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Reflection Article/Essay

# Essential characteristics of sleep from the occupational science perspective

## *Características essenciais do sono na perspectiva da ciência ocupacional*

Lorena Leive[a], Rodolfo Morrison[b]

[a]University of Buenos Aires – UBA, Buenos Aires, Argentina.
[b]Universidad de Chile, Santiago, Chile.

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**Abstract**

Sleep occupation bears interesting and particular characteristics when described from the occupational science perspective. This theoretical essay examines literature from different disciplines, as well as key concepts of Occupational Science to contribute to this perspective of sleep. Firstly, the article describes sleep occupation as a pillar of health, wellbeing, and quality of life in human beings. Then, the essay focuses on how the occupation emerges in early life in the context of family routines and rituals. Daily participation and sleep are analyzed in response to two major questions that have arisen related to this occupation: how participation can be observed in an occupation characterized with periods of a reversible loss of consciousness, and how these periods could be integrated into a unique and particular occupation such as sleep. Afterward, the essay focuses on orchestration and synchronization as essential processes in the occupation. Sleep occupation meanings are described as a great contribution to people's identity and sense of belonging. Finally, sleep occupation is proposed as an occupational right. Understanding crucial sleep characteristics offer a broad vision from an occupational perspective. The possibility to examine this essential occupation for human life opens an opportunity to enrich the vision about what individuals do to sleep, how they organize it, and promote or not their health, besides how contextual elements support or not this occupation.

**Keywords:** Activities of Daily Life, Occupational Therapy, Sleep.

***Resumo***

A ocupação do sono apresenta características interessantes e particulares quando descrita pela perspectiva da Ciência Ocupacional. Este ensaio teórico examina a literatura de diferentes disciplinas, assim como os conceitos-chave da Ciência Ocupacional, a fim de contribuir para a perspectiva do sono. Primeiramente, o artigo descreve a ocupação do sono como um pilar da saúde, do bem-estar e da qualidade de vida dos seres humanos.

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Em seguida, o ensaio se concentra em como a ocupação surge no início da vida, no contexto das rotinas e rituais da família. A participação diária e o sono foram analisados em resposta a duas questões principais que surgiram relacionadas a essas ocupações: como a participação pode ser observada em uma ocupação caracterizada por períodos de reversível perda da consciência e como estes períodos podem ser integrados em uma ocupação única e particular, como o sono. Posteriormente, o ensaio focaliza a orquestração e sincronização como processos essenciais na ocupação. Os significados da ocupação do sono são descritos como uma grande contribuição para a identidade e o sentimento de pertencimento das pessoas. Finalmente, a ocupação do sono é proposta como um direito ocupacional. A compreensão das características cruciais do sono oferece uma visão ampliada do ponto de vista ocupacional. A possibilidade de examinar essa ocupação essencial para a vida humana abre uma oportunidade para enriquecer a visão sobre o que os indivíduos fazem para dormir, como a organizam, e como isso promove a união à sua saúde, além de como os elementos contextuais apoiam ou não essa ocupação.

**Palavras-chave:** Atividades Cotidianas, Terapia Ocupacional, Sono.

## 1 Introduction

The complex role of sleep in human life has been analyzed and described many times, in the context of various scientific disciplines, including Occupational Science and Occupational Therapy. The notion that sleep is essential for occupational balance and wellbeing has appeared consistently throughout the history of both disciplines, from the earliest frameworks (Meyer, 1922; Slagle, 1922) to contemporary practice models such as the Model of Human Occupation (Kielhofner, 2008) and the Model of Lifestyle Balance (Matuska & Christiansen, 2008).

The Occupational Therapy Practice Framework stated that sleep is an occupation (American Occupational Therapy Association, 2017). This framework distinguished and briefly described two groups of activities related to the occupation: sleep preparations and sleep participation. Moreover, Occupational Therapy as a discipline has done a great contribution to sleep study. Research in Occupational Therapy has been conducted to explore sleep disorders in diverse population (Crowe et al., 1996; Engel-Yeger & Shochat, 2012; Fjeldsted & Hanlon-Dearman, 2009; Green et al., 2008; Marquenie et al., 2011; O'Connell & Vannan, 2008; O'Donoghue & McKay, 2012; Wright et al., 2006), the relationship between sleep and performance skills (Foitzik & Brown, 2017; Salls et al., 2002; Vasak et al., 2015) And interventions effectiveness on sleep disorders (Eakman et al., 2017; Leland et al., 2014). All these studies offered different perspectives about sleep as human occupation which can be characterized as the opportunity enjoyed by every human being to engage in tasks in a specific space and time, with meaning and purpose (Christiansen & Townsend, 2010), or, alternately, "[…] as chunks of culturally and personally meaningful activity in which humans engage that can be named in the lexicon of our culture" (Clark et al., 1991, p. 301). Yet, another definition is "[…] a subjective event in perceived temporal, spatial, and sociocultural conditions that are unique to that one-time occurrence" (Pierce, 2001, p. 139). The tasks that make up an occupation have purpose; are performed in situations or contexts that influence how

and with whom they are carried out; can be identified or named by others; and have a particular meaning for the individual as well as a meaning that is shared with others (Christiansen & Baum, 2005). An occupation implies both a "conscious impulse" to act and a pre-established purpose. Occupations are vital for survival and are linked to a person's quality of life, sense of belonging, and identity (Kielhofner, 2009). Occupations may generate other occupations, which may be harmful or beneficial. They can provide a means for adaptation to the environment; allow for the development of new capabilities; evolve over time; and influence societies and ecosystems. In some cases, the intersection of the occupation and environment may jeopardize one's human condition, compelling a person to "do" but not allowing him or her to "have an occupation" (Morrison et al., 2011; Wilcock & Hocking, 2015).

The foregoing definitions and concepts of human occupation make it difficult to appreciate how sleep can be a specific occupation involving a dynamic and purposeful process. Researchers have noted that sleeping has moments with no purposeful participation in which could be difficult to see how "doing" would be portrayed. Therefore, identifying, characterizing and describing essential aspects of sleep from an occupational perspective can contribute to greater clarification of these possible interrogations. Likewise, the incorporation of new knowledge from other disciplines can help broaden the description and understand how people see, experience and organize the occupation, which is the first level of research in Occupational Science (Pierce, 2014). The standpoint of an occupational perspective is understanding what individuals do and how they organize what they do to promote health and how systems support or not the occupations (Whiteford & Townsend, 2011). This theoretical essay has the goal to broaden an occupational perspective of sleep as an occupation with distinct and essential characteristics. It is part of a larger project on the occupational development of bedtime routines in the first years of life in which, in the first place, it was necessary to describe the sleep occupation.

Various tenets of Occupational Science can be applied to the process of developing an occupational description of sleep (Christiansen & Baum, 2005; Clark et al., 1991; Yerxa, 1990; Zemke & Clark, 1996), including the characterization of the field as "[…] the study of people as occupational beings and is inclusive of the daily continuum of activity, rest, and sleep over the life course" (Wilcock & Hocking, 2015, p. 132). First of all, a detailed knowledge of the occupation requires a synthesis of knowledge from the biological and social sciences (Clark et al., 1991). In addition, specific findings from sleep science can also be used to build this characterization.

This study is organized into sections reflecting the major concepts and research findings used to develop this perspective on sleep. First, sleep is described as a pillar of health, wellbeing and quality of life. Next, sleep occupational development is characterized as a process of initiation, establishment and change over time of sleep occupation in the first years of life. The relationship between sleep occupation and daily participation is discussed presenting how participation can be observed in an occupation which has periods of reversible consciousness loss, articulating how these periods can be integrated into a unique occupation. Orchestration and synchronization are characterized as essential processes in the sleep occupation. Afterwards, the individual and sociocultural meaning of sleep occupation is described in order to identify the contribution of this foundational occupation to identity and sense of belonging. Finally, sleep occupation will be proposed as an occupational right of human beings.

## 2 Sleep occupation

### 2.1 Sleep occupation as a pillar of human beings' daily life

One of the main occupations in human's daily life is sleep occupation. Sleeping involves all activities related to obtain restorative sleep to support healthy, active engagement in other occupations (American Occupational Therapy Association, 2017). As part of the Ottawa Charter for Health Promotion, the World Health Organization (WHO) stated that physical wellbeing, which includes a balanced and healthful engagement in sleep/rest, activity/exercise, and cognition/perception, is a prerequisite for global health (World Health Organization, 1986).

Sleep is not only an occupational need (Tester & Foss, 2018) but is also a primary biological necessity (Wilcock & Hocking, 2015) for all humans (Loughlin et al., 2000; Ramos Platón, 1996). In other words, human beings cannot survive without sleeping. Satisfying this need requires a person to invest approximately one third of their life into the process, making sleep a major priority in daily life (Christiansen & Baum, 2005).

Satisfying our biological needs is an essential element of human occupation (Wilcock, 1993, 2002). Achieving sleep-wake homeostasis provides a sense of health and wellbeing, bolstering personal motivation to do and to achieve in the social environment (Wilcock & Hocking, 2015). In sum, "[…] biological needs are the primary impetus for people to use time to provide the requirements for everyday living…" (Wilcock, 2002, p. 190). This homeostasis allows human beings to learn and to perform new occupations.

Cognitive studies on sleep and learning have demonstrated that a person who has had a sufficient amount of restorative sleep performs better at a new task than one who has not (Green & Brown, 2015). One is better prepared to confront challenges in various contexts after restorative sleep, allowing one to go beyond survival and seek meaningful occupation.

On the other hand, lack of sleep may cause personal, social, or environmental problems, including poor health or even premature death (Wilcock & Hocking, 2015, p. 87). Inadequate sleep is associated with mood problems, behavioral disorders, general health issues such as obesity, substance abuse, and overall poor quality of life (Mindell & Owens, 2009). Especially in children, inadequate sleep may interfere with cognitive function, leading to problems with capacities such as attention and learning (Johnson & Mindell, 2011) that are fundamentally important for development. In adults, sleep quality and quantity impact on their lifestyle (St-Onge et al., 2016). Some special work activities such as shift work, are related to sleep disorders and have a significant relationship with chronic diseases and accidents as well (Kecklund & Axelsson, 2016).

As a consequence, limiting our understanding of the occupation of sleep to mere satisfaction of a biological need may risk falling back to a reductionist perspective. In fact, there are numerous meaningful tasks involved in sleeping that are associated with social participation, including determining how, when, where, and with whom one sleeps. Beyond basic survival, sleep satisfies psychological needs (Campbell et al., 2015), contributing to one's identity, sense of belonging, and competence, which are also fundamental characteristics of all human occupations. Therefore, the occupation of sleep constitutes one of the main pillars of human's life impacting on health, wellbeing and quality of people's life.

### 2.2 Sleep occupational development as a crucial process in early humans' life

Sleep patterns are established in the first years of life. They are ever-changing across the first few years with great variability (Galland et al., 2012; Henderson et al., 2010; Mindell et al., 2016) The primary change in sleep throughout the first few months and years is sleep consolidation. The child gradually can sleep through the night and at the same time, diminishes daily naps as well as night awakenings (Mindell et al., 2016). All these changes are contextualized in a rapid developmental period in which emerge occupational behaviors. The occupations arise through transactions between the child and the environment, as a coherent pattern of intentional and culturally valued actions (Humphry, 2002).

Occupational development is the systematic process of change through which a human being comes to know the occupational world and becomes competent within it (Davis & Polatajko, 2010). The transactional development of sleep (Sadeh et al., 2010) offers a broad vision about how an infant develops sleep patterns immersed in a cultural, environmental and family context. In this model child sleep develops bidirectional interaction between the intrinsic infant and parenting factors. This bidirectional association includes the parental behaviors, cognitions and emotions, parent–child relationships and attachment, parental well-being and psychopathology, and the socio-cultural context of the parents (Sadeh et al., 2010).

Family routines and rituals that parents develop in the first years of child life are one of the most powerful factors that establish sleep patterns. Organizing the routines practice and creating meaningful rituals are one of the ways in which families balance, adjust, and adapt ever-shifting child changes (Fiese, 2006). Routines are subsets of occupation and are considered to support occupational engagement (Luebben & Royeen, 2007). They provide structure to the day (O'leary et al. [S.D.]), and play an important role in the construction of the self (Clark, 2000). The communication in routines is instrumental, involving momentary time commitment, and providing an uninterrupted flow of the daily life since they are repeated over time, with little alteration (Fiese, 2006). By contrast, Fiese (2006) points out that rituals are highly symbolic in nature and they are full of physical, patterned, and affective symbols. Rituals attain feelings of belonging and often the meaning extends across generations encapsulating family identity and investing in how the family will continue acting (Fiese, 2006).

Routines are a valuable and meaningful piece of sleep occupation (Royeen, 2010). Sleep family routines and rituals are linked with parenting competence and family identity (Evans & Rodger, 2008; Fiese, 2006). What is more, bedtime routines are defined as predictable activities before the child falls asleep (Mindell et al., 2009), and has been identified as a major contribution to regulation and consolidation of sleep in the first years of life (Mindell & Lee, 2015). The ability to make a transition from wakefulness to sleep is one of the most significant tasks in the development of sleep during infancy (Staples et al., 2015). Bedtime routines contribute to a wide range of positive developmental outcomes beyond improved sleep, including language development, literacy, child emotional and behavioral regulation, parent-child attachment, and family functioning, among other outcomes (Mindell & Williamson, 2018).

In the sleep occupational development process, for some families, sleep routines can developed into rituals when they take emotional connotations and have meaning for the

family, and rituals can revert to routines (Evans & Rodger, 2008). As Evans & Rodger (2008) point out bedtime offers a family time of closeness and affection, thus in some family's bedtime routines such as bedtime stories, there are meaningful rituals. These change ritual-routines highlight the dynamical process that sleep as an occupation requires to be established and developed continually in the lifespan.

Bedtime requires for some parents to work cooperatively, especially for those who have more than one child, organizing routines which provide structure and consistency to the days' evening (Evans & Rodger, 2008). The organization of preparatory sleep routines in time and space are necessary to be in synchrony with the current infant stage development promoting gradual autonomy and competence. Initially the infant is caregiver dependent and thus, both are involved in a co-occupation. As time progresses and the infant develops, the occupation emerges in a context of family time quality.

As Humphry (2016, p. 4) refers "[…] occupational science is uniquely positioned to examine young people's developing participation by engaging in occupations". Occupational development (Wiseman et al., 2005) of sleep, offers a specific perspective to observe and describe how little children initiate, establish and consolidate sleep from co-occupation with his parents to occupation, through progressive engagement in sleeping, orchestrated and synchronized in family routines and rituals.

### 2.3 Sleep occupation as a pillar of human being daily participation

In order to support active engagement in daily occupations, a person necessarily needs to sleep (American Occupational Therapy Association, 2017). Sleep is the foundation of all our waking occupations and the quality of sleep impacts on everything we do each day (Pierce & Summers, 2011), that is to say it impacts in daily participation. Participation implies the "[…] involvement in any of life's occupations that may be self as well as family or socio-politically initiated" (Wilcock & Hocking, 2015, p. 149). On the other hand, occupational engagement implies a personal value and perceived consequences to participation and cannot be imposed, as participation can be (Morris & Cox, 2017).

Sleep has been questioned mainly by two questions in relation to the concept of participation: 1. how participation could be observed in an occupation characterized with periods with reversible loss of consciousness, and 2. how these periods could be integrated in a unique and particular occupation such as sleep.

### 2.4 Participation in sleep occupation

Some occupational scientists could question if during sleep occupation it is possible to appreciate participation or "doing". This interrogation could be posed under the assumption that occupation implies occupational engagement, understood as "[…] the occupying of place and time in a rich tapestry of experience, purpose, and attached meaning" (Christiansen & Townsend, 2010, p. 2) or for example, a definition in which the occupation involves a "conscious impulse" (Kielhofner, 2009, p. 21). It is difficult to perceive how the individual is could be engaged or with a conscious impulse from a biological point of view:

> […] sleep is viewed as a state of the brain and body governed by diencephalic and brainstem neural systems and characterized by periodic, reversible loss of consciousness; reduced sensory and motor functions linking the brain with the environment; internally generated rhythmicity; homeostatic regulation; and a restorative quality that cannot be duplicated by rest without sleep or by any food, drink, or drug. Sleep is as essential as food and water: The physiologic and psychological drive to sleep can overwhelm all other needs (Aldrich, 1999, p. 3).

From this perspective, sleep can also be characterized as a state of lethargy, lassitude, and inactivity, with a specific posture (Goupil & Bekinschtein, 2012). From the moment a person falls asleep to the moment he/she awakens, the person is unconscious. Therefore, this period cannot be considered a purposeful task.

However, and as a response to the first interrogation, humans participate actively and purposefully in planning and carrying out specific tasks related to the process of sleeping. Humans are usually involved in daily tasks that allow them to *fall asleep*, as well as to *wake up* and begin a morning routine (Royeen, 2010). Both stages —falling asleep and waking up —are activities nested within a greater occupation, that is, sleep. Humans participate in both innate and learned behaviors (Ramos Platón, 1996), and in certain cases, behaviors are learned as part of a significant relationship with another person (Green & Brown, 2015). Human behaviors are framed by tasks that involve ideation and planning of actions; are named and identified by different cultures (Álvarez et al., 2007); and have characteristics that contribute to individual identity and belonging to a social group (Wilcock & Hocking, 2015). Above all, human behaviors are characterized by engagement in purposeful tasks (Carrasco & Olivares, 2008; Zemke & Clark, 1996).

Summarizing the answer to the first interrogation, sleeping involves purposeful tasks in which a person participates and/or engages to condition him/herself for sleep. Participation in the occupation of sleep is possible to be observed during the process of falling asleep, waking up, and all the tasks involved in preparation, adaptation, and/or modification of how, when, where, and with whom one sleeps.

### 2.5 Sleep and waking as interdependent process in the continuum of daily life participation

Another interesting question is how the period of reversible loss of consciousness during sleeping could be integrated in the unique sleep occupation. If occupation is "doing", only moments of participation should be considered. However, sleep occupation involves a dynamical process in which sleep and waking are part of the same occupation, and are interdependent process contributing to the balance and organization of the daily life participation. This interdependence could be analyzed from different points of view.

Several states of consciousness are integrated in sleep occupation for a common purpose. From a biological point of view, Tononi & Cirelli (2006, 2014) state in their Synaptic Homeostasis Hypothesis (SHY) that the function of sleep is to ensure that optimal recovery of the energy spent during the constant process of learning that occurs during waking hours. This theory emphasizes the need for purposeful activity during

waking moments in order to learn, as well as the need for sensory disconnection that precludes purposeful activity during sleep, allowing for consolidation and integration of what has been learned (Cirelli & Tononi, 2017). According to the SYH theory, sleep allows for homeostasis. The excess synapses produced during waking life are pruned, forestalling the chaos that would ensue if everything that one perceived was learned and integrated without discerning between the important and unimportant. Moreover, sleep refreshes the "gears" of memory. This periodic "resetting" is necessary for the memory system to remain active. As stated by Cardinali, "sleep is the substrate of this memory 'service'" (Cardinali, 2015, p. 65). Therefore, on a neurophysiological level, humans must abstain from purposeful actions during sleep in order to consolidate the memories recorded during waking hours. Sleep and waking, therefore, are interdependent processes.

The integration of the various states of human consciousness is also evident in the dynamic processes involved in sleeping. Specifically, the process of falling asleep consists of various dynamic transitions between the consciousness of waking hours and the unconsciousness of sleep (Valdas Noreika et al., 2017). Falling asleep is a gradual, dynamic process, in which a person passes through successive and intermediate states of consciousness. This stage is characterized by hypnagogic imagery and gradual loss of external world awareness, control of thoughts, and time perception (Goupil & Bekinschtein, 2012). Therefore, the purposeful tasks involved in sleeping are part of a dynamic process that interrelates the different states of consciousness. It should be noted that drowsiness, in which a person passes through intermediate states of consciousness, also occurs during waking hours (Valdas Noreika et al., 2017). That is, humans move dynamically through different states of consciousness throughout the continuum of daily life participation.

Daily life is organized on an individual basis, according to personal preference in terms of use of time and balance between activity and rest (Matuska, 2012). However, configuration of the sleep-wake schedule can also be analyzed according to the expectations and values of the community. It is interesting to observe that the sleep-wake dichotomy is a social and historical construction that is not universally accepted. According to various authors, binary division between waking and sleeping is a concept largely particular to industrialized countries (Glaskin & Chenhall, 2013). From a behavioral perspective, use of time for sleep varies widely by culture. Chinese, Indian, and Japanese societies, for example, are more accepting of sleeping during the day than many Western cultures (Brunt & Steger, 2004), even in public or at work (Steger, 2003). In sum, different societies may follow monophasic, biphasic, or polyphasic sleep patterns (Brunt & Steger, 2004).

From a social perspective, humans also need time dedicated to "not doing" in order for active occupations to retain their meaning. If we focus exclusively on occupations that involve productive, immediate activity, we risk losing sight of the person as a whole. Every person needs time to rest, to recover one's energy, to take a break from social activity. In sum, having a moment to one's self (even if only for a few moments or hours, as occurs during sleep), preserves one's sense of balance. It is interesting to note that the concept of human occupation is often interpreted from a capitalist perspective, in which "doing" is seen as productive while "not doing" has little value, especially given that Occupational Therapists originally viewed occupation, in part, as a way to counteract the movement towards mechanism and capitalism taking place at the end of the

nineteenth century and beginning of the twentieth century. For example, the founders of Occupational Therapy saw the Arts and Crafts movement as a form of resistance against mechanistic work that emphasized manufacturing. However, after the World Wars, theories of occupation began to emphasize "doing" and overlook "not doing", even though rest and recreation were crucial concepts in the original frameworks of the profession (Morrison, 2017).

Summarizing the answer to the second interrogation, sleep occupation integrates in a precisely and coordinate way, both sleeping and waking processes. The occupation of sleep has the power to give to the person one of the necessary foundations to participate in daily life. One of the essential characteristics of this occupation is that it consolidates during sleeping hours what he/she does in waking moments, integrates various stages of consciousness, and provides a balance between doing-not doing in the continuum of everyday life.

### 2.6 Orchestration and synchronization as essential processes of sleep occupation

People orchestrate and synchronize daily life by planning, selecting, and engaging their occupations in daily life (Primeau, 1998). Circadian rhythms play an essential part due to the fact that they set the pace and time of everyday. The need to use time for purposeful occupations is a factor in the health-maintaining process (Wilcock, 2002). These occupations are organized into a 24-hour sleep-wake cycle (Christiansen, 2015; Green, 2008; Green & Brown, 2015; Wilcock & Hocking, 2015; Zemke, 2004), regulated by the circadian rhythms which is the physiological 24-hour time pattern of human life (Czeisler et al., 2016). The circadian rhythms are physical, mental, and behavioral changes that follow a daily cycle. These rhythms are produced by the interaction between endogenous clocks situated in nearly every tissue and organ, and environmental and social factors. The endogenous clocks are coordinated and synchronized by a master clock localized in the suprachiasmatic nucleus of the hypothalamus in the central nervous system, and it has an endogenous free-running period that lasts approximately 24 hours (Dunlap et al., 2004). Environmental and social factors continually force this clock to synchronize in this period of 24 hours each day (Golombek, 2007). The most powerful environmental factor or "zeitgeber" is the light – darkness cycle. Social factor includes all human beings can do in order to organize daily life in the rest – doing continuum (Wilcock & Hocking, 2015).

Cyclic activity is common to many phenomena, such as day and night, the seasons of the year, and the life cycles of most living beings. As do most other mammals, humans structure their lives according to the circadian rhythms establishing a daily behavioral, physiological, and biological rhythm (Golombek, 2007). Physiological periodicity, for all human beings but especially in a small child with a developing brain, provides a framework for perceiving and understanding the passage of time, remembering the past, and projecting into the future (Feldman, 2007), which is a fundamental basis for orchestrating occupations in time and space.

Sleep implies a process of dynamic orchestration of tasks towards a common purpose. Orchestration is defined as "[…] ideation, composition, execution, ordering, and qualitative aspects of occupation through the course of one's day" (Larson, 2004, p. 269) and -depends on perception of individual temporality and place (Zemke, 2004).

The process is flexible and dynamic during the continuum of daily life over the evolution of a person in society.

The process associated with sleeping involves various tasks that are orchestrated in time and space. In terms of time, some sleep-related tasks are accomplished in an immediate future or more distant time. The first one, the immediate future time, is associated with the "here and now", such as tasks involved in the process of sleeping itself like falling asleep or waking. Other tasks are associated with more distant goals, such as planning and furnishing the place or bedroom in which one will sleep in preparation for the non-immediate future. Finally, the tasks associated with sleeping are orchestrated in harmony with other daily tasks, such as hygiene tasks upon waking during the morning routine (Royeen, 2010), or, in infants, feeding upon waking in the morning or during the night (Sadeh et al., 2009). This complex, dynamic orchestration of the occupation in time (Zemke, 2004) helps to define the lifestyle of an individual, in coordination with the family or social group to which he or she belongs. A balanced lifestyle can be thought of as one in which there is congruence among both desired and actual time spent in activities (Matuska & Christiansen, 2008).

The concept of orchestration of tasks is associated with another key concept in characterizing sleep as human occupation: *synchronization*, which "[…] refers to a timed relationship, whether concurrent, sequential, or organized in an ongoing patterned format, between two or more events that cohere into a single process" (Feldman, 2007, p. 329).

First, the sleep-wake rhythm, monitored by one's biological clock, is one of the bases for the synchronization of social rhythms, beginning with the development of the parent-infant rhythm, and forming the foundation of the child's eventual capacity for relationships, use symbols, develop empathy, and ability to read others intentions. The degree of synchrony between the caregiver and child maintains over time, impacting the development of the child (Feldman et al., 1999) and therefore his or her social participation, which is a fundamental aspect of human occupation. Moreover, understanding the temporal coordination of daily occupations is crucial for understanding a person's lifestyle and family life (Larson & Zemke, 2003).

Second, sleep synchronizes a basic necessity with daily life. The need for sleep produces the disequilibrium necessary for a person to rest from the other daily tasks in which he or she engages. The sleep occupation provides time and space to rest, in harmony with one's other occupations and with the other people in one's community. Sleeping satisfies the need that produced the disequilibrium, allowing for the emergence a new equilibrium that allows the person to continue performing his or her other tasks the next day (Wilcock & Hocking, 2015). That is, a person prepares and organizes for sleep as part of his or her daily tasks (Williams, 2002) because of the disequilibrium produced by the need for sleep. This observation reflects the dynamism of the process, as daily life is active, and the possibilities, expectations, and context in which a person performs one's tasks changes from day to day. As noted by Matuska & Christiansen (2008), equilibrium is achieved when needs are met through occupation.

The temporal-spatial organization of the sleep process is cyclical, according to the circadian rhythm which orders the cyclic of sleep and wakefulness (Golombek, 2007) allowing for a balance between rest and activity. Achieving this balance provides the equilibrium and homeostasis necessary for participation in other occupations

throughout the continuum of life. Sleep, therefore, plays a fundamental part in a person's role identity, that is, the construction of a person's occupations.

Finally, the cyclic aspect of sleep provides a foundation for the institutionalization of social norms, synchronizing human occupations in harmony with others and with the historical and cultural framework of a society. "When we sleep, how we sleep and where we sleep are all nonetheless intimately related to social structure in more or less revealing sociological ways" (Williams, 2002, p. 193). As stated by Pemberton & Cox (2015, p. 291), "[…] time defines occupation and occupation gives meaning to time". It should be emphasized that sleep-related tasks are synchronized and orchestrated in a concurrent, sequential, or ongoing patterned format, allowing two or more events to cohere into a single process, providing a better comprehension of sleep as an occupation.

In conclusion, the sleep occupation requires an orchestration and synchronization of tasks in time and space for a common purpose, as well as coordination with other tasks and other people. Both orchestration and synchronization are essential process in sleep occupation. The synchronization is individual and allows us to understand concepts of human occupation such as presence, balance, and engagement (Pemberton & Cox, 2015). The occupation of sleep should be characterized according to the lifestyle of each person (Matuska & Christiansen, 2008) in a way that reflects one's unique orchestration and synchronization of tasks within the familial and community environment.

### 2.7 Sleep occupation meanings as a contribution to people's identity and sense of belonging

Occupations provide meaning and purpose in people's life. They are complex because they have diverse meaning with social as well as individual significance (Christiansen & Townsend, 2010). Occupational meaning derives from the transaction for both the person and the context (Dickie et al., 2006).

Sleep demonstrates "[…] cultural aspects of personhood, intersubjectivity, cosmology, values, beliefs, transformation, embodiment, and more" (Glaskin & Chenhall, 2013, p. 3). Musharbash (2013), in a study of a remote Australian Aboriginal settlement in Yuendumu, describes a sleeping arrangement in rows called a "yunta" (in Warlpiri language). This arrangement reflects the characteristics of the community and provides an expression of a person's inner state or emotions. The author reports that "young children, the frail, ill, weary, or sad" sleep "kulkurru" (on the inside of the sleeping rows), "[…] where there is greater protection and shelter" (Glaskin & Chenhall, 2013, p. 12). The others sleep along the outside of the space, with the understanding that they are caring for those further inside the area. As this example demonstrates, sleep activities can take on both an individual and a collective meaning.

The context continually conditions the person providing occupational opportunities or restricting it. One of the most influential changes throughout society history has been the invention of electric lights, which has pushed the onset of sleep to a later time and reduced the total hours that humans use for resting (Czeisler, 2013). Economic and temporal issues associated with productivity and sleep are reflected in the cultural practices of different nations where the typical hours of operation of diverse cities vary according to the light (Cardinali, 2015; Glaskin & Chenhall, 2013). Particular values of the society are present in the context also conditioning every task of sleep. A work by

Morelli et al. (1992), for example, addresses the cultural significance of the concept of independence in the occupation of sleep for mothers and babies. In the United States, the culture emphasizes importance of sleeping in a separate space; falling asleep independently or with a transitional object; and having a bedtime routine to promote autonomy. In contrast, babies in the Mayan population fall asleep without a specific bedtime routine, in the same space as their siblings and sometimes their parents or other family members. Closeness and interdependence are key values in this culture, reflecting in the way members learn occupation alongside others by getting engaged in the same task.

Another interesting observation is that daily tasks associated with sleeping reflect the implicit values of a culture regarding privacy and use of space. In Europe and United States, for example, sleeping tends to be associated with nighttime and privacy, while in some Asian cultures, communal sleeping is quite normal. In these cultures, the importance of enjoying a sense of protection and belonging are expressed through these practices (Brunt & Steger, 2004). Familial norms regarding sleep represent symbolic actions that expresses the deepest moral ideals of a cultural community (Shweder et al., 1995).

Moreover, different social practices related to sleep can be seen as a way to preserve individual or cultural identity. A study by Van Meijl (2013) notes that "Maori collective sleeping serves not only to foster intimacy and solidarity amongst Maori people themselves but also to reinforce Maori autonomy in the settler-colonial society of New Zealand" (Glaskin & Chenhall, 2013, p. 15). These observations underline the high relevance that poses sleep as all human occupations, as steeped in meaning, providing identity to the individual and a sense of belonging to the family and the social group through the exercise of characteristic sleep-related behaviors.

### 2.8 Sleep occupation as an occupational right

Sleep, as all human occupations, implies an occupational right defined as "[…] the right of all people to engage in meaningful occupations that contribute positively to their own well-being and the well-being of their communities" (Hammell, 2008, p. 62). In the article 24 of the Human Rights Law proclaimed by the Universal Declaration of Human Rights in 1948, is stated that people have the right to rest and leisure (United Nations, 1949). Sleeping and resting are part of restoration activities in this human right in which rest is proposed as opposed to working hours. However, resting is defined from an occupational perspective differently from sleep. In fact, resting has been described as engaging in quiet and effortless actions that interrupt physical and mental activity resulting in a relaxing state in order to restore energy and calm and renew interest in engagement (American Occupational Therapy Association, 2017). If sleep occupation has essential and particular characteristics which distinguishes it from rest occupation, it is necessary to highlight the occupational right of sleep.

The World Federation of Occupational Therapists, fully endorsing the United Nations Universal Declaration of Human Rights, has published a position on human rights in relation to human occupation and participation (World Federation of Occupational Therapists, 2006). Based on this position, sleep occupational rights are

described below as the last section of essential characteristics of sleep from an occupational science perspective.

Firstly, sleep occupational right implies that people have the right to participate on it, enabling them to fulfil their potential and experience satisfaction in a way consistent with their culture and beliefs. Secondly, people have the right to be supported to participate in sleep occupation, and through engaging in it, to be included and valued as members of their family, community and society. In third place, people have the right not to be sleep deprived with pressure, force, or coercion in a way that this practice dehumanizes or degrades the person. Next, the expression of the sleep as an occupational right could take different forms in different places shaped by the cultural, societal and geographic contexts. Afterwards at the societal level, people have the right to be ensured by equitable access to participate in sleep, regardless of each person's diverse contribution. Finally, as the position statement of the WFOT claims, people have the right not to suffer abuses by economic, social or physical exclusion to have the necessary knowledge, skills, resources, or venues where sleep occupation usually takes place.

The threaten to the sleep as an occupational right may result in sleep occupational disruption, dysfunction or deprivation. Occupational disruption is a state that is usually temporary when a person's normal pattern of occupational engagement is disrupted (Whiteford, 2000) as it is exemplified in a study of people who suffer carpal tunnel syndrome and it impacts in sleep quality (Goorman et al., 2019). Occupational dysfunction can be caused by non-resolved occupational disruption or performance deficits, or as a result from a prolonged state of occupational deprivation (Whiteford, 2000). The research study done by O'Donoghue & McKay (2012) asserts an useful sleep dysfunction example about how obstructive sleep apnea is related to difficulties in daily life and occupational engagement. Lastly, as researchers have been warning, occupational deprivation is "[…] a state of preclusion from engagement in occupations of necessity and/or meaning due to factors that stand outside the immediate control of the individual" (Whiteford, 2000, p. 201). Sleep deprivation is, therefore, a common scientific term utilized in sleep medicine and it refers to a withholding of an entire night of sleep or a substantial reduction of sleep (Kushida, 2004). It is, however, important to highlight from an occupational perspective that occupational deprivation of sleep, refers specifically to a limitation imposed by the context without the control of the individual, which can be exemplified in occupational science research in the exploratory study of homelessness daily experiences sleeping in the streets (Cunningham & Slade, 2019). Sleep deprivation is unfortunately a prevalent method of psychological torture (Cakal, 2019). Testimonies such as those collected from people illegally detained in clandestine detention centers in the last military dictatorship in Argentina, are clear examples of how the intentional and forced alteration of sleep and wake rhythms can lead the person to a state of absolute vulnerability and to death (Comisión Nacional sobre la Desaparición de Personas, 1984).

In conclusion, an occupational perspective of sleep can contribute to highlight the essential characteristics of this occupation. One of the mayor contributions to this perspective is to claim sleep as an occupational right which is related to universal rights of life, health and wellbeing.

## 3 Conclusion

Sleep occupation has been one the most fascinating and intriguing occupation of human beings since it is among few powerful occupations capable of organizing daily life. Identifying, characterizing, and describing the process of sleeping offers to broaden the occupational science standpoint about this occupation which decidedly contributes to the organization and consolidation of occupational participation in the person's life continuum.

Sleep affects a person's wellbeing, the quality of Life (World Health Organization, 1986) and the sense of balance (Matuska, 2012). This the reason why sleep is not only an occupational need (Tester & Foss, 2018), but also a primary biological need in order to maintain life in human being (Loughlin et al., 2000). As with all human occupations, sleep emerges initially from the foundation of one's early attachment to primary caregivers in a transactional relationship (Sadeh et al., 2010). The occupational development process in which sleep emerges may be seen in the first years of child life, during the initiation, establishment and consolidation of sleep patterns. This process can be observed from a co-occupation with caregivers to an autonomous occupation, through progressive engagement in sleeping daily processes orchestrated and synchronized in family routines and rituals.

Sleep occupation demands a rhythmic, dynamic and cyclical process (Golombek, 2007) where sleep and waking are interdependent processes. Understanding sleep as a dynamic process involves distinct stages of consciousness. These includes falling asleep, sleeping, and waking, which allows us to view sleep as a unique occupation, characterized by periods that require participation and other situations that do not. The moments that do not require participation are fundamental for performance during waking hours. From a neurophysiological standpoint, humans absolutely depend upon this inactive state in order to organize and consolidate the actions performed during waking hours.

One important question that is out of the scope of this study is how this interrelation between "doing" and "not doing" that the sleep occupation entails, might be contemplated in "occupation theoretical definitions". If occupation is the central core of Occupational Therapy and Occupational Science, and sleep is an essential occupation in human life, the definitions of occupation may be broadened as a way to encompass all occupations, including sleep.

Participation in sleep is the most controversial point when researchers describe sleep, since the moment a person falls asleep to the moment he awakens, the person is in state of lethargy, lassitude, and inactivity (Goupil & Bekinschtein, 2012). However, as just mentioned, sleep occupation is a complex and dynamic process in which human beings integrate diverse stages of consciousness and a possibility to integrate restoration and activity moments. Participation in sleep related activities can be directly observed in all tasks related to the process of sleeping, where individuals participate actively and purposefully in ideating, planning and executing specific tasks. Participation and/or engagement is evident during the process of falling asleep, waking up, and all of the tasks involved in preparation, adaptation, and/or modification of how, when, where, and with whom one sleeps (Williams, 2002). Tasks involved in sleep require orchestration (Larson, 2004) in the same and in different time and spaces, as well as

synchronization (Feldman, 2007) in concurrent, sequential, or organized in an ongoing patterned format.

The greatest power of sleep occupation lies in its potential to orchestrate and synchronize not only activities related to sleep, but participation in daily activities. In this way sleep could be seen as the occupation that makes up the thread of all occupations, outlining a continuum in everyday life. The organization provided by sleep is embedded in the individual and collective meaning of its occupation, contributing to the concept of identity and belonging to the social group in which it occurs.

On the other hand, sleep is a powerful occupation which contributes to the coordination of social life. How family, community and society orchestrate and synchronize people ways of sleeping, influences their health, wellbeing and quality of life. The organization involved in these processes implies a challenge at the context provision of the equitable occupational opportunities. Lastly, sleep occupation is an essential occupational right of human beings. It is consequent with the Universal Declaration of Human Rights (United Nations, 1949) in which resting is a universal human right. However, it is necessary to distinguish from an occupational perspective that sleep occupation is different from rest occupation as this distinction implies considering these not to bear identical characteristics. Being focused on the sleep occupation as an occupational right is a challenge that leads occupational scientists and occupational therapists to the duty to be focused on the precise description of each sleep occupation characteristics are in risk regarding people's occupational rights. The disfunction, disruption and deprivation of sleep occupation is an imperative distinction to be made when this occupation is studied.

### 3.1 Implications of the study of sleep for Occupational Therapy and Occupational Science

Analyzing essential characteristics of sleep from an occupational perspective allows to identify possible future research to continue developing key concepts in the dynamic of sleep occupation. Studies in routines and rituals of sleep in Occupational Science and Occupational Therapy are still scarce despite being routines and rituals one of the central axes in the study of human occupation. It is important to highlight that, to our current knowledge, there is no specific research in these fields that describes how sleep routines and rituals develop, being occupational development one of the most important processes to characterize how occupations are initiated, established and changed over the time (Wiseman et al., 2005). Future research needs to explore occupational development of sleep routines and rituals. An interesting question that emerges from this theoretical essay and delineate forthcoming investigation is how all essential characteristics of sleep occupation that have been described, can be reflected in studies of occupational therapy practice. Focusing on how essential characteristics of sleep occupation is evidenced in prevention and intervention of sleep in occupational therapy practice is outside of the scope of this essay, though. Finally, it is necessary to conduct research which identifies and characterizes how different populations deal with orchestration and synchronization of activities related to sleep and with other occupations, in the individual and social context. The daily organization that is

generated from sleep occupation could be the key to provide a specific occupational perspective.

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**Author's Contributions**

Lorena Leive carried out the bibliographic review. She edited the document. Rodolfo Morrison edited and reviewed the document and he directed the investigation. All authors approved the final version of the text.

**Corresponding author**

Rodolfo Morrison
e-mail: rodolfo.morrison@uchile.cl