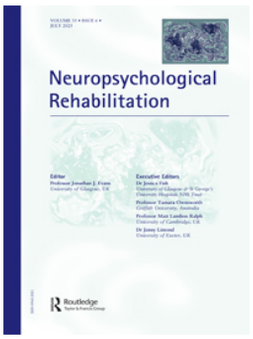

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Exploring the meaning of life (MoL) after acquired brain injury (ABI) in Costa Rica

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ABSTRACT

Primary objective: This study aimed to explore the process of MoL-Resignification following ABI in a Costa Rican sample.
Research Design: A cross-sectional, exploratory mixed-method approach.
Methods and Procedures: Qualitative narratives about the MoL-Resignification were collected and supported with quantitative data using instruments like the Mental and Physical Health Adapted Scale (MPHAS), Brief Resilient Coping Scale (BRCS), UCLA Loneliness Scale Revised (UCLALS-R), and New Me Scale (NMS).
Main Outcomes: Four dimensions of MoL-Resignification after ABI were identified: Individual, Social, Global, and Spiritual. Narratives regarding the Individual MoL ranged from coping with the limitations imposed by ABI to adopting new values and senses of identity. Social MoL emphasized the importance of family support, while Global MoL centred on adopting a present-focused perspective. The Spiritual MoL highlighted the role of faith and religious beliefs in helping individuals navigate their lives after ABI. Resignification processes were associated with greater life satisfaction post-ABI (NMS), lower psychological and physical burdens (MPHAS), reduced loneliness (UCLALS-R), and more effective coping strategies (BRCS).
Conclusions: MoL-Resignification and Identity change after ABI, demonstrates the importance of family and spiritual beliefs in coping within the context of Costa Rican culture. These factors should be addressed in future research and rehabilitation efforts.

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Resignification; identity; coping strategies; Latin America

Introduction

Acquired brain injury (ABI) refers to brain damage after birth, resulting in neurological conditions that lead to physical, social, emotional, cognitive, and behavioural impairments. In our study, ABI specifically includes adult conditions such as brain tumours, traumatic brain injuries, and neurovascular or neuroimmunological pathologies. Symptoms can include impulse control issues, social

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withdrawal, communication challenges, and dependency on daily tasks, all of which affect functional and social domains (Mcalister et al., 2016; Ownsworth, 2014; Ownsworth et al., 2011; Ownsworth et al., 2015; Ownsworth & Nash, 2015). Individuals with ABI often experience challenges with self-esteem, motivation, increased risk of depression, feelings of hopelessness, and a sense of loss of control over their lives (Chow, 2017; Chow, 2018; Drewes et al., 2018; D'Cruz et al., 2019; Hafsteinsdottir & Grypdonck, 1997; Jumisko et al., 2005; Mcalister et al., 2016; Nochi, 2000; Salas & Prigatano, 2018; Salazar-Villanea et al., 2016). These psychological sequelae and changes in self-perception significantly contribute to disability, stigma, and discrimination following ABI (Koponen et al., 2011; Rabinowitz & Levin, 2014; Russell, 1996; Sandelowski & Leeman, 2012; Yeates, 2019). They can also result in social isolation, the loss of friendships, and difficulties in forming new significant relationships (Northcott & Hilari, 2011). Changes in family or partnership roles often trigger intrafamilial conflicts (Webber-Ritchey et al., 2021).

Understanding identity and psychosocial changes after ABI

Scientific literature shows that ABI significantly affects one's sense of identity, with many individuals reporting "not feeling themselves" (Douglas, 2020; D'Cruz et al., 2019; Fraas, 2015; Fraas & Calvert, 2009; Knox et al., 2017; Muenchberger et al., 2008; Nochi, 2000; Ownsworth, 2014; Ownsworth et al., 2011; Ownsworth et al., 2015; Ownsworth & Nash, 2015; Salas & Prigatano, 2018; Salazar-Villanea et al., 2016; Salazar-Villanea et al., 2023; Sinclair & Wallston, 2004). ABI survivors and their families often face the impact of residual sequelae on daily life functioning. Feelings of disorientation in their life's trajectory and a sense of helplessness related to life changes are commonly reported (Chow, 2017; Chow, 2018; Jumisko et al., 2005; Littooij et al., 2016; Salazar-Villanea et al., 2016). In this context, identity and the Meaning of Life (MoL) reciprocally influence and evolve.

Research has identified significant gaps in understanding the psychosocial consequences of ABI, particularly in how survivors perceive the reconstruction of their identities and find meaning in life post-injury across various contexts (Glintborg, 2015). While addressing the sense of loss is recognized as essential for rehabilitation, identity itself has often been overlooked in the rehabilitation literature (Segal, 2010). Comprehensive approaches integrating psychosocial perspectives are lacking, which affects the understanding of identity and meaning reconstruction after ABI. Based on the belief that the subjective experiences of ABI survivors might not be a reliable or significant source of information for evaluating progress, there is often a preference for other outcome measures such as score-based assessments, which frequently overlook the individual's perspective (Faccio et al., 2024; Segal, 2010).

Moreover, there is a noticeable gap in research on how individuals redefine their MoL after an injury. Most findings focus on narratives of drastic change and a sense of loss regarding one's self and abilities, since identity disruptions lead to difficulties in forming and maintaining social networks. However, there is a lack of follow-up aimed at understanding how individuals find new MoL in their development (Faccio et al., 2024; Neils-Strunjas et al., 2017; Nochi, 2000).

Meaning-Making process after ABI within MoL conceptual frameworks

Individuals with ABI actively seek new life meanings and redefine their identities as effective coping mechanisms (Kessler et al., 2009; Liang et al., 2020; Pan et al., 2019; Park, 2010; Park, 2013; Park & Folkman, 1997). Studies indicate that the meaning-making process after ABI is often associated with a better quality of life (Ashing-Giwa & Lim, 2009; Dahlberg et al., 2022; Davis et al., 2013; Drewes et al., 2018; Klein et al., 2016; Van Bost et al., 2022). Reconnecting with personal values, beliefs, and strengths can empower individuals to rebuild their sense of self (Chow, 2017; Chow, 2018).

The MoL has been extensively explored from a philosophical standpoint (Frankl, 1992; Koltko-Rivera, 2004), however, Park and Folkman (Park, 2010; Park, 2013; Park & Folkman, 1997) introduced a psychological model to examine MoL through the lens of coping mechanisms in response to stressful and adverse life events. Their model emphasizes how coping processes, personal beliefs, experiences, and goals influence an individual's MoL, rather than focusing solely on the development of a coping theory. Within this framework, "meaning" is conceptualized as the perceived significance attributed to specific experiences.

According to the authors, the MoL consists of two related dimensions: Global Meaning includes enduring beliefs and life goals shaping an individual's worldview, while Situational Meaning involves the interpretation of specific life events influenced by personal experiences and context. Park and Folkman's model has been foundational, especially regarding MoL in ABI. Meaning-making, as defined in their model, is the cognitive and emotional process of reconstructing one's understanding in response to stress or adversity. This process arises from incongruence between Global and Situational Meanings. Successful meaning-making occurs when individuals reconcile this incongruence, either by adjusting situational meaning to fit their global beliefs or by modifying those beliefs to accommodate new experiences. Table 1 offers a detailed overview of influential MoL models in the ABI literature and their contributions to the conceptualization of MoL adopted in this study.

This psychological process of "meaning-making" involves finding significance in specific situations related to their ABI and reflecting on life's purpose and

Table 1. Description of MoL Models and contributions to understanding meaning-making After ABI.

Authors	MoL framework proposed
Park and Folkman (1997)	MoL comprises two core dimensions: global MoL and situational MoL. Global MoL represents an individual's enduring beliefs, values, and worldview, while situational MoL refers to the meaning assigned to specific life events, particularly the perceived reasons behind their occurrence. Stressful or adverse events often create incongruence between these two dimensions. To restore coherence, individuals may either reassess their situational meaning to align it with their global MoL or modify their global beliefs and values to accommodate the new experience. This process is called meaning-making.
Reker (2007)	This model builds on Park and Folkman's situational and global MoL frameworks, adapting them to Traumatic Brain Injury (TBI). It identifies factors shaping Global Meaning, divided into two perspectives: elemental (generalized beliefs about life's meaning) and holistic (personal purpose and coherence). TBI often creates dissonance between Global and Situational Meaning, disrupting an individual's sense of meaning. For instance, a belief in benevolent divine intervention may conflict with the reality of TBI, prompting a search for new meaning. Reker highlights that TBI can catalyze new meaning-making, aligning with Park and Folkman's process.
Liitoj et al. (2016)	The findings of Littoij et al. (2016) are significant in characterizing the MoL within the context of Acquired Brain Injury (ABI) literature. They highlight themes such as social belonging and personal resilience, emphasizing the role of social connectedness and individual disposition in interpreting life experiences. Their study also addresses the influence of worldview and identity transformation. Contribution: Narratives related to the ABI experience in global MoL include several subdomains. 1. Core values; 2. Relationships; 3. Worldview; 4. Identity, 5. Inner posture; 6. Continuity and change (meaning-making process). In their research, MoL was significantly influenced by the type of ABI (Acquired Brain Injury) experience, with distinct meaning-making processes observed between stroke patients and those with spinal injuries. Spinal injury patients, facing sudden physical changes, often adapted quickly and reconstructed meaning more rapidly. In contrast, stroke or brain tumor patients, experiencing gradual cognitive and emotional impairments, underwent a more prolonged and complex meaning-making process.
Chow (2017, 2018)	Maintains previous conceptual frameworks and aligns with findings from Littoij et al. (2016) on MoL's multidimensionality in ABI. Applies Meaning of Life (MoL) processes in ABI narrative therapies. Contribution: ABI patients often focus on redefining meaning through individual, social, and global dimensions. This MoL is characterized by changes in the person's individual beliefs about their meaning in life (sense of self), the relevance of their social connections and the new beliefs about MoL in general.
Current study	Based on Salazar et al. (2023), our study´s contribution: MoL-Resignification refers to the transformation of an individual's beliefs and values related to their personal meaning in life, social purpose, worldview, and spiritual beliefs. This process involves the re-adaptation and reintegration of pre-existing values, beliefs, meanings, and behaviours to construct a new MoL. Identity plays a transversal role in this process, as changes in MoL are deeply interconnected with shifts in self-concept.

goals (Pan et al., 2019; Park, 2010; Park, 2013; Park & Folkman, 1997). This is relevant to our study, as resignifying MoL after ABI involves reflection on personal life events and narratives concerning identity reconfiguration (Hartog et al., 2020; Littooij et al., 2016; Ownsworth, 2014; Ownsworth et al., 2011; Ownsworth et al., 2015; Ownsworth & Nash, 2015; Salazar-Villanea et al., 2016; Whiffin et al., 2021) that facilitate adaptive coping strategies (Jumisko et al., 2005; Littooij et al., 2016; Reker, 2007). Following ABI, individuals typically adjust certain aspects of their MoL while keeping others stable, depending on which adaptations help them navigate their experiences and new realities (Jumisko et al., 2005; Littooij et al., 2016; Reker, 2007). This process is also observed in MoL theorization for non-ABI patients (Frankl, 1992).

The promotion of new meaning-making after ABI positively impacts individuals' well-being (Ownsworth et al., 2011; Ownsworth & Nash, 2015; Segal, 2010; Shao et al., 2013a), leading to reduced loneliness and enhanced social reintegration (Dahlberg et al., 2022; Honan et al., 2019; Janda et al., 2006; Ownsworth et al., 2011; Piil et al., 2018). Individuals who develop a new sense of meaning after ABI report fewer posttraumatic symptoms (Allen et al., 2021; Grace et al., 2015; Manning et al., 2021; McGrath, 2011; Shao et al., 2013b).

Chow (Chow, 2017) demonstrated that interventions, such as narrative therapies aimed at enhancing meaning in life, significantly improve psychological well-being, decrease depression, and improve life satisfaction after ABI. This process involved patients redefining their sense of meaning in life, re-evaluating their social interactions, and reinterpreting their broader life experiences. Chow's studies further operationalized these findings by showing that, following an ABI, patients' narratives consistently revolved around three dimensions: individual, social, and global (Chow, 2017). These observations align with earlier findings (Littooij et al., 2016), which similarly emphasized the multidimensional nature of MoL in the context of ABI.

For the current study, we establish our MoL framework based on the literature described in Table 1. Our framework aligns closely with the models proposed by Littooij et al. (Littooij et al., 2016) and Chow (Chow, 2017; Chow, 2018), as their work is grounded in research specifically focused on ABI. We conceptualize MoL as encompassing an individual's beliefs and values, their social purpose, their broader understanding of the human experience or the world, and their spiritual beliefs (Table 1 and Figure 1). Specifically, we define four subdomains of MoL: Individual MoL-Resignification, Social MoL-Resignification, Global MoL-Resignification, and Spiritual MoL-Resignification. These subdomains are informed by common findings from prior models, which indicate that individuals with ABI often describe changes in their MoL in terms of shifts in individual beliefs, social roles, and global perspectives on life. The inclusion of the fourth subdomain, spiritual MoL, is based on research with Costa Rican populations, which highlights the significant role of religion in constructing meaning in life.

Our previous research has shown that individuals with ABI often face abrupt and disruptive changes. However, they also tend to adjust and reintegrate their pre-injury values, goals, and experiences into their current sense of self (Salazar-Villanea et al., 2016; Salazar-Villanea et al., 2023). Therefore, this research focuses on the concept of MoL-Resignification. While MoL-Resignification shares similarities with the meaning-making process described in earlier literature, we employ the term Resignification to emphasize the adjustments and reintegration of pre-existing life aspects (such as values, goals, hobbies, traditions, behaviours, and identity), rather than focusing solely on resolving incongruences between global and situational meanings, as is often the case in meaning-making frameworks. Finally, our framework

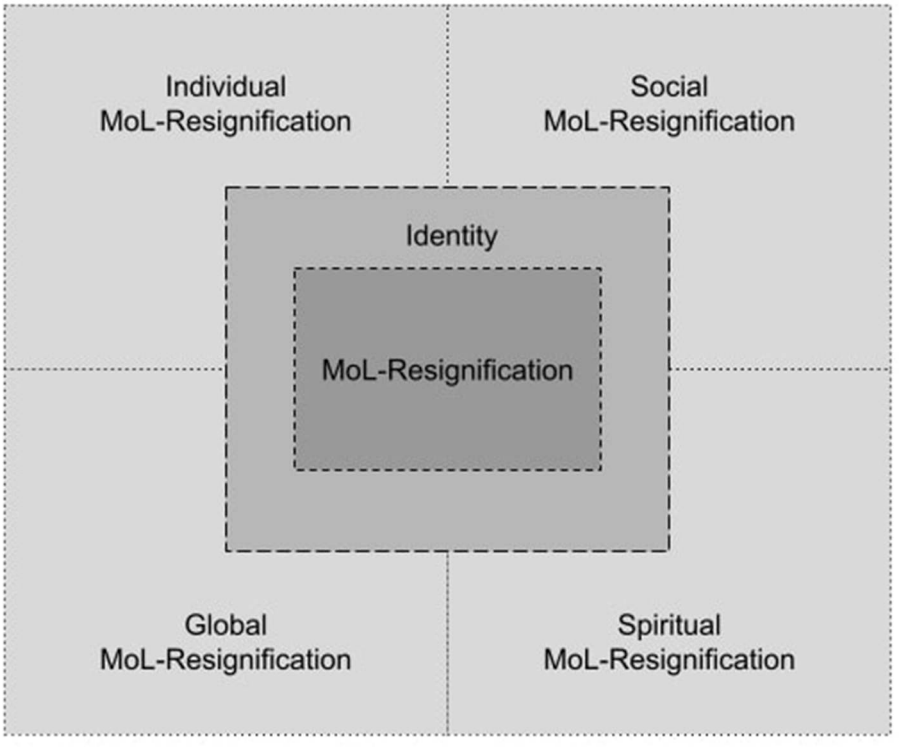

Figure 1. Diagram of MoL-Resignification framework employed for the current study.

Note: MoL-Resignification is constituted of four dimensions without a hierarchy of importance: Individual, Social, Global, and Spiritual. Identity (or changes in identity) is transversal to each dimension.

recognizes identity as a transversal element in the MoL-Resignification. Identity is deeply intertwined with MoL, and changes in one often result in shifts in the other (See Figure 1).

Culture and MoL: interrelations for rehabilitation

Culturally relevant aspects of MoL – such as core beliefs, identity, societal influences, and life purpose – can impact rehabilitation, recovery, and overall well-being. In Hispanic cultures, including Costa Rica, familism emphasizes the family's role in providing support, as a protective factor against mental health issues (Cahill et al., 2021; Douglas et al., 2019; Urech et al., 2020). Although family dynamics are predictors for psychosocial outcomes in the ABI population, research on how family functioning influences rehabilitation progress and community participation is limited (Morrison et al., 2024). It is essential to explore how this cultural factor influences the meaning-making process following ABI since it has been consistently associated with individual adjustment among Hispanic/Latino persons (Cahill et al., 2021).

ABI is the second most common cause of disability in the Americas (Morrison et al., 2024), making it essential to understand how self-reported mental and

physical health, coping strategies, and feelings of loneliness affect outcomes in different contexts. These findings could inform culturally tailored rehabilitation programs that enhance patient engagement and improve long-term outcomes by aligning with local beliefs. Given ongoing challenges in treatment and research (Ortega, 2013), it's crucial to inform healthcare policies in Costa Rica, emphasizing the role of familial support in ABI rehabilitation.

By equipping rehabilitation and counselling professionals with key psychosocial concepts for assessment and treatment, and by clarifying the role of the family in promoting positive rehabilitation and participation outcomes within the ABI Latino community (Morrison et al., 2024), we can promote new avenues for family-centred approaches. Evidence shows that family involvement during rehabilitation improves community participation and cognitive functioning, maximizing outcomes (Bogner et al., 2019). This may include incorporating community support systems and caregiver training while addressing the challenges faced by ABI patients in developing countries.

This study aimed to explore the process of MoL-Resignification following ABI in a Costa Rican sample. Specifically, we focused on how individuals with ABI narrate changes in their individual MoL, social purpose, global beliefs about life, spiritual conceptions, and identity post-injury, as we believe that self-perceptions and MoL-Resignifications are deeply interconnected.

To complement this exploration, we sought to provide a quantitative description of participants' performance on various mental health scales. These quantitative measurements were used to enrich and contextualize the participants' narratives about their MoL-Resignification. To facilitate this, we back-translated and adapted four psychological scales from English to Spanish, ensuring they applied to the Costa Rican context based on a pilot study´s findings. As a secondary aim, we conducted reliability analyses for the employed scales.

The current research was conducted from a phenomenological perspective, emphasizing the description of subjective experiences through a mixed-methods approach. Qualitative methods were employed to capture participants' lived experiences of MoL-Resignification following ABI, while quantitative methods were used to describe participants' general mental health profiles and to provide a deeper understanding of their MoL-Resignification narratives. By integrating qualitative and quantitative data, we hope to provide a foundation for future research and interventions related to MoL, mental health profiles in individuals with ABI, and the interplay between these factors within the cultural context of Latin America.

The findings lay the groundwork for future research on the interplay between coping strategies, meaning in life, and neuropsychological rehabilitation in ABI patients. Given the significance of family and community in Costa Rican culture, these insights can aid in developing culturally sensitive rehabilitation protocols, ultimately improving engagement and outcomes in neurorehabilitation programs.

Materials and methods

Design

This is a cross-sectional, exploratory, and descriptive study employing mixed methodologies. We aim to explore the experience of MoL-Resignification after ABI, specifically in a Costa Rican sample, since MoL research in Latin American populations is scarce.

MoL frameworks related to disease experiences are usually complex because each patient exhibits a unique combination of variables or themes that influence their experience of the disease and life meaning. Specifically for ABI, this complexity arises from the varied sequelae that can impact cognitive, emotional, physical, social and functional domains. To better understand those complex variables, we employed an idiographic approach. Several studies with this approach have been able to depict the subjective experience of people with ABI, therefore informing tailored neuropsychological interventions (Creswell, 2013; Marshall & Rossman, 2016; Pringle et al., 2011).

We preferred short interviews with concise questions for the qualitative approach instead to in-depth interviews. This type of instrument is more suitable for individuals with ABI, as traditional qualitative interviews can be challenging due to memory deficits, functional impairments, and fatigue (Douglas, 2013; Douglas, 2020; Douglas, 2021; Douglas et al., 2019). In the quantitative approach, we employed several psychological scales to assess mental and physical health, coping strategies, loneliness and identity reconfiguration after the ABI.

The study was approved and supervised by the Ethics Committee of the University of Costa Rica (approval reference numbers CEC-10-2021 and CEC-448-2022). We ensured all ethical and legal standards were met to protect participants, and anonymized all oral and written responses for analysis. Results are presented to show how participants' narratives about MoL-Resignification relate to mental health outcomes and their scores on the New Me Scale (NMS), which measures their new identity experience after ABI.

This research was part of a larger ABI project that included both an investigative phase and a community implementation phase, but this second phase is not included in this paper´s aims. Data collection began at the end of the COVID-19 pandemic restrictions in Costa Rica at the end of 2022. To facilitate a broad sample and address any health concerns of participants regarding face-to-face assessments, an online survey was designed for data collection. Participants had the option to complete the survey with the phone assistance of a trained psychology student, part of the research team. Guidelines for conducting telephone assistance were included as part of the research team training to ensure that the data collection process remained unbiased.

The online survey offered numerous advantages (Salvador et al., 2020), and contrary to the notion of an impersonal and task-oriented platform, current

research indicates a huge potential for qualitative research into individuals' very personal and profound experiences (Schiek & Ullrich, 2017). The benefits included private, time-unrestricted online participation and the involvement of participants despite their geographical location. However, limitations such as varying levels of technological literacy among different populations or poor WiFi connectivity are acknowledged as obstacles (Dodds & Hess, 2021; Jowett, 2020; Lazarte et al., 2020; Pocock et al., 2021; Rania et al., 2021; Topcu et al., 2021). A small portion of participants (2 cases in total) were interviewed in person by the research team to meet their specific difficulties with reading and writing.

The community intervention aimed to sensibilize about the ABI experience by conducting focus groups and disseminating educational media to the broad Costa Rican population. The community intervention phase started at the end of the data recollection process but is not analysed in this paper.

Data recollection

Participants were recruited through various channels, including open online invitations, advertisements disseminated via the Psychological Research Institute (PRI) of the University of Costa Rica´s Facebook, and open invitations in psychoeducational talks delivered in healthcare settings and community forums by professional clinicians or the research team. This open "snowball" sampling method is recognized as a non-probabilistic technique for identifying potential participants. All invited participants were redirected to the PRI webpage to complete the online survey, which included quantitative scales and qualitative questions (30 min in total). Participants who required telephone assistance were added to a calling list and contacted in the week after the advertisement. Those who indicated they couldn't participate online or via phone received face-to-face assistance from a trained psychology student or a member of the research team. These participants completed the online survey using a computer provided by the research team (2 cases in total).

Participants underwent a screening process to meet the following inclusion criteria: (1) Adults with ABI who provided informed consent, (2) individuals willing to share and reflect anonymously upon their lived experiences, and (3) those capable of communicating their responses in written or oral formats. Exclusion criteria included individuals with severe health conditions or significant cognitive or motor sequelae that would hinder participation.

Participants

Participants were a convenience sample of Costa Rican adults (18 years or older) who voluntarily agreed to complete an online survey about their ABI experiences. Given the phenomenological nature of our research, we did not set any strong inclusion criteria regarding the type of ABI or time elapsed since

the injury. Instead, we aimed to capture a diverse range of experiences to provide a comprehensive understanding of ABI in Costa Rica. This approach establishes a foundation for future research in the field of ABI in Costa Rica.

A total of 35 ABI participants (12 men, and 23 women) were recruited. No participants dropped off from the study. Previous international studies have worked with samples of between 6 and 30 participants (Braun et al., 2019 Braun & Clarke, 2006; Connelly & Peltzer, 2016; DeSantis & Ugarriza, 2000; Salazar-Villanea et al., 2023). Regarding our quantitative analysis, we acknowledge that the current sample could lack statistical power. Nonetheless, the design of the current study is exploratory and descriptive. Therefore the focus is not to present strong statistical patterns, but to describe results that can advance the ABI field and be tested or corroborated in the future. Table 2 presents sociodemographic data of the ABI sample.

Instruments and procedures

All instruments and procedures were selected based on an extensive review of previous literature and adapted according to international standards and

Table 2. Participant Sociodemographics.

Sociodemografic variable	n (%)	M (SD)	Range
Gender	35		
Female	23 (32.86)		
Male	12 (17.14)	46.57 (13.283)	26 years – 76 years
Age (years)		6.76 (6.93)	0.2 months – 31.8 years
Time since injury (years)			
ABI diagnosis			
Brain tumor	10 (68,57)		
Traumatic Brain Injury	8 (22,86)		
Neurovascular pathology	7 (20)		
Non-specified neuropathology	6 (17,14)		
Neurodegenerative pathology	3 (8,57)		
Neuroimmunological pathology	1 (2,86)		
Education level			
Higher education	24 (34.29)		
Technical education	3 (4.29)		
Middle education	6 (8.57)		
Primary education	2 (2.86)		
Employment status			
Employed	35 (100)		
Non employed	-		
Marital status			
Married or in a consensual union	18 (51,43)		
Single	11 (31,43)		
Divorced	6 (17,14)		
Household company			
Lives accompanied	31 (88.57)		
Doesn't live accompanied	4 (11.4)		
Demographic area			
Rural	27 (77.14)		
Urban	8 (22.86)		
Province			
GMA[b]	34 (97,14)		
Non-GMA	1 (2.86)		

Note. a = Employment status considers pension by the government or informal job; b = Great Metropolitan Area.

guidelines for managing ABI (Bayley et al., 2018; Centers for Disease Control and Prevention., 2023; Federación Española de Daño Cerebral Adquirido, 2023; Jolliffe et al., 2018; Reuter-Lorenz & Park, 2014; Verdugo et al., 2019). A multidisciplinary group of Costa Rican health practitioners, including neurosurgeons, neurologists, neuropsychologists, psychologists, psychiatrists, and mental health nursing personnel, was consulted to select and adapt a set of instruments and questions addressing various domains of living with ABI.

In the study survey, scales that lacked a Spanish version underwent a back-translation procedure. The research team initially translated items from English to Spanish and then back-translated them by an external associate researcher who was a native English speaker. Language adaptations were made to provide contextually relevant and accessible items for adults with ABI in Costa Rica.

A pilot study was conducted in 2021, and preliminary results have been already published (Salazar-Villanea et al., 2023). The pilot study included 9 participants (5 men and 4 women): 4 adults with ABI, 3 family member caregivers, and 2 ABI health practitioners. Cognitive interviews with pilot respondents led to improvements in the study questionnaires, including adjustments to instructions, wording, subscale ordering, visual enhancements in Likert scales (such as a visual aid of a glass ranging from empty to full, see Figure 2), and the inclusion of reminders in each question. The adjustments made based on the cognitive interviews were also aimed at improving the informed consent process for the study. Standard procedures were adapted to address cognitive or communicative challenges that might affect participants´ understanding of the information. The measures implemented included presenting the informed consent in a structured and simplified format and using plain language to avoid complex phrasing or medical terms. Additionally, the content was divided into smaller segments and supplemented with visual aids. To accommodate any potential memory deficits, the research team was available to summarise and repeat information when participants required it.

First phase instruments

This research employed qualitative and quantitative instruments. Qualitative questions allowed the exploration of participants' specific characteristics and

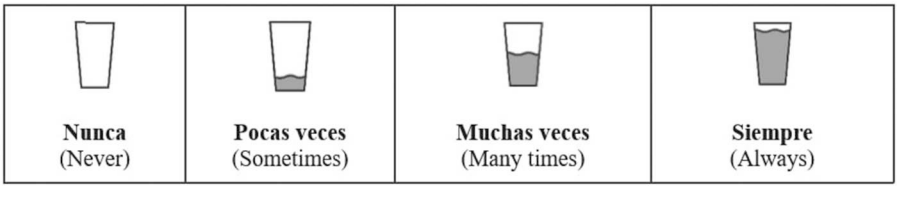

Figure 2. Likert scales adapted.

Note: English translations are included in parentheses and were not incorporated in the original Spanish version.

experiences. Quantitative scales provided a description of participants' mental health profiles. As mentioned in the study aims, we performed reliability back translations for each scale and calculated reliability using Cronbach's alpha.

Qualitative instruments

Anonymous Personal Information Form. Sociodemographic variables were collected, including age, gender, education level, employment status, marital status, family members, demographic area, and province of residence. Participants were also asked about their ABI diagnosis and the number of years since the brain injury occurred.

Open Questions Questionnaire (OQQ). To explore narratives phenomenologically, a series of open questions were formulated based on expert criteria, cognitive interviews from the pilot study, and a review of related qualitative studies. The questions for ABI participants can be found in the Supplementary files.

Quantitative instruments

Mental and Physical Health Adapted Scale (MPHAS). Our study included items from the Costa Rican version of the Acute Stress Reaction (ASR) scale (Jurado-Solórzano et al., 2023). This version's initial construct validity demonstrated good reliability (α = .85) and internal consistency (r = .47 to r = .67). Confirmatory factor analysis (CFA) supported a one-dimensional model (χ^2/df = 2.72, CFI = .96, RMSEA = .070, 90% CI [.048, .093]). For this study, questions were introduced with the statement, "Since last week, have you experienced any of the following symptoms?" on a Likert scale from "(1) never" to "(4) always." Additionally, based on expert recommendations and previous studies (Russell, 1996; Salas & Prigatano, 2018), we added 9 more items to the original 9 items in the scale (18 items in total) to explore symptoms specific to individuals with ABI. The new name given to the scale on the online survey was MPHAS (see Supplementary files for the final item list). For this adapted version, Cronbach's alpha was α = .95, indicating an excellent fit.

Brief Resilient Coping Scale (BRCS). We used the BRCS adapted for Costa Rica (Jurado-Solórzano et al., 2023), based on the Sinclair and Wallston (Sinclair & Wallston, 2004) version, which demonstrated good reliability (α = .89). In our ABI sample, the BRCS reliability was acceptable at α = .74.

UCLA Loneliness Scale Revised (UCLALS-R). Originally developed by Russell et al. (Royal London College of Physicians & British Society of Rehabilitation Medicine, 2016; Russell et al., 1978), the UCLALS-R measures subjective feelings of loneliness and social isolation. We used the revised version by Hays and DiMatteo (Hays & DiMatteo, 1987), which maintains reliability, validity, and factor structure. For the Costa Rican sample, Jurado et al. (Jurado-Solórzano et al., 2023) provided construct validity and supported correlations between loneliness and health and well-being measures. Reliability for our ABI subsample was good (α = .89).

New Me Scale (NMS).

We adapted the instrument from the research "A New Me: Experiences of Life After Brain Injury" (Glover, 2003; Headway the brain injury association., 2017) (see Supplementary files for the final item list). This instrument was developed for individuals with brain injuries to assess how they perceive changes in their lives and sense of identity following an ABI. The term "New Me" was defined in the scale as the perceived changes in self-identity that emerge after ABI, encompassing both personal and social dimensions of life.

All items were back-translated (English-Spanish-English) and adapted in the pilot study. Reliability for our ABI sample was good ($\alpha = .83$). The scale was divided into two sections: The first section included twelve items with the statement, "Please indicate if you agree or disagree with the following affirmations," answered with "(1) Yes," "(2) No," or "(3) Does not apply to me." This section explored the subjective experience of identity change after ABI as well as understanding from others about the psychological effects of ABI. The second section included six items with the statement, "Please indicate if the following aspects of your life improved or worsened after your ABI," answered on a scale from "(1) Significantly worsened" to "(5) Significantly improved." This section assessed perceived self-esteem, independence, social life, home relationships, job employment and economic circumstances. According to the NMS (Headway the brain injury association., 2017), individuals with lower scores exhibit greater challenges in integrating their post-ABI identities, whereas those with higher scores demonstrate a stronger recognition of the positive aspects of their new identities.

The NMS presented a unique opportunity as it is one of the few tools specifically designed to capture the subjective experience of identity change after ABI. However, we acknowledge that the NMS may represent a latent construct encompassing more than just identity. As previous studies have shown perceived identity or personal changes, are relevant aspects of a new sense of identity, MoL, and re-signification, which are all theoretically related (Chow, 2017; Chow, 2018; Littooij et al., 2016; Park & Folkman, 1997; Reker, 2007 Salazar-Villanea et al., 2023). Therefore, we chose to explore the nomological validity of the "New Me" perception since it is a complex construct within the framework of MoL research.

Nomological validity tests have primarily been used in health psychology to evaluate complex constructs within systems (Hagger et al., 2017). It refers to the extent to which predictions made within a formal theoretical framework are supported (Rauvola et al., 2020).

To establish nomological validity to the NMS, we conducted Pearson correlations analysis between the NMS and other psychometric measures included in this study. Results revealed a strong negative correlation between the NMS and the MPHS ($r = -.69$, $p < .001$), indicating that participants with higher NMS scores reported lower mental and physical health symptoms. A moderate

positive correlation was observed between the NMS and the BRCS ($r = .49$, $p < .001$), suggesting that higher NMS scores were associated with more adaptive coping strategies. Additionally, the NMS demonstrated a moderately strong negative correlation with the UCLALS-R was negatively moderate ($r = -.67$, $p < .001$), implying that participants with higher NMS scores experienced lower levels of loneliness.

Although the current sample size precludes definitive conclusions about statistical construct validity, our findings – grounded in theoretical frameworks of identity change after ABI – support the NMS as a proxy measure of MoL. The observed nomological interplay of constructs and measures aligns with hypothesized theoretical relationships, reinforcing the scale's utility.

Narrative analysis

Building on our previous study and an extensive literature review, the research team developed an initial categorical system for analyzing the experiences of individuals with ABI through their narratives. The narrative analysis process employed phenomenological content analysis as the primary technique for examining the narratives collected via the Open Qualitative Questionnaire (OQQ). Since this study is part of a broader research project, the initial categorical system was designed to analyze multiple themes (Salazar-Villanea et al., 2023). However, for this article, only the category of MoL-Resignification was considered for narrative analysis.

The narrative analysis process utilized the constant comparison method and proceeded as follows: Using ATLAS.ti software (version 9.0.21.0), the research team – comprising two main researchers and three advanced psychology students trained in qualitative methods – independently coded the narrative extracts from the OQQ. The team applied the newly developed categorical system and proposed provisional modifications to the system for further refinement. After the independent coding process, intercoder agreement was calculated. Discrepancies in categorization were resolved through team discussions, referencing prior literature, and revising the categorical system to incorporate new theoretical perspectives proposed by the team. Following these discussions, the final intercoder agreement was calculated. For the MoL-Resignification categories, the intercoder agreement reached $\alpha = .984$, indicating a high level of consistency. Representative narratives for the MoL-Resignification categories were selected based on the expert judgment of the research team and translated for inclusion in this paper.

Reflexivity

As researchers, we emphasize the importance of reflexivity in enhancing the credibility and depth of our findings. We acknowledge that our engagement

with participants extends beyond data collection, shaping our understanding of the phenomena under investigation (May & Perry, 2014; Park & Folkman, 1997). This ongoing interaction has compelled us to confront the social inequalities prevalent in our Latin American context, particularly in Costa Rica, where we aim to influence public health policy for individuals with ABI and their families.

Our empathic engagement with participants has heightened our awareness of the challenges faced by this vulnerable population, revealing significant gaps in existing public health policies. Through critical self-reflection and weekly team discussions, we identified and addressed our biases, which informed our exploration of previously overlooked topics, such as the role of religious and spiritual referrals – a theme deeply embedded in our cultural context and participants' narratives. This reflective process enriched our analysis and allowed us to approach participants' narratives with greater sensitivity, particularly regarding issues of discrimination and emotional distress.

We also recognize the transformative potential of our work in amplifying marginalized voices. Society often prioritizes physical impairments while neglecting the emotional and personality changes associated with ABI. This underscores the need for rehabilitation strategies that involve both individuals with ABI and their support networks. Although our study is limited by a small sample size, we advocate for further research to validate or challenge our interpretations and to advance our understanding of these critical issues.

Statistical analysis

Following the classification of narratives, quantitative data for all participants was analyzed. Sociodemographic differences among groups were assessed using appropriate statistical tests: The Welch Two-Sample t-test for age by gender; the Wilcoxon rank-sum test for years since ABI by gender; and Fisher's exact test for education level by gender, marital status by gender, household company by gender, demographic area by gender and province by gender. Cronbach's alpha coefficients were calculated to evaluate the reliability of the scales. Additionally, t-tests were conducted to examine differences in scale scores by gender within the ABI group. All statistical analyses were performed using RStudio software (version 2023.03.0 Build 386).

Given the exploratory nature of this research in the Costa Rican context, descriptive analyses were conducted on the scale scores (MPHAS, BRCS, UCLALS-R, and NMS). Since MoL-Resignification is the primary focus of this research, participants were divided into quantiles based on their scores on the NMS. We analyzed the differences in scores across the other scales in relation to the NMS quantile divisions using ANOVAs (see statistical results for further details). This quantile-based approach allowed for a deeper understanding of the qualitative data related to MoL-Resignification. The NMS measures the degree to which an individual experiences a new sense of identity following ABI.

Given that the development of a new sense of identity after ABI is considered a key component of the process of constructing a new MoL (Chow, 2017; Chow, 2018; Liang et al., 2020), we considered this scale a suitable – albeit indirect – quantitative indicator of MoL. We acknowledge that the use of this scale is experimental, as no factor analysis has been conducted to date to validate its latent structure. However, reliability analysis in our sample demonstrated a good fit (α = .83), and no other MoL scale specifically designed for individuals with ABI has been developed.

As a mixed-methods study with an exploratory focus, we aimed to interpret the NMS scores in light of the qualitative narratives provided by participants. This approach enabled us to explore the relationship between quantitative measures of identity change and qualitative insights into MoL-Resignification, thereby enriching our understanding of this complex phenomenon.

Results

Categorical analysis

Narratives from a total of 35 participants with ABI (N = 35) were analyzed. For this study, only fragments coded under the MoL-Resignification categories were considered. After the coding process described in the methods section, intercoder agreement, calculated using Krippendorff's alpha, was assessed among the research team (comprising two researchers and three trained psychology students). The analysis demonstrated strong reliability (α = .98) for the MoL-Resignification categories (see Table 3).

The overarching category of MoL-Resignification was defined as participants' descriptions of changes in their perspective on life and self-experience following ABI. These narratives often reflected a newfound sense of meaning regarding life, self-identity, and a renewed sense of purpose or societal role. To capture the nuances of these changes, Resignification was divided into four subcategories, each reflecting distinct dimensions of participants' narratives: (1) Individual MoL-Resignification: Changes in personal meaning and self-identity; (2)

Table 3. Categorical system related to "Resignification."

MoL-Resignification: Refers to changes in one's perspective on life and self-experience following ABI. The narratives often include a newfound meaning regarding life, self-identity, and a renewed sense of purpose or societal role. Individual MoL-Resignification (Douglas, 2013): Narratives that address the transformation of self-identity and personal values. This involves the implementation or development of a new personal approach to living, along with new wishes for one's own life or well-being.
Social MoL-Resignification (Braun & Clarke, 2006): Narratives that refer to developing a new social role related to work, family relationships, friendships, or broader societal interactions. This category includes positive changes in social relationships and a renewed sense of meaning or purpose in engaging with others.
Global MoL-Resignification (DeSantis & Ugarriza, 2000): This category involves attributing a new meaning to life, human experience, values, or principles that the person believes are commonly applicable.
Spiritual MoL-Resignification (Cahill et al., 2021): Narratives that mention spiritual or religious beliefs to derive meaning from the experience of ABI, whether on a personal or universal level.

Note. Frequencies for each category are presented inside parentheses.

Social MoL-Resignification: Shifts in perceived societal roles or purposes; (3) Global MoL-Resignification: Broader changes in beliefs about life in general; (4) Spiritual MoL-Resignification: The incorporation of religious or spiritual beliefs to reframe the ABI experience.

This categorization aligns with prior literature on the MoL in ABI populations (Chow, 2017; Chow, 2018; Littooij et al., 2016; Park, 2010; Park, 2013; Park & Folkman, 1997; Reker, 2007). However, the subcategory of Spiritual MoL-Resignification was considered culture-specific. Costa Rica is the only country in the Americas with Catholicism established as its official religion (Article 75 of the Constitution of Costa Rica), and religious and spiritual beliefs are deeply ingrained in the cultural fabric. This subcategory captures narratives in which participants draw on spiritual or religious beliefs to navigate the challenges of ABI and reframe their MoL. Specifically, Spiritual MoL-Resignification is defined as the integration of spiritual or religious beliefs that provide personal and universal meaning to the ABI experience.

Table 4 presents representative narrative examples for each Resignification category, illustrating the diverse ways in which participants articulated their experiences of MoL-Resignification following ABI.

Descriptive quantitative analysis

A total of 35 individuals with ABI completed the quantitative instruments (N = 35). Of these, 23 identified as female (n = 23) and 12 as male (n = 12). Descriptive data for each demographic variable were previously presented in Table 2. Given the apparent heterogeneity in gender distribution within the sample, we evaluated potential differences between genders across all demographic variables. No significant differences were found for age by gender (Welch Two-Sample test; $t(17.20) = -0.63$, $p = .54$); time since injury by gender (Wilcoxon rank-sum test; $W = 115.5$, $p = .44$); ABI diagnosis by gender (Fisher's exact test; $p = .86$); education level by gender (Fisher's exact test; $p = 1.00$); marital status by gender (Fisher's exact test; $p = .12$); household company by gender (Fisher's exact test; $p = .59$); demographic area by gender (Fisher's exact test; $p = .40$); and province by gender (Fisher's exact test; $p = .22$).

All participants reported having an economic income (affirmative employment status), so this variable was not evaluated. Descriptive data for the entire sample (N = 35) on the psychological scales – BRCS, NMS, MPHS, and UCLALS-R – are presented in Figure 3.

Scale score differences by gender

A series of independent sample t-tests were conducted to examine gender differences within the ABI group. No significant differences were found between men (n = 12) and women (n = 23) on the MPHS, the UCLALS-R or the

Table 4. Example narratives for each category of MoL Resignification.

Individual Resignification of the Meaning of Life after ABI
Laura: Female, 31 years, Neurovascular pathology, 3 years since ABI (NMS: first quantile) - "For me, I have learned a lot, and without a doubt, psychological support has been important in learning how to regulate my emotions in a healthier and more compassionate way. This process has changed many things and remains an unfinished journey – I still have so much to learn. If I could make a wish, it would be to regulate my emotions perfectly. But realistically, I hope to live the best way I can, staying active and aware of my needs." **María: Female, 36 years, Neurovascular pathology, 3 years since ABI (NMS: second quantile)** - I need to reinvent myself, relearn, and develop other areas that function better after my ABI to make me feel excited about living. It is a daily personal therapy of acceptance, thinking that it could have been worse. However, it was difficult in the work aspect because I did not receive support. This has made me seek options to learn something that I feel I can do, and in my case, I started learning to draw so that I can later design clothes. This excitement is like my driving force during these times of struggle. **Emily: Female, 62 years, Brain tumor, 1 year since ABI (NMS: second quantile)** - "I need to reinvent myself, relearn, and develop other areas that function better after my ABI, to make me feel excited about living. It is a daily personal therapy of acceptance – thinking that it could have been worse. However, it was difficult in the work aspect because I did not receive support. This has made me seek options to learn something I feel I can do. In my case, I started learning to draw so that I can later design clothes. This excitement is like my driving force during these times of struggle." **Andrea: Female, 33 years, Brain tumor, 3 years since ABI (NMS: third quantile)** - "I also think that I am not the same person. Instead, I have managed to break a couple of mental blocks on both a personal and social level." **Juan: Male, 26 years, Non-specified neuropathology, 7 years since ABI (NMS: third quantile)** - "My life took a radical turn; I feel it has improved. It was like a metamorphosis. Since the accident, my previous self disappeared, and I have become a more disciplined, organized person with a great desire to live and improve myself. I learned a lot from the life experience that my ABI left me with." **Luisa: Female, 27 years, Traumatic Brain Injury, 2 months since ABI (NMS: third quantile)** - "I was reborn after the accident, and my life changed completely. In other words, I have a second chance to live life without stress, trying not to repeat the same mistakes as before." **Clara: Female, 41 years, Brain tumor, 2 years since ABI (NMS: third quantile)** - "The changes I have experienced have been for the better. Recognizing my condition and starting treatment has helped me improve my confidence and ability to listen to my own body." **Emma: Female, 42 years, Traumatic Brain Injury,1 year since ABI (NMS: third quantile)** - "After my ABI, I have learned that my body and mind have an inexplicable resilience. I am enormously surprised that I haven't forgotten aspects I consider very important to me. I have learned to be patient and to start with small steps."
Social Resignification of the Meaning of Life after ABI
Laura: Female, 31 years, Neurovascular pathology, 3 years since ABI (NMS: first quantile) - "I have learned the importance of family and surrounding yourself with people who are willing to help you, even when life gets tough. However, you should also not suffer over those who didn't help you." **Pablo: Male, 35 years, Neuroimmunological pathology, 7 years since ABI (NMS: second quantile)** - "With the help of professionals, family, and oneself, one can move forward. And if everyone comes together, we can achieve many things." **Emma: Female, 42 years, Traumatic Brain Injury,1 year since ABI (NMS: third quantile)** - "My social relationships are stronger and more long-lasting. I have learned to discover other aspects of people that I enjoy – aspects I wouldn't have previously given the time to know. Perhaps I wasn't interested in exploring other characteristics of people before. Now, I am more selective in investing time with others." **Andrea: Female, 33 years, Brain tumor, 3 years since ABI (NMS: Third quantile)** - After my ABI, I have learned that every minute counts and that unconditional friendships are fundamental in these difficult moments of life … Whether it's with a call, with messages, or with a gesture, the act of being present is really important to me. **José: Male, 44 years, Brain tumor, 32 years since ABI (NMS: third quantile)** - "After my ABI, I have learned that every minute counts and that unconditional friendships are fundamental in these difficult moments of life. Whether it's through a call, messages, or a simple gesture, the act of being present is truly important to me."
Global Resignification of the Meaning of Life after ABI
Laura: Female, 31 years, Neurovascular pathology, 3 years since ABI (NMS: first quantile) - "I have learned that life can end in a second, so life is about the present moment. This realization has made me less strict and stingy with myself, and more focused on enjoying the present." **Marta: Female, 47 years, Brain tumor, 8 years since ABI (NMS: first quantile)** - "Philosophically, life is very fragile. In an instant, it can change 360 degrees without our desire or expectation." **Fernanda: Female, 46 years, Brain tumor, 6 years since ABI (NMS: second quantile)** - "Nothing in life is guaranteed. Everything can change, and change is not synonymous with negativity." **Carlos: Male, 76 years, Neurovascular pathology, 13 years since ABI (NMS: second quantile)** - "Life changes, and with every change, one is no longer the same. It's about learning to become a different person". **Priscilla: Female, 39 years, Traumatic Brain Injury, 24 years since ABI (NMS: third quantile)** - "Not to rush through life … Live one day at a time." **Andrea: Female, 33 years, Brain tumor, 3 years since ABI (NMS: Third quantile)** - "I would like people with ABI to be brave and to take their diagnosis as a temporary situation from which everything will turn out well. Push away any negative thoughts and believe that everything will be positive, no matter how adverse the situation may seem. The power of the mind is

(*Continued*)

Table 4. Continued.

Individual Resignification of the Meaning of Life after ABI
extremely strong." **Fabián: Male, 46 years, Brain tumor, 1 years since ABI (NMS: third quantile)** - Living with ABI it's not easy, and one should consider living life day by day.
Spiritual Resignification of the Meaning of Life after ABI
Rosa: Female, 56 years, Non-specified neuropathology, 3 years since ABI (NMS: first quantile) - "I am a human being filled with faith and love, grateful to God and the Virgin Mary. I am devoted to God, the Virgin, and the Holy Spirit. Nowadays, I am a different person, and I feel that my accident changed me for the better." - "For everything I have right now, I am grateful to God and the Virgin Mary. I am a miracle – that's what the doctors and friends have said. According to the doctors, I was supposed to become paralyzed, use a wheelchair, and have speech problems. To live each day is to feel, love, be, breathe, pray, bless, be grateful, and reflect." - "A new me is the most beautiful gift that God and the Virgin Mary have given me. I am a woman of faith, dedicated to God and the Virgin Mary. Being the new me means being grateful every second for being alive and present. I breathe, go to doctor's appointments, take medical exams, and keep track of all my medications and schedules. Being a new person is amazing because I am a different woman – full of love and faith." **Mirta: Female, 27 years, Non-specified neuropathology, 10 years since ABI (NMS: second quantile)** - "There is a God who sees everything and has helped me face my sequels after ABI." **José: Male, 44 years, Brain tumor, 32 years since ABI (NMS: third quantile)** - "Being a new me is … let's say, at the beginning of my illness, I was kind of lost. In what sense? I didn't have direction in my life, whether things were going well or not. That's why, in adolescence, at 21 years old, I accepted Christ – and since then, it has been the best decision of my life. Christ has helped me even with the small things in life, like my social skills, friendships, and my spirit."

Note. The given names for each participant are fictional for readability purposes. The original participant´s language is Spanish, so translations include culturally-specific phrasing.

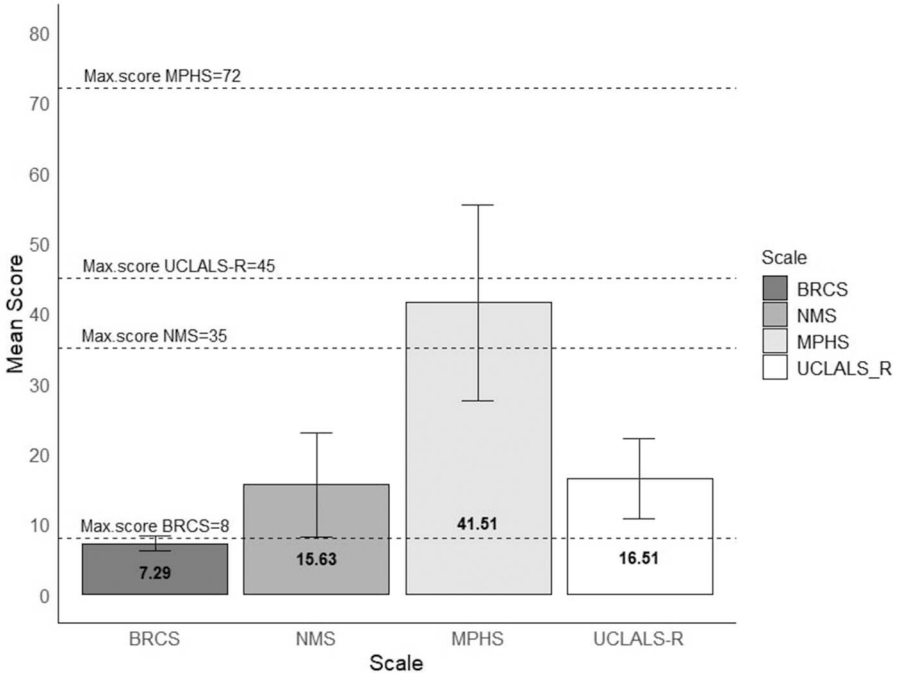

Figure 3. Scale mean score and standard deviations for the ABI group.

Note: The dotted lines indicate the maximum possible score for each scale. Note: BRCS (M = 7.29, SD = 0.98), NMS (M = 15.63, SD = 7.40), MPHS (M = 41.51 SD = 13.96), UCLALS-R (M = 16.51, SD = 5.65).

BRCS (t-test; $t(33) = 0.85$, $p = .40$). However, a significant gender difference was observed on the NMS (t-test; $t(33) = 2.24$, $p = .03$), with male participants scoring higher ($M = 19.33$, $SD = 5.51$) than female participants ($M = 13.70$, $SD = 7.61$).

NMS: resignification quantile splitting strategy

Narrative analysis revealed qualitative differences in participants' experiences between each MoL-Resignification category (see Results for detailed qualitative findings). To further explore and describe these differences, the ABI sample was divided into three quantiles based on NMS scores (see the Statistical Analysis subsection in Materials and Methods). Three quantiles were chosen as the optimal grouping due to the sample size and score distribution. The quantiles were defined as follows: Q1: Scores ranging from 1 to 10 (n = 9); Q2: Scores ranging from 11 to 17 (n = 14); Q3: Scores ranging from 18 to 31 (n = 12).

Participants in Q1 (the lowest quantile) reported significantly lower NMS scores, indicating reduced satisfaction with their post-ABI identities. Those in Q2 (the middle quantile) demonstrated average NMS scores, reflecting a moderate, transitional phase of identity change. In contrast, participants in Q3 (the highest quantile) achieved the highest NMS scores, suggesting greater acceptance and recognition of the positive aspects of their new identities.

The sociodemographic characteristics of participants in each quantile are presented in Table 5. Descriptive analyses showed no significant differences between quantiles for the following variables: Age, gender, time since injury, ABI type, education level, civil status, zone and province. However, significant differences were found for family company (Fisher's exact test; $p = .01$). Nonetheless, post-hoc analyses with Bonferroni correction ($\alpha = .05$) yielded non-significant results.

Average scores for each quantile across the psychological scales are shown in Figure 4.

A series of ANOVAs were conducted to test for significant differences between quantiles. For the BRCS, significant differences were found between Q3 and Q1 (ANOVA; $F(2, 32) = 4.377$, $p = .01$), indicating that participants with the highest NMS scores (Q3) reported better-coping strategies than those with the lowest scores (Q1).

For the MPHS, significant differences were observed between Q3 and Q2 (ANOVA; $F(2, 32) = 13.78$, $p = <.001$) and between Q3 and Q1 (ANOVA; $F(2, 32) = 13.78$, $p < .001$). This suggests that participants with higher NMS scores (Q3) reported less mental and physical health burden compared to those with medium (Q2) and low (Q1) scores.

Regarding the UCLALS-R, significant differences were found between Q2 and Q1 (ANOVA; $F(2, 32) = 12.01$, $p = .007$), and between Q3 and Q1 (ANOVA; $F(2, 32) = 12.01$, $p < .001$). This indicates that participants with higher (Q3) and average (Q2) NMS scores reported significantly fewer perceptions of loneliness than those with the lowest scores (Q1).

Lastly, the potential effects of years since ABI and participant age as covariates were examined for each quantile subgroup using ANCOVA. No significant differences in scale scores were attributable to years since ABI after controlling

Table 5. NMS Quantile Sociodemographics.

Sociodemographic variables	M (SD)	Range	
- Age			
Q1	43.2 (12.5)	26 years – 60 years	
Q2	51.9 (13.2)	35 years – 76 years	
Q3	42.9 (12.9)	26 years – 71 years	
- Time since injury			
Q1	6.37 (4.36)	3 months – 15 years	
Q2	5.29 (3.96)	1 year – 13 years	
Q3	8.77 (10.4)	2 months – 32 years	
n (%)			
	Q1	Q2	Q3
Gender			
Female	9	8	6
Male	-	6	6
ABI diagnosis			
Brain tumor	2	4	4
Traumatic Brain Injury	2	1	5
Neurovascular pathology	3	2	2
Non-specified neuropathology	2	3	1
Neurodegenerative pathology	-	3	-
Neuroimmunological pathology	-	1	-
Education level			
Higher education	5	10	11
Technical education	-	-	-
Middle education	3	4	-
Primary education	1	-	1
Employment status			
Employed	9	14	12
Non employed	-	-	-
Marital status			
Married or in a consensual union	5	9	4
Single	3	1	7
Divorced	1	4	1
Household company			
Lives accompanied	9	14	8
Doesn't live accompanied	-	-	4
Demographic area			
Rural	8	11	8
Urban	1	3	4
Province			
GMA[b]	9	10	12
Non-GMA	-	1	-

Note. a = Employment status considers pension by the government or informal job; b = Great Metropolitan Area.

for quantile subgroups. Similarly, participant age did not significantly affect scale scores when controlling for quantile subgroups. This indicates that differences in scores between quantiles (Q1, Q2, Q3) were robust to adjustments for years since ABI and participant age.

Relationship between scorings in the NMS and resignification narratives

To better characterize and relate participants' narratives with their quantitative results on the NMS, we calculated the frequency of Resignification narratives within each NMS quantile. Figure 5 illustrates that Individual MoL-Resignification narratives were more prevalent in the second (Q2) and third (Q3) quantiles, which are associated with higher NMS scores and, consequently, a more positive self-reported experience of life after ABI. In contrast, Social MoL-Resignification

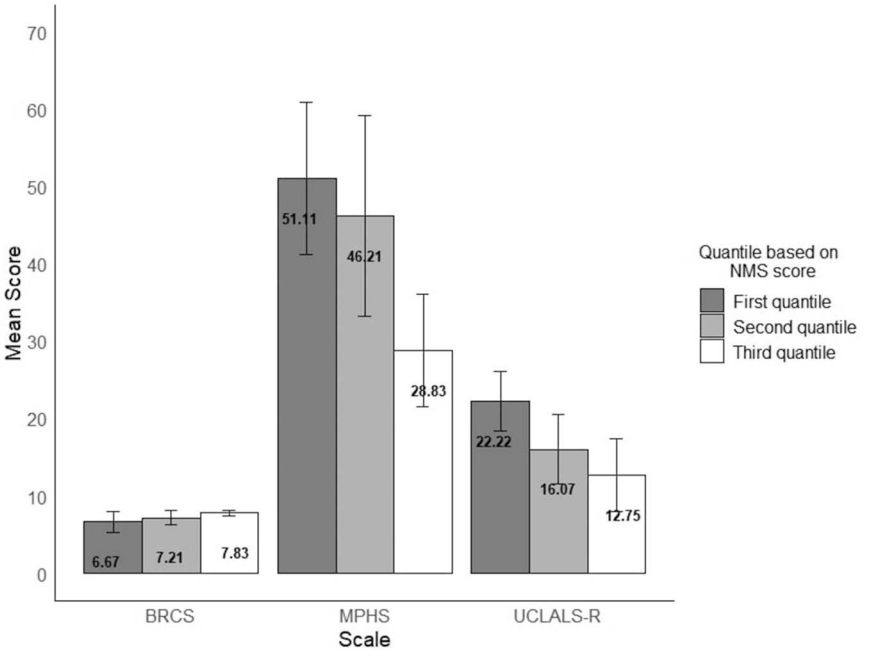

Figure 4. Mean scores and standard deviations for each scale by NMS quantile splitting.

narratives were infrequent across all quantiles. Notably, participants in the lowest NMS quantile (Q1) exhibited a high prevalence of Spiritual MoL-Resignification narratives.

Narratives, MoL-Resignification after ABI and NMS quantile scores

The analytical process for the current study began by categorizing the narratives of participants with ABI into four MoL-Resignification categories (Table 3). The quantitative analysis provided scores for participants on each psychological scale, with the NMS emerging as a strong candidate for describing identity change as part of MoL-Resignification. In this section, we will outline the qualitative data descriptions based on the quantiles derived from NMS scoring, as previously discussed regarding the reasons for quantile division in statistical analysis. This approach is supported by three key justifications. First, preliminary qualitative analysis revealed that there were distinct personal aspects within the MoL-Resignification subcategories. For example, the personal narratives of MoL-Resignification varied significantly in terms of how individuals internalized and accepted changes in their MoL following ABI. Second, when examining the frequency of MoL-Resignification categories, we observed clear trends in their distribution across the NMS quantiles (see Figure 5). Third, categorizing these narratives according to MoL-Resignification themes and NMS quantiles enabled a more organized and clearer presentation of the qualitative results.

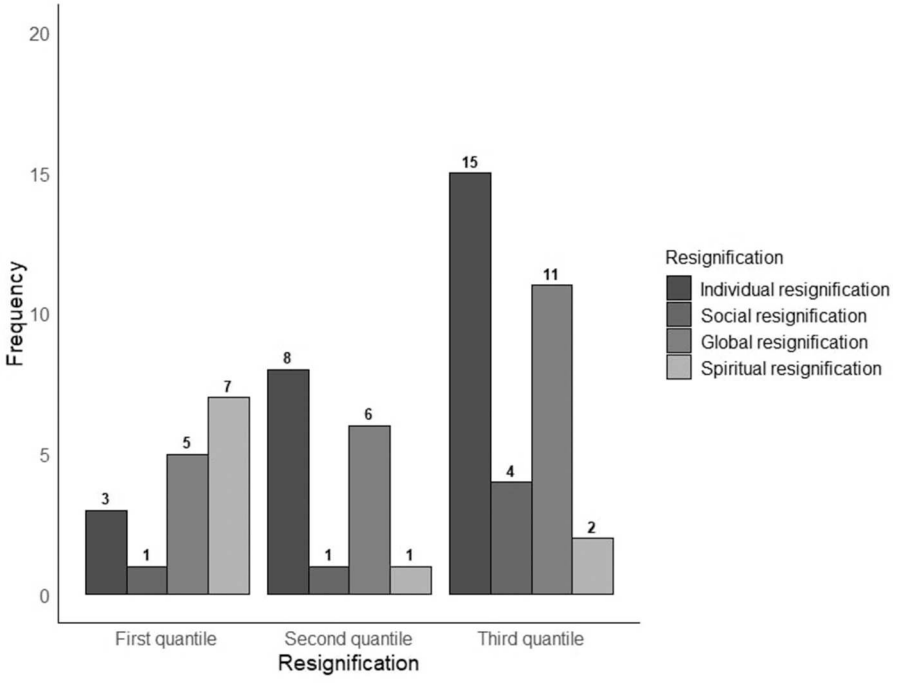

Figure 5. Frequencies of the "MoL-Resignification" subcategories for each NMS quantile.

Note: The total cumulative percentages of each category are Individual MoL-Resignification narratives (40,63%), Global MoL-Resignification narratives (35,94%), Spiritual MoL-Resignification (15,63%), and Social MoL-Resignification (6,25%).

We acknowledge that the quantile-based analysis should be revisited in future studies, particularly with larger samples and the development of a MoL scale specifically designed for individuals with ABI (see Limitations section).

Below, we present the thematic narrative aspects for each MoL-Resignification category (Individual, Social, Global, and Spiritual), organized by NMS quantiles which reflect participants' experiences previously provided in Table 4.

Individual MoL-Resignification

The NMS measures individuals' perceptions of improvement, continuity, or deterioration in internal or external life conditions after ABI. Participants in the first quantile (Q1) (characterized by the lowest NMS scores) focused on the impact of ABI sequelae on daily life. Their narratives expressed hope and a desire for change to improve life experiences, often emphasizing emotional dysregulation and its challenges. While they desired improvement, many struggled to find a clear path or understand the effort required to adapt to their new circumstances.

Participants in the second quantile (Q2) emphasized adjustment and adaptation, acknowledging the importance of functional changes in achieving new lifestyles and values. They expressed acceptance of their condition, often

feeling comforted by the realization that their situation could have been worse. By modifying their previous responsibilities, they were able to redefine their roles, which led to feelings of relief and peace.

In the third quantile (Q3), participants described reflective processes and insights, framing their life with ABI as a learning experience. This interpretation enabled them to embrace identity changes and adopt new ways of living. Their narratives highlighted acceptance and positive evaluations of their new selves, often illustrating how they cultivated new personal values and engaged with their bodies and self-images in ways that contributed to a renewed perspective on life.

Social MoL-Resignification

Participants in the first quantile (Q1) highlighted the importance of social support, such as family and friends, in navigating life after ABI. However, they also reported feelings of distancing from previous relevant social groups (coworkers for example). In the second quantile (Q2), while familial social support remained important, participants also valued professional support in improving their post-ABI life conditions.

Narratives in the third quantile (Q3) described the emergence of new ways to connect to others, viewing improved familial and social relationships as essential for a fulfilling life. Some narratives reflected a prosocial stance, with participants expressing a desire to positively impact others by sharing their ABI experiences.

Global MoL-Resignification

Participants in the first quantile (Q1) perceived life as fragile and unpredictable, though some acknowledged positive aspects of their post-ABI experiences. In the second quantile (Q2), narratives also acknowledged life's unpredictability but framed it neutrally or positively. Participants employed coping strategies, such as appreciating what remained continuous in their lives and how they maintained a connection to their bodies and self-images. Their values were centred on adapting to change, viewing illness as an inherent part of life.

In the third quantile (Q3), time emerged as a central theme, with participants focusing on "living in the present" as a coping strategy. This "living in the present" is characterized by participants' sense of patience and acceptance of their sequels, experiencing current live events with adjustments, instead of dwelling in the past or engaging with future worries. Also, narratives expressed different possibilities to overcome their current limitations through adaptation. This approach reduced the burden of existential questions (e.g., "Why me?") and emphasized the possibility of maximizing well-being. Participants with higher life satisfaction appeared to move beyond grief and uncertainty, focusing instead on the subjective meaningful aspects or values in their lives.

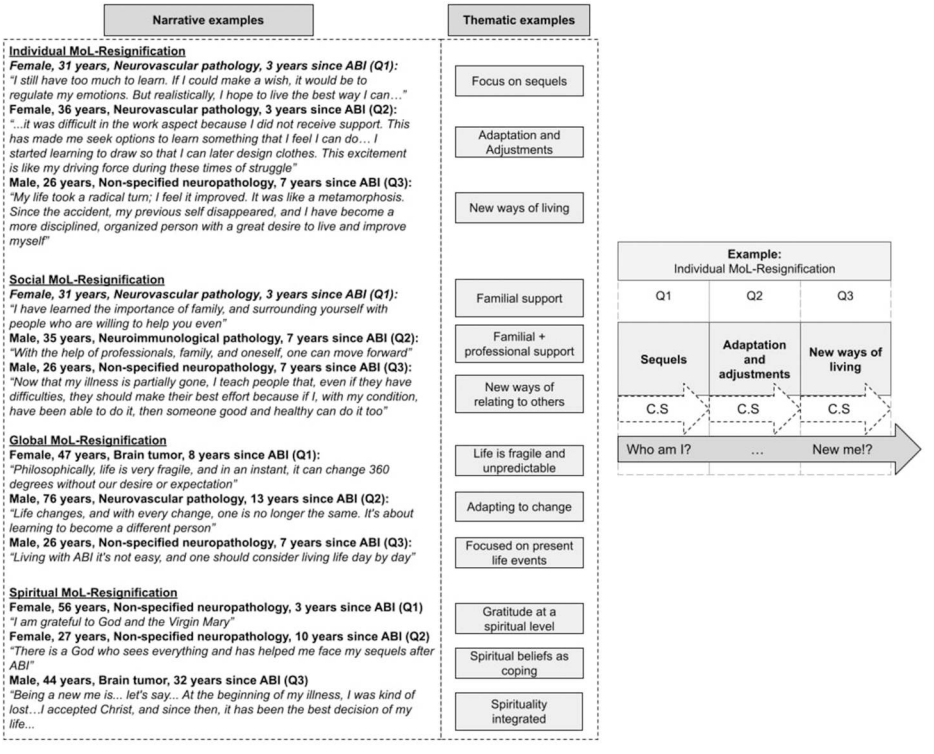

Figure 6. Examples of thematic aspects identified in each MoL-Resignification category and their relation to the NMS quantiles.

Note: The Individual MoL-Resignification example describes how themes change for each NMS quantile as Coping Strategies (C.S) are implemented. Through this process, a new sense of identity is reconfigured.

Spiritual MoL-Resignification

Participants in the first quantile (Q1) identified themselves as survivors or "miracles", expressing gratitude to religious figures and dedicating their lives to them (in a gratitude stance). While they acknowledged identity changes or life changes, these were primarily linked to religious experiences and interpretations. In the second quantile (Q2), religious beliefs served as a coping mechanism for navigating life adversities after ABI. Participants in the third quantile (Q3) viewed religious beliefs as integral to their understanding of life experiences. These beliefs guided them in developing a new sense of identity and fostering personal growth despite the challenges posed by ABI. Therefore participants moved beyond a gratitude stance for being alive and started expressing a motivation to achieve a new life meaning including their spiritual values (Figure 6).

Discussion

In this paper, we aimed to explore the process of MoL-Resignification following ABI in a Costa Rican sample. The qualitative data analysis showed that

participants present narratives regarding four levels of MoL-Resignification (Individual, Social, Global and Spiritual). Quantitative analysis described the ABI sample's performance on various mental health scales, with the NMS being of particular interest, due to its focus on measuring identity change. Employing a mixed-methods approach, qualitative data was analyzed through the lens of NMS scores using a quantile-splitting strategy.

The findings indicate that participants with higher NMS scores, reflecting greater enhancement in identity and life circumstances, exhibited significantly better mental and physical health, lower levels of loneliness, and more effective coping strategies compared to those in the lower and middle quantiles. Participants in the lowest NMS quantiles (Q1 and Q2) predominantly described struggles with ABI sequelae, consistent with prior literature (Armstrong et al., 2016; Ashing-Giwa & Lim, 2009; Drewes et al., 2018; Klein et al., 2016). Findings suggest that individuals who struggle to cope or resignify their identity post-ABI often experience greater mental and physical health symptoms (e.g., pain, sadness, psychological diagnoses) and feel more lonely.

In contrast, participants with higher NMS scores (Q3) demonstrated narratives of acceptance and adaptation, employing coping strategies to reconstruct or maintain a sense of identity. This aligns with previous research indicating that developing a new identity and achieving personal goals post-ABI are associated with improved well-being (Muenchberger et al., 2008; Ownsworth, 2014; Ownsworth et al., 2015; Salazar-Villanea et al., 2016; Thomas et al., 2014). Additionally, mediating factors such as a renewed MoL and identity integration have been linked to reduced depression, and hopelessness (Chow, 2017; Chow, 2018), enhancing daily functioning (Ownsworth et al., 2015). Outside the sphere of MoL and identity change, the return to life activities and increased independence as described in narratives, have been shown to promote quality of life in ABI patients (Liang et al., 2020; Pan et al., 2019; Rapport et al., 2020; Segal, 2010; Shao et al., 2013a; Van Bost et al., 2022; Verdugo et al., 2019).

The results of this study, supported by prior research (Salazar-Villanea et al., 2023), suggest that Individual MoL-Resignification – encompassing personal values and identity – is closely related to the implementation of effective coping strategies. Cognitive adaptation theories (Taylor, 1983) and compensatory psychosocial scaffolding (Reuter-Lorenz & Park, 2014) propose that when ABI patients employ effective coping strategies in daily functioning, they develop a heightened subjective awareness of the possibility of well-being post-ABI (Kreutzer et al., 2016; Littooij et al., 2016; Nalder et al., 2019; Neils-Strunjas et al., 2017; Scholten et al., 2020). Thus, coping strategies may serve as bridges that facilitate the MoL-Resignification. This idea is further supported by evidence that gradual improvements in self-efficacy and future-oriented control promote satisfactory identity reconfiguration after ABI (Almeida et al., 2022).

For the Costa Rican sample, narratives referring to the Social MoL-Resignification were scarce, which is consistent with prior literature reporting limited social purpose and community connection among individuals with ABI (Cockerham et al., 2017; Dahlberg et al., 2022; Honan et al., 2019; Janda et al., 2006). Some studies suggest that fear of disclosing their condition or sequelae drives individuals with ABI toward social isolation or suppression of their impairments (Ownsworth et al., 2011; Park & Folkman, 1997). In the cultural context of Costa Rica, the low prevalence of Social MoL-Resignification may reflect societal stereotypes and barriers that limit individuals with ABI from engaging in prosocial activities, as well as social stigmas surrounding cognitive impairment (Salazar-Villanea et al., 2023).

Participants with lower NMS scores often expressed gratitude for informal social support, particularly from family. Research has shown that in the first moments after ABI, patients experience social withdrawal due to their sequels and identity-shattering (Cubis et al., 2018; Cubis et al., 2019).

Those with higher scores also described familial support but tended to adopt a prosocial stance, and actively seek new purpose in sharing their post-ABI experiences. As they manage new life challenges and re-integrate their own sense of identity, incorporation back into social spheres tends to emerge (Dahlberg et al., 2022; Ownsworth et al., 2011; Ownsworth et al., 2015). Additionally, feeling understood by family and close social groups has been shown to reduce loneliness among ABI patients (Cubis et al., 2018; Cubis et al., 2019; Salazar-Villanea et al., 2023), a finding reflected in the NMS scores and Social MoL-Resignification narratives of this sample.

For Social MoL-Resignification narratives, family support was consistently identified as the main social support. This finding in the ABI Costa Rican sample is consistent with the majority of research on the psychosocial culturally-rooted concept of familism in Latino populations (et al., 2019;; Cahill et al., 2021 Valdivieso-Mora et al., 2016). Familism is described as a protective factor in the belief that family members should support one another and maintain close emotional connections, as well as the disposition to help family both currently and in the future, providing financial assistance or shelter when needed.

Global MoL-Resignification varied significantly across NMS quantiles. Participants with the lowest NMS scores viewed life as fragile and unpredictable, often anchored in past losses. Research suggests that intense emotional distress, such as despair and anger, can lead individuals with ABI to perceive life as meaningless (Grace et al., 2015; McGrath, 2011; Shao et al., 2013b). In contrast, participants in the second NMS quantile acknowledged life's unpredictability, but framed it neutrally or positively, employing coping strategies such as appreciating remaining abilities and maintaining a connection to their bodies and self-images. The key differentiator from the first quantile appears to be a sense of control facilitated by coping and adaptation strategies, which have been shown to moderate negative life perceptions and promote post-traumatic

growth (Allen et al., 2021; Kim et al., 2020; Manning et al., 2021). Participants in the third quantile emphasized living in the present as a core coping strategy, integrating a present-focused perspective into their life values. Studies indicate that present-focused frameworks, such as mindfulness, promote well-being after ABI, because they reduce individuals' anxiety and promote strategies to overcome current challenges (Desdentado et al., 2023; Lovette et al., 2022; Niraj et al., 2020).

Interestingly, Spiritual MoL-Resignification narratives were most prevalent among participants with the lowest NMS scores. Research suggests that spiritual beliefs often serve as coping mechanisms for individuals lacking other resilience resources or for whom religion has historically been the source of their resilience (Sandelowski & Leeman, 2012; Whiffin et al., 2021). In Costa Rica, where Catholicism is deeply ingrained in the cultural fabric, religious beliefs often dictate conduct and life principles (et al., 2019). Many participants attributed their recovery to divine intervention or miracles, reflecting a passive reliance on religious figures to overcome ABI sequelae (Jones et al., 2018; Waldron-Perrine et al., 2011). The decline in spiritual narratives among participants with higher NMS scores may indicate that other active coping strategies become more effective in managing ABI sequelae, though this does not imply a rejection of religious beliefs.

In conclusion, this study is the first to explore MoL-Resignification after ABI within a Costa Rican sample. Participants who reported greater life satisfaction post-ABI also experienced lower psychological and physical burdens, reduced loneliness, and more effective coping strategies. For Individual MoL-Resignification, narratives transitioned from focusing on ABI sequelae to embracing new values and coping strategies, facilitating the development of satisfactory self-identities and life goals. Social MoL-Resignification was less prominent, with family support being the primary theme. Global MoL-Resignification narratives revealed that higher NMS scores were associated with a present-focused cognitive framework, emphasizing experiencing current life events and positive life aspects, rather than dwelling on past losses. Finally, Spiritual MoL-Resignification was most prevalent among participants with lower NMS scores, suggesting that religion serves as a coping mechanism for navigating life challenges. The decline in spiritual narratives among those with higher NMS scores may reflect the adoption of other effective coping strategies, though religion remains an integral part of their lives in this cultural context.

Rehabilitation after ABI poses significant challenges in Costa Rica and throughout Latin America, primarily due to limited healthcare infrastructure and prevailing cultural factors that influence treatment outcomes. There is an urgent need for clinical practices and psychosocial interventions that are culturally sensitive and aligned with local values. Given the lack of specialized rehabilitation services in Costa Rica and many countries in the region, the support of family members becomes a vital component in the recovery journey.

Harnessing the strong familial bonds and spiritual beliefs common in our communities can significantly improve both the mental and physical health-related quality of life for patients as they navigate the process of redefining their MoL after ABI. It is crucial to recognize familism – deeply rooted in Latin American culture – as a central tenet in clinical and rehabilitation practices. Future approaches should prioritize meaning-making and identity reconstruction throughout the ABI recovery process, ultimately leading to enhanced health outcomes.

Study limitations

This research has several limitations that should be acknowledged. First, the relatively small sample size, while consistent with prior qualitative research, limits the strength of the statistical findings in the quantitative analysis. Additionally, the reliability analysis of the scales should be interpreted with caution, especially since some scales were translated from English to Spanish, a process that may have affected their reliability.

Recruitment constraints also posed challenges. The Costa Rican health system does not provide formal certifications regarding the severity of brain injuries, the extent of sequelae, or cognitive disabilities. As a result, we were unable to define the cognitive and functional profiles of participants with precision. Cognitive testing was not conducted, and the data collection strategy prioritized self-reported and subjective experiences over precise medical or clinical-pathological data, which could not be anonymized through an epicrisis.

The use of a non-probabilistic convenience sampling method further limits the generalizability of the results. Findings should be interpreted within the specific contextual framework of this study. Potential biases in this convenience sampling, such as heterogeneity in ABI types, and cognitive variability among participants must be considered. Additionally, potential biases such as accessibility and social desirability were not controlled, which may have influenced participants' responses.

Regarding the NMS, it could be argued that the latent construct it measures is not clearly defined or may solely pertain to identity. Further structural analysis of the scale is needed to clarify its utility in MoL research and to establish its validity and reliability in this context.

Future directions

Our findings suggest several promising avenues for future research on ABI in Costa Rica and Latin America. Coping strategies emerged as a central theme in the results, highlighting their potential role in the meaning-making and resignification processes. Existing MoL frameworks have proposed that

coping strategies may be integral to these processes. Future studies could explore the interplay between coping strategies, MoL-Resignification, and neuropsychological rehabilitation to better understand how these elements interact to promote recovery and well-being in different cultures. Additionally, there is a growing recognition of the need for reliable and culturally adapted measures of MoL-Resignification.

Neurorehabilitation frameworks increasingly emphasize the importance of assessing and enhancing variables such as identity and MoL. Longitudinal research that examines the dynamic relationship between these variables could provide valuable insights into their role in recovery and adaptation post-ABI.

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Data availability

Data available on request due to privacy/ethical restrictions.

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