory feedback originated from the participants’ footsteps as they walk (see Tajadura-Jiménez et al., 2015). The system is comprised of a pair of strap sandals, two microphones attached to the sandals that capture the walking sounds, an M-sound M-track duo pre-amplifier and a stereo 9-band graphic equalizer that amplifies the sounds and changes the sound spectra (see figure 2.2). Participants complete three 1-minute walking trials wearing the ‘Magic Shoes’ sound device. Online auditory feedback of the modulated footstep sounds is delivered through headphones. The three trials correspond to three different sound-feedback conditions (see Tajadura-Himénez et al., 2015): (1) ‘Control’ condition in which footsteps sounds are equally amplified across frequency bands; (2) ‘High frequency’ condition in which the frequency components of the footsteps sounds in the range 1–4 kHz were further amplified by 12 dB and those in the range 63–250 Hz were attenuated by 12 dB; and (3) ‘Low frequency’ condition in which the frequency components in the range 63–250 Hz were further amplified by 12 dB and those above 1 kHz were attenuated by 12 dB. Differently from Tajadura-Jiménez et al. (2015), participants walked on the spot, on a wooden platform, due to the limited available space. After each of the three walking trials participants completed the Body-Visualization task (see section 2.2.2) and the self-report measures (see section 2.3).



Figure 2.2: ‘Magic Shoes’ sound device, comprised of a pair of strap sandals, two microphones attached to the sandals, an M-track duo amplifier and a stereo 9-band graphic equalizer that amplifies the sounds and changes the sound spectra.

2.2.2 The Body-Visualization Task (BVT)

After each walking trial, participants visually reported their perceived body size through a computer-based program (bodyvisualizer.com) which represents an avatar (a virtual body) on the screen (see Figure 2.3). They were instructed to modify the shape of the avatar so as to represent, as much as possible, how they perceived themselves. The participants could modify the avatar only along the “weight” dimension, whereas the height of the avatar was fixed and its value was equal to the actual height of the participants. To avoid an anchoring effect of the initial avatar appearance, its initial weight was set at either +25% or -25% relative to each participant’s actual weight. These two initial weight conditions were fully randomized across participants and across measurements. The result of each visual report is represented by a number corresponding to the ‘weight’ of the avatar. This value is used as dependent variable in the analysis of variance (ANOVA) computed to assess the effect of the MSWT on participants’ body-size perception.

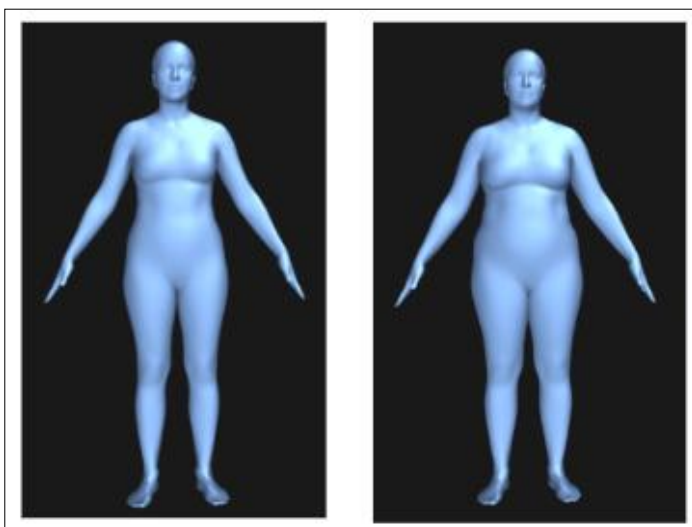


Figure 2.3: Body-Visualization Task. (Tajadura-Jiménez et al., 2015) Participants can increase or decrease the ‘weight’ of the avatar by pressing two different keys on the keyboard.

2.3 Self-report measures

a) Bodily Feelings questionnaire

It is a 7-point Likert scale adopted from Tajadura-Jiménez et al. (2015) that enquires about felt strength, weight, speed and straightness. It also includes four items about the felt vividness of one's body (reverse item), the level of agency experienced while participants walk, the perceived ability to locate oneself in space (self-location) and the level of surprise with regards to how one's body felt during the MSWT. Following Tajadura-Jiménez et al. (2015), the scores on each item were analysed individually.

b) The adapted version of the "Self-Assessment Manikin" (SAM)

Adapted from Bradley & Lang (1994; see Tajadura-Himénez et al., 2015), it consists in a 9-point Likert scale that enquires about emotional states. In particular, it assesses the level of happiness (valence), arousal and dominance. It uses a graphic character representing emotional states and this is thought to facilitate reports and cross-cultural comparisons (Morris, 1995).

c) The Cambridge Depersonalization Scale - State version (CDS-S)

It is an adaptation of the original Cambridge Depersonalization Scale (Sierra & Berrios, 2000; Baker et al., 2007). It contains 22 items assessing the level of depersonalization in the present moment. Participants rate the severity of the experience on a visual analogue scale. Scores range from 0% to 100% for each item and the final score results from the calculation of the overall percentage mean. The scale displayed good internal consistency (see also Millman et al., 2022).

d) The Awareness of Narrative Identity Questionnaire (ANIQ)

ANIQ is a valid and reliable tool developed by Hallford & Mellor (2017) to assess individuals' awareness of having a narrative identity and their perception of its coherence (see also Dunlop, 2021a; Sevim & Otrar, 2021; Dierdorff et al., 2023). It is a 11-point Likert scale constituted by 20 items subdivided into 4 subscales (5 items each): 'Awareness', 'Temporal Coherence', 'Causal Coherence' and 'Thematic Coherence'. The 'Awareness' subscale inquires about the explicit perception of having self-definitional stories and how aware individuals are of drawing on these stories to figure out their identity. Temporal coherence is the ability to perceive the order of the events in one's past. Causal coherence is the ability to perceive meaningful connections between events. Thematic coherence represents the ability to perceive the presence of unifying self-definitional themes in one's autobiographical memories. The score for each item ranges from 0 to 10 and the score for each subscale thus ranges from 0 to 50. The total score of the ANIQ is calculated by summing the scores of the four subscales (range: 0-200).

3. Data analysis and results

3.1 Results phase 1: correlation analysis between CDS-29 and ANIQ (“Awareness” subscale)

The linear relationship between the CDS-29 and ANIQ was tested through a correlation analysis. The datasets included 189 data points. As both datasets were not normally distributed (normality tested with the Shapiro-Wilk test), the correlation analysis was conducted using the non-parametric Spearman’s rank test. A negative correlation was hypothesized (one tailed test) as higher levels of depersonalisation were expected to correspond to a lower awareness of one’s narrative identity. Results indicate no significant correlation between the level of experiences of depersonalization (as measured by CDS-29) and the level of awareness of narrative identity (as measured by the ‘Awareness’ subscale of the ANIQ), $r_s(187) = -0.044, p = .275$. The correlation analysis was computed also on the subscales of the CDS-29 to see whether there exists a linear relationship between the ‘Awareness’ subscale of the ANIQ and the different subcategories of symptoms of depersonalisation. No significant correlation was found (see Table 3.1 below).

Table 3.1. Correlation analysis involving the ‘Awareness’ subscale of the ANIQ and the 4 subscales of the CDS-29.

Correlation Matrix		Awareness	Emotional numbing	Anomalous Subjective Recall	Anomalous Body Exp
Awareness	Spearman’s rho	—			
	df	—			
	p-value	—			
Emotional numbing	Spearman’s rho	-0.067	—		
	df	187	—		
	p-value	0.181	—		
Anomalous Subjective Recall	Spearman’s rho	-0.094	0.539	—	
	df	187	187	—	
	p-value	0.098	1.000	—	
Anomalous Body Exp	Spearman’s rho	-0.046	0.606	0.635	—
	df	187	187	187	—
	p-value	0.267	1.000	1.000	—
Alienation	Spearman’s rho	-0.012	0.676	0.615	0.732
	df	187	187	187	187
	p-value	0.432	1.000	1.000	1.000

3.2 Results phase 2 (in-person)

3.2.1 Awareness of Narrative Identity Questionnaire (comparison between groups)

An initial t-test was computed to test whether there is a difference in the level of awareness and coherence of narrative identity (as measured by the ANIQ) between the two groups (‘High DP’ vs ‘Low DP’). The ‘Low DP’ group was hypothesized to have higher scores than the ‘High DP’ group. A significant difference was found ($p = 0.012$), with higher scores for the ‘Low DP’ group. As the ANIQ is comprised of 4 correlated subscales, a one-way Multivariate Analysis of Variance (MANOVA) was conducted to test whether there is a difference between the ‘High DP’ and the ‘Low DP’ group on the four subscales considered together. See table 3.2 for descriptives. Multivariate tests revealed no significant difference in the 4 subscales of the ANIQ between the two groups, $F(df=4) = 1.79, p = 0.152$; Wilk’s lambda = 0.834). Univariate tests (see table 3.3) revealed no significant effect of DP group on the ‘Awareness’ subscale ($F(df=1) = 0.888, p = 0.352$), on the ‘Causal coherence’ subscale

($F(df=1) = 3.056, p = 0.088$) and on the ‘Thematic coherence’ subscale ($F(df=1) = 1.189, p = 0.282$). However, a significant effect was found for the “Temporal coherence” subscale ($F(df=1) = 7.122, p = 0.011$), with higher scores for the ‘Low DP’ group.

Table 3.2. Descriptives of the scores on the four subscales of the ANIQ (‘Awareness’, ‘Temporal coherence’, ‘Causal coherence’, ‘Thematic coherence’).

	group	awareness	temporal	causal	thematic
N	Low	15	15	15	15
	High	26	26	26	26
Mean	Low	37.1	36.5	37.3	37.1
	High	34.6	26.7	33.5	34.3
Std. error mean	Low	1.90	2.30	1.91	2.04
	High	1.74	2.45	1.25	1.58
Standard deviation	Low	7.38	8.90	7.41	7.89
	High	8.87	12.5	6.37	8.05
Shapiro-Wilk W	Low	0.943	0.888	0.909	0.951
	High	0.967	0.973	0.947	0.962
Shapiro-Wilk p	Low	0.420	0.063	0.132	0.534
	High	0.548	0.699	0.197	0.432

Table 3.3. MANOVA, Univariate statistics for variables in analysis. Between-groups comparison of ANIQ subscales.

Univariate Tests						
	Dependent Variable	Sum of Squares	df	Mean Square	F	p
group	awareness	62.2	1	62.2	0.888	0.352
	temporal	915.9	1	915.9	7.122	0.011
	causal	139.8	1	139.8	3.056	0.088
	thematic	75.9	1	75.9	1.189	0.282

3.2.2 “Magic Shoes Walking Task”

We performed a series of repeated measures analyses of variance (ANOVAs) to examine the effects of the ‘Magic Shoes Walking Task’ on the various dependent variables (self-reports and results of the Body-Visualization Task) in different sound conditions (‘Control’, ‘Low Frequency’, ‘High Frequency’). The 3x2 mixed design involved ‘Sound condition’ (Control, Low Frequency, High Frequency) as within-subject factor, and DP group (‘High DP’, ‘Low DP’) as between-groups factor. If data were not normally distributed (normality tested with Shapiro-Wilk), LOG-transformation was conducted to attempt normalization. Otherwise, non-parametric tests (Friedman, Durbin-Conover, Wilcoxon) were also computed.

3.2.2.1 Body-Visualization Task (BVT) – Perceived Body Weight

As the data were not normally distributed, LOG-transformation was applied. Homogeneity and sphericity assumptions were respected. The ANOVA was performed on the normalized data. Results revealed no significant main effect of Sound condition ($p = 0.164$) and no significant main effect of

DP Group ($p = 0.973$). No significant interaction between sound condition and group was found, either ($p = 0.859$). This analysis suggests that the specific sound conditions did not affect perceived body weight as measured by the body visualization tool and that the Magic Shoes Walking Task did not differentially affect the two groups in terms of body weight perception.

3.2.2.2 Emotional responses – Self-Assessment Manikin

Table 3.4. Means and standard deviations of the perceived level of emotional Valence, Arousal and Dominance.

Measure	Group	Control		High freq		Low freq	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Valence	Low DP	6.20	1.08	6.53	1.46	6.40	1.18
	High DP	5.65	1.06	5.31	1.52	5.62	1.24
Arousal	Low DP	4.47	1.46	4.80	1.32	4.60	1.55
	High DP	4.42	1.53	4.35	1.98	5.04	1.34
Dominance	Low DP	4.80	0.775	4.93	0.799	5.13	1.19
	High DP	4.77	1.21	4.92	1.47	4.81	1.10

No significant effect was found with regards to the level of perceived arousal and dominance ($p > .05$). However, in the case of valence (perceived level of happiness), a significant main effect of DP group ($F(df = 1) = 5.80, p = 0.021, \eta^2=0.098$) indicated overall differences between the two groups, with higher scores for the ‘Low DP’ group. This means that individuals with lower levels of depersonalisation experienced more positive emotions during the experience. No significant main effect of sound condition and no interaction between sound condition and group was found ($p > .05$). However, data were not normally distributed and, in some cases (‘High frequency’ condition for ‘Arousal’ and ‘Dominance’ items), the assumption of homogeneity of variances was not respected. Non-parametric tests (Friedman, Durbin-Conover, Wilcoxon) were performed with no significant result. With regards to the level of ‘Valence’, Mann-Whitney U tests revealed significant between-group differences in all conditions (‘Control’, $p=0.047$; ‘High frequency’, $p=0.010$; ‘Low frequency’, $p=0.015$).

3.2.2.3 Bodily Feelings – Perceived speed, weight, strength and straightness

Table 3.5. Means and standard deviations for the first 4 items of the ‘Bodily Feelings’ questionnaire.

Measure	Group	Control		High freq		Low freq	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Speed	Low DP	3.93	1.33	4.27	1.22	4.40	1.24
	High DP	3.50	1.53	4.27	1.40	3.62	1.39
Weight	Low DP	4.20	0.862	3.87	0.834	3.87	1.13
	High DP	3.81	1.60	4.31	1.46	4.46	1.39
Strength	Low DP	4.00	0.535	4.33	0.724	4.67	0.900
	High DP	3.85	1.12	3.81	1.02	3.73	1.04
Straightness	Low DP	4.20	0.775	4.27	0.961	4.47	0.990
	High DP	4.08	1.35	4.12	1.37	3.77	1.21

Performing analyses of variance (ANOVAs), we found no significant effect with regards to perceived weight, speed and straightness ($p > .05$). As for participants' perceived strength, a significant main effect of group was found ($F(df = 1) = 4.99, p = 0.031, \eta^2=0.069$), with higher scores for the 'Low DP' group. This indicates that individuals experiencing lower levels of depersonalisation tended to feel stronger during the experience. We observed no significant main effect of sound condition and no interaction between sound condition and group ($p > .05$). However, as the data were not normally distributed, results need to be interpreted with caution. Non-parametric tests were also carried out for each item. The advantage of these tests lies in that they do not require normality and homogeneity of variances. The results of Wilcoxon tests indicated a significant ($p=0.035$) difference between 'Control' and 'Low frequency' conditions in terms of perceived body weight, with lower scores for the 'Control' condition. This means that individuals tended to feel heavier in the 'Low frequency' condition, in line with the results observed by Tajadura-Jiménez and colleagues (2015). As for the experienced speed, a significant effect was found in the Friedman test ($p=0.025$). Subsequent pairwise comparisons (Durbin-Conover) indicated a significant difference between the 'Control' and the 'High frequency' condition ($p=0.006$), with participants feeling quicker in the 'High frequency' condition. The same result was obtained in the Wilcoxon test ($p=0.005$), with the 'Control' condition being associated to lower levels of perceived speed relative to the 'High frequency' condition, in line with Tajadura-Jiménez et al. (2015).

3.2.2.4 Bodily Feelings – Perceived agency, vividness, surprise, self-location

Table 3.6. Means and standard deviations for the second 4 items of the 'Bodily Feelings' questionnaire. The '-' next to the item 'Vividness' indicates that it is a reverse (or negative) item.

Measure	Group	Control		High freq		Low freq	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Agency	Low DP	5.60	1.84	6.07	1.10	5.67	1.50
	High DP	5.35	2.00	5.15	2.11	5.27	1.93
Vividness (-)	Low DP	3.40	1.64	2.60	1.18	2.60	1.45
	High DP	4.19	1.81	4.23	1.86	4.50	1.84
Surprise	Low DP	3.20	1.37	3.20	1.26	2.60	1.40
	High DP	4.12	2.01	3.88	1.73	4.15	1.67
Feet Loc	Low DP	4.67	2.26	5.20	1.66	4.67	2.26
	High DP	3.69	2.19	3.77	2.12	3.81	2.17

No significant effect was found for perceived agency and feet location ($p > .05$). However, when adding the 'Awareness' subscale of the ANIQ as covariate, a significant effect of narrative awareness was found on participant's perceived ability to locate one's feet while walking ($F(df = 1) = 5.78, p = 0.021, \eta^2=0.062$). As for the level of surprise experienced during the task, a main effect of group was found ($F(df = 1) = 5.83, p = 0.021, \eta^2=0.088$), with higher scores for the 'High DP' group, indicating that their experience of their body during the task was more surprising. Results showed no main effect of sound condition and no interaction between sound condition and group ($p > .05$). Interestingly, when adding the 'Temporal coherence' subscale as covariate, an interaction (Sound condition * Temporal coherence) was found ($F(df = 2) = 3.275, p = 0.043, \eta^2=0.015$). However, data were not normally distributed and the assumption of homogeneity of variances was not met for 'Control' and

‘High frequency’ conditions. As for the level of experienced vividness (inverse item), a main effect of group was found ($F(df = 1) = 9.64, p = 0.004, \eta^2=0.145$), with higher scores for the ‘High DP’ group. As the ‘vividness’ item is a reverse item, higher scores indicate lower levels of vividness. This means that the ‘High DP’ group tended to have a less vivid experience. However, the assumption of homogeneity of variances in the ‘High frequency’ condition and the assumption of normality were violated. Non-parametric tests were also carried out for each item. No significant result was found.

3.2.2.5 Cambridge Depersonalisation Scale –State version (CDS-S)

Table 3.7. Means and standard deviations of the CDS-S scores.

Measure	Group	Control		High freq		Low freq	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
CDS-S	Low DP	0.824	1.54	0.679	1.26	0.939	1.68
	High DP	19.5	16.9	20.2	19.4	19.7	18.0

The analysis indicated a main effect of DP group ($F(df = 1) = 16.6, p < 0.001, \eta^2=0.294$), with higher scores for the ‘High DP’ group. This is a logic result as subjects in the ‘High DP’ group typically experience higher levels of depersonalisation symptoms. Interestingly, no significant effect due to sound condition and no significant interaction effect was found ($p > .05$). This means that the specific sound condition did not influence the level of depersonalisation symptoms experienced by participants. Adding the ANIQ as covariate did not lead to significant results. However, data were not normally distributed and the assumption of homogeneity of variance was violated in all conditions, as indicated by Levene’s test. Additional non-parametric tests were performed, with no significant result.

4. Discussion

The first aim of this study was to investigate the relationship between experiences of depersonalisation and individuals’ awareness and coherence of narrative identity. We hypothesized a negative correlation between the scores on the CDS-29 and the scores on the “Awareness” subscale of the Awareness of Narrative Identity Questionnaire (ANIQ). This is because an alteration of one’s bodily experience and of one’s sense of self and presence was expected to correspond to an alteration of one’s perception of oneself as having self-definitional narratives. Furthermore, higher narrative awareness is thought to reflect a more meaningful integration of one’s experiences (Hallford & Mellor, 2017; Janowicz et al., 2022). As experiences are less meaningfully integrated in depersonalisation, a lower narrative awareness was expected. Finally, the reports by individuals with depersonalisation indicating a lack of plot in one’s life (Ciaunica & Charlton, 2018; Ciaunica et al., 2021b) strengthened the hypothesis. However, the absence of a significant correlation indicates that individuals with higher levels of depersonalisation do not explicitly perceive themselves as less storied.

A possible explanation lies precisely in the fact that what was investigated was an explicit form of self-awareness. Individuals with depersonalisation maintain an intact reality testing, and while their felt experience is one of detachment from oneself and from a world that feels unreal, they are rationally and explicitly aware that their body and their actions are their own and that the world is real. Despite the fact that pre-reflective self-awareness is disrupted, the observational and explicit self-

reference and self-knowing seems to be intact. Indeed, Ciaunica and colleagues (2022a) focused on how depersonalisation is characterized by hyper-reflexivity and overthinking and how this explicit self-reference might be a compensatory mechanism subsequent to the alteration of bodily self-awareness. Therefore, individuals can be explicitly aware of their self-narratives, even though they do not feel affectively connected to their memories. This might also explain the absence of a negative correlation between individuals' awareness of narrative identity and the 'Anomalous Subjective Recall' subscale of the ANIQ, which assesses one's self-detachment from one's own memories.

The participants who participated to the in-person study (N=41) completed the full ANIQ questionnaire, with a full assessment of the perceived coherence of one's narrative identity. The connection between the 'Awareness' subscale and the three 'Coherence' subscales lies in that the inability to perceive one's self-definitional stories is thought to be associated to an incoherent narrative identity and a fragmented account of one's experiences (Hallford & Mellor, 2017). A difference between the groups was hypothesized and participants in the 'High DP' group were expected to show a lower perceived coherence in their autobiographical memories. In line with the results of the previous correlation analysis, the two groups did not differ in terms of explicit awareness of having a narrative identity. However, the two groups differed in terms of 'Temporal coherence', with lower scores for the 'High DP' group. No significant difference was found for 'Causal coherence' and 'Thematic coherence' instead.

Finding between-groups differences in just one form of coherence is compatible with the idea that "these subscales represent constructs that are highly related, but empirically distinct" (Hallford & Mellor, 2017, p.11). The three forms of coherence (temporal, causal and thematic) are thought to represent progressively more advanced types of global coherence and increasingly more sophisticated levels of autobiographical reasoning (Hallford & Mellor, 2017). They are all necessary to the formation of a narrative identity. Thematic coherence represents the higher-order level that integrates and abstracts temporal and causal knowledge, and the higher the level of autobiographical reasoning, the stronger the correlation with awareness of having self-definitional narratives (Hallford & Mellor, 2017). Temporal coherence represents instead the most basic level of autobiographical reasoning, consisting in the ability to order past events in time without reference to the broader meaningful context and to the causal ties linking such events. Our results suggest that this ability is negatively impacted in depersonalisation.

Time perception is a key feature of self-awareness as a sense of temporality, or temporal awareness, intended as the ability to perceive the permanence and changes of both the outside world and one's inner sensations, lies at the root of our conscious experience of being an embodied agent (Freeman, 1998; Dainton, 2010; Ferroni et al., 2023). Importantly, alterations of self-awareness have been related to distortions of time perception (Ueda et al., 2018; Ferroni et al., 2023). For example, Ueda et al. (2018) found that schizophrenia is associated to an anomalous interval timing, indicating distortions in the "internal clock" (see also Bonnot et al., 2011). Time perception is thought to depend upon mnemonic and attentional mechanisms and the association between altered self-awareness and anomalous time perception is not surprising, though a clear picture is yet to be achieved (Bonnot et al., 2011). Depersonalisation, characterized by deficits in early perceptual and attentional processes, is associated to impairments in the encoding of new information (Guralnik et al., 2007). Together with alterations of somatic processing observed in depersonalisation (see Sedeno et al., 2014; Owens et al., 2015; Medford et al., 2016; Ciaunica et al., 2021c), this might therefore hinder time perception. Indeed, Simeon et al. (2007) found that depersonalisation is associated to a measure of temporal

disintegration, indicating an alteration of the perceived flow of time and a sense of disconnection between past, present and future.

Our study is related to time perception in that we focused on narrative identity and on individuals' diachronic sense of self, by investigating different levels of autobiographical reasoning and contributing to the characterization of depersonalisation. Our finding that 'temporal coherence' is diminished in depersonalisation is complementary to the results observed by Ferroni and colleagues (2023), who found that individuals with higher levels of depersonalisation displayed deficits in temporal 'self-referencing', i.e., they were less able to locate events in time relative to their present reference point. Ferroni et al. (2023) also investigated individuals' ability to 'self-project', i.e., "the ability to mentally move back and forward in time, maintaining the competence of correctly situating events in time" (p.7). They observed differences in how individuals with high and low levels of depersonalisation process past events. Hence, they suggested that 'High DP' individuals process past events in the same manner as they process hypothetical future events and that the experience of self-detachment that characterizes depersonalisation could be the cause of such an alteration of episodic memory. 'High DP' individuals are thus thought not to leverage episodic memory in the same way as individuals with lower levels of depersonalisation do (Ferroni et al., 2023).

Self-detachment from one's own memory and the reduction of the meaningfulness of one's affordance landscape (see Dings, 2019; 2021) could also explain our present findings, namely, the observed difference between the two groups in terms of temporal coherence of one's narrative identity. Ferroni et al. (2023) also suggest that the overthinking, hyper-intellectualization and obsessional self-check that characterize depersonalisation (see also Simeon & Abugel, 2006; Ciaunica, 2022a), in addition to prevent full engagement with the world, might also hinder one's connection with one's past. Our results confirm and shed further light on previous reports about an alteration of the diachronic sense of self in depersonalisation (Simeon & Abugel, 2006; Ciaunica & Charlton, 2018). Future studies should deepen our understanding of time perception and temporal awareness in depersonalisation, by focusing on the relationship between alterations of episodic memory and disturbances of bodily self-awareness. Furthermore, future research should also focus on different kinds of mnemonic abilities (e.g., semantic memory).

Possibly, our findings also represent an additional distinction between depersonalisation and the other dissociative disorders. In spite of having been categorized as dissociative disorder, recent accounts have proposed that depersonalisation may be best defined in terms of self-detachment, rather than dissociation (see Ferroni et al., 2023). Narrative coherence may be one of the demarcating factors, as the integration of self-narratives and the cohesion of one's autobiographical memory seem disrupted to a greater extent in dissociative disorders (see Seligman & Kirmayer, 2008; Kirmayer, 2016; Schechtman, 2015). Further research needs to shed light on this issue.

Another possible take-home message from this analysis is that, in addition to or instead of investigating the explicit awareness of one's narrative identity and its structural characteristics, e.g., the level of coherence, future research should also focus on the contents of one's self-narratives and on their flexibility (see Cheng, 2022). Indeed, the constructed self-narratives, in spite of being coherent, can become inflexible and maintain psychopathology (Cheng, 2022; Janowicz et al., 2022). In cases of depersonalisation, the heightened explicit focus on one's self and the inevitable permanent attention to one's symptoms, together with the experienced sense of meaninglessness, is likely to fossilize one's narrative identity and restrict one's possibility of narrative exploration. As one's narrative identity is also founded on the integration of one's future plans, future research might also focus on individuals'

ability to imagine and create possible future alternatives, a process which in narrative studies was called “subjunctivization” (see Monteagudo, 2011). The imagery deficits that characterize depersonalisation (see Knappik, 2022), might hinder this process.

The investigation of the contents of one’s self-narratives can be done through qualitative methods of narrative coding (see Hallford & Mellor, 2017; Dunlop, 2021a). The psychological theme of ‘redemption’, that is, how negative circumstances are turned into positive outcomes, is one of the common features that would be interesting to evaluate in depersonalisation as predictor of improvements (see McAdams, 2006; Dunlop, 2021b). The contents of one’s narrative identity tend to change when one’s affordances and possibilities to act in the world change. For instance, Sparkes & Smith (2002) investigated how the presence of one’s body-self relationship in one’s narratives changes due to psychological and physical challenges. The analysis of stories in conditions of illness, deficits, or difficulties in general, is thus of high relevance and allows to understand how meaning-making is restructured across time (Lang, 1989; Hyden, 2008). Importantly, investigating alterations in narrative contents in depersonalisation might lead to possible psychotherapeutic and narrative interventions aimed at fostering the recovery of one’s sense of self and at transcending one’s current condition, or at least improving the way to deal with it. In line with Hutto’s ‘Narrative Practice Hypothesis’ (Hutto, 2008) and with the idea that storytelling modifies one’s identity (see Hyden, 2008), narratives can influence one’s sense of meaning in life and one’s sense of agency and could represent a complementary and affectivity-enhancing tool helpful in cases of depersonalisation.

As for the Magic Shoes Walking Task, we observed a pattern that is only partially similar to what Tajadura-Jiménez and colleagues (2015) found. Replicating their finding, individuals tended to feel quicker in the ‘High frequency’ condition relative to the ‘Control’ condition. This is compatible with the idea that high-frequency sounds are associated to lighter objects and that hearing one’s own footsteps as tilted towards higher frequencies makes people feel lighter and quicker (Tajadura-Jiménez et al., 2015). Additionally, in line with the idea that low-frequency sounds are instead associated to heavier bodies, participants also tended to feel heavier in the ‘Low frequency’ condition compared to the ‘Control’ condition. However, we did not find any difference across sound conditions with regards to one’s perceived body weight in the Body-Visualization Task. We did not find any difference across conditions in the level of perceived emotional valence, dominance and arousal, either.

As for the differences between the two groups, in line with our hypothesis and with the alterations of emotional processing characteristic of depersonalisation, individuals with higher levels of depersonalisation tended to experience more negative emotions during the experience, as measured by the self-reported level of emotional valence. Compared to the ‘Low DP’ group, they tended to feel weaker overall and they reported a less vivid experience. This is compatible with the characteristic reduction in sense of presence described in the literature. Interestingly, they also reported a more surprising experience about their bodies during the task. As can be logically expected, participants belonging to the ‘High DP’ group were found to experience higher levels of symptoms of depersonalisation in the moment (as measured by the CDS-S).

One of the aims of this project was to assess whether the modulation of one’s footstep sounds while walking could influence individuals’ sense of self and presence. Importantly, subjects suffering from depersonalisation reported using social encounters, with particular emphasis on physical contact, as a means to recover a sense of immersiveness in the here and now (Simeon & Abugel, 2006). In certain cases, even self-inflicted and controlled pain seems to be a possible way to temporarily feel embodied again (Simeon & Abugel, 2006). Ciaunica et al. (2022a) expressed the idea that letting go of oneself,

forgetting about oneself, in order to plunge into active engagement with the world, might reduce overthinking and counterbalance the sensation of being stuck in one's head. Taking an 'active inference' approach, they used the notion of 'self-attenuation', which can be described as the ability "to process self-related information transparently in the background" (Ciaunica et al., 2022a, p. 6). A disruption in the process of self-attenuation seems to lie at the roots of depersonalisation experiences and active engagement with the world is thought to represent a key factor for symptoms amelioration. The point is to understand which types of activities might be beneficial. The Magic Shoes experience was thought to be capable of reducing symptoms of depersonalisation due to its effects onto body representations, as observed by previous studies (Tajadura-Jiménez et al., 2015). The idea was strengthened by the fact that Tajadura-Jiménez et al. (2017b) observed improvements in body perception in subjects suffering from complex regional pain syndrome and experiencing body-perception disturbances, using the Magic Shoes paradigm.

However, against the hypothesis we formulated about the possible effects of the modulation of footstep sounds on individuals' sense of self, no significant change in depersonalisation symptoms was found across sound conditions. This could partially be explained by the fact that hearing one's own footsteps represents an unusual situation that might increase explicit attention. This might hinder, instead of facilitate, one's sense of being immersed in the here and now. Such an interpretation is also supported by the fact that individuals with higher levels of depersonalisation symptoms found the experience more surprising. Additionally, due to the limited available space and to the characteristics of the equipment, participants had to walk on the spot. Improvements in the ecological validity of the task are thus needed and might lead to different results. Another limitation of this report concerns the number of participants that were included (N=41) and the unequal distribution of participants between the two groups (26 in the 'High DP' group and 15 in the 'Low DP' group). Therefore, the results and analysis reported here should be considered as preliminary. Future research should also take into account different activities and tasks that could foster one's engagement with the world and increase self-attenuation. For instance, a sense of immersiveness could be obtained through more pleasurable experiences, or through experiences capable of evoking flow states. Also, as sociality seems to be a helpful way to contrast feelings of self-detachment and alienation, tasks involving other social agents should be considered.

Yet, it is interesting to note that the level of agency experienced with regards to one's footsteps (as measured by the explicit self-report) did not differ between the two groups. This seems in contrast with the idea that depersonalisation is associated to a reduction in one's sense of agency. However, agency was measured through an explicit self-report and, as individuals with depersonalisation maintain an intact reality testing, they seem to be explicitly aware that their bodies and actions are their own. As depersonalisation is characterized by a sense of self-detachment and an observer-observed duality, we might find a discrepancy between explicit and implicit measures of body representations and self-awareness. Therefore, implicit behavioral measures of agency and body ownership are required in order to have a more valid assessment. Accordingly, the same can be said with regards to emotional states as a comparison between explicit and implicit measures would constitute a more complete way to assess emotional processing in depersonalisation.

As for the relationship between narrative identity and bodily experience, we investigated the influence of one's awareness of having self-definitional stories and of the coherence of one's narrative identity over the effects of the task on self perception. Narrative awareness was found to influence one's perceived ability to locate one's feet while walking, whereas the level of 'Temporal coherence' was found to differentially influence the level of surprise experienced during the task depending on the

sound condition. These are unclear results that need to be further explored in order to understand the ties that link these variables.

Previous studies investigating the relationship between the sensorimotor processes that scaffold one's bodily self-awareness and the higher-order levels of the self focused on conceptual aspects of the self (Krol et al, 2020). However, compared to narrative identity, self-concept is considered a more static representation of the self (McAdams, 2018) and conceptual self-knowing has been distinguished from the temporally extended self-knowledge which is based on self-narratives (Neisser & Fivush, 1994; Asma, 2021). This reduces the possibility to draw comparisons and conclusions from our findings. Furthermore, Krol and colleagues (2020) focused on the rubber hand illusion (RHI) and the body-swap illusion, which involve sensory manipulations which are different from those considered in our study. They found that self-concept clarity, which speaks to how defined and aware one's self concept is, influences the effects of the illusion during asynchronous conditions. While the connection between self-concept clarity and the structure of one's narrative identity has been investigated (Wong et al., 2021), the differences between the paradigms do not allow for a proper comparison. Our study could thus be considered as a preliminary and exploratory investigation of the relationship between the structural features of narrative identity and the malleability of the bodily self.

5. Conclusion

In this study we have investigated the relationship between narrative identity and the bodily self, with particular focus on experiences of depersonalisation. The theorized connection between different aspects of the self and the lack of a proper assessment of narrative identity in depersonalisation speak to the relevance of this research project. Our findings suggest that individuals with higher levels of depersonalisation have a lower temporal coherence in their narrative identity. Temporal coherence represents the lowest level of autobiographical reasoning. Our results strengthen and complement previous findings about disruptions in the ability to temporally locate events in relation to one's present reference point in depersonalisation. Higher levels of autobiographical reasoning (i.e., causal and thematic coherence) seems intact. However, the study focused on explicit perception of one's narrative coherence and on the explicit awareness of having a narrative identity. As explicit self-reference is thought to be intact in depersonalisation, further research should focus on other aspects of individuals' self-narratives. Another aim of the study was to investigate how body representations and sense of self can be modified by a task thought to be capable of enhancing individuals' sense of embodiment and sense of presence. While interesting differences between individuals with high levels and low levels of depersonalisation have been found, we did not find evidence for a beneficial effect of the auditory modulation of one's footstep sound on participants' sense of self. However, the focus of this work was placed on explicit measure of body perception, emotional states and self-awareness. Implicit behavioral and physiological measures need to be considered in order to have a more thorough assessment. Future research should also explore the potential of other types of embodied activity to reduce symptoms of depersonalisation.

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