

Psychological Perspectives of Participation in Physical Activity and Sports among Persons with Mobility Impairments

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Abstract

The purpose of this integrative review is to synthesize the scientific literature referring to barriers and facilitators of physical activity participation for individuals with mobility impairments. Using EBSCO and Google Scholar search engines, peer-reviewed articles published in English between 2000–2019 were screened. After extracting research-based articles focusing on participants with mobility limitations 46 articles were retrieved, including eight intervention studies. The outcomes reported in these studies were synthesized referring to theoretical approaches including the theory of reasoned action, the transtheoretical model of change, and self-efficacy theory. A thematic analysis was conducted on study contents. The following categories were constructed. (a) Personal factors, with secondary categories: personal medical condition, personal psychological perception of physical activity practice, and self-efficacy; (b) environmental factors, with secondary categories: physical environment and social environment, each of them also containing tertiary categories, and (c) interventions aimed at increasing physical activity. Practices promoting physical activity participation were recommended.

Keywords: disability, sport, exercise, integrative review, intervention

1. The Psychosocial Framework of Disability, Physical Activity and Sport

According to the World Bank (World Bank, 2018), about 15 percent of the world’s population – nearly a billion people – experience some form of disability that is a substantial limitation to one or more life activities due to a physical or mental impairment. The International Classification of Function and Disability (World Health Organization – WHO, 2001) provides a more specific frame of reference, suggesting that disability implies impairments in body functions and structures as well as being implicated in the restrictions experienced by an individual in his or her activity and participation. These restrictions may be related not only to the impaired functions and structures, but also to environmental factors imposing a gap between an individual's capacity and his or her actual performance. About 20 percent of persons with disability encounter significant limitations in their daily life performance. The understanding of disability has changed over the years from a predominantly medical to a social relational and contextual point of view (Amundson, 1992). The medical perspective perceived disability as a personal tragedy (Oliver, 1996), resulting from a functional failure based on disease or injury to the physical systems, and therefore persons with a disability were considered incapacitated. Continuous encounters with medical agents, as well as educational agents assuming the medical perspective, may have resulted in the development of an oppressed self-view internalizing this perception of incapacity as a personal narrative. One of the outcomes of the medical model was the adoption of an exclusion policy that intended to protect the disabled individual in specialized circumstances. Such exclusion policies intended to minimize the potential harm and facilitate cure or maintenance by means of various professional procedures including drugs, operative and conservative processes, psychotherapy, special education, sheltered workshops, and specialized day-care centers. While this view may be helpful to some extent – particularly for acute intervention, developing as a child and adolescent and pursuing a lifelong career under such circumstances is often perceived as oppressive and marginalizing, and may be responsible for the development of a self-depreciated identity (Shakespeare, 1996). The World Bank report (World Health Organization & World Bank, 2011) warns that persons with a disability tend to benefit less from education opportunities, and are more likely to be unemployed

and as a result have a lower income. Indeed, the Bureau of Labor Statistics (2019) reported that in 2018 the employment-population ratio, which is the proportion of the population that is employed in the USA, was 19.1 percent among those with a disability, compared to 65.9 percent in those without a disability. Unemployment, together with the additional health costs required by most persons with a disability, poses a burden for them to maintain the cost of living. An alternative, social perspective emerged in the 1970s by activists in the Union of the Physically Impaired Against Segregation (UPIAS), which was scholarly formulated by Shakespeare (1996) and others. According to this social model, people are defined as being disabled by society rather than by impairments of their bodies. Furthermore, it is society that does not dismantle barriers in order to promote inclusion and the participation in an active social life of persons with impairments (Watson, 2002)

Finally, the bio-psycho-social model adopted by the International Classification of Function (ICF) provides a synthesis of the social and medical models. According to this model, the disability and ability to function are viewed as a dynamic interaction between a person's health condition and contextual factors based on both personal and environmental attributes. Within the ICF (WHO, 2001) disability is defined as an umbrella term for structural and or functional impairment, activity limitation, and participation restrictions. Activity limitations refer to challenges one may experience when executing an activity (e.g., walking), whereas participation restrictions refer to difficulties one may face in life situations, for instance responses of others toward a person's impairment (World Health Organization & World Bank, 2011). A major construct that has recently been outlined as the foundation for optimizing movement to improve the health of society is the "Movement System" (see American Physical Therapy Association, 2015; Voight & Hoogenboom, 2017). This term represents a collection of systems (cardiovascular, pulmonary, endocrine, integumentary, nervous, and musculoskeletal) that interact to move the body or its component parts.

One of the life domains in which persons with mobility impairments experience activity limitations and participation restrictions is physical activity—from physical education at school settings (Coates & Vickerman, 2010; Fitzgerald, 2005; Fitzgerald and Stride, 2012; Hutzler et al., 2002) through leisure time and sport club activities (Rimmer, 2005), to high-level competitive sports (Haslett, Fitzpartick, & Breslin, 2017; Wadey & Day, 2018). Physical activity participation is considered one of the fundamental aspects of maintaining a healthy life style (Bragaru et al., 2013) and improving quality of life (Laferrier, Teodorski, & Cooper 2014; Littman, Bouldin, & Haselkorn 2017). The history of physical activity, and particularly sport participation, of persons with mobility impairments is mainly associated with the legacy of Sir Ludwig Guttmann (see Bailey, 2008; Guttmann, 1976). Dr. Guttmann was a neurologist treating injured servicemen with spinal cord injury in England during World War II (WWII), and subsequently became the founder of the Paralympic movement. He was one of the first promoters of physical activity as an active lifestyle for persons with mobility impairments. This triangular mix of physical activity as (a) part of lifelong rehabilitation, (b) a recreational link to quality of life, and (c) competitive elite sports has characterized the physical activity participation of persons with disability at least since WWII, and is still evident today (Clark, 1980; Kiuppis, 2016).

Research has identified the psychological, physical health, and social benefits of participation in physical activity for individuals with mobility impairments. Psychological benefits include improved concentration, emotional function, personal well-being, and self-understanding; the development of a hopeful outlook on life; enhanced self-confidence, self-efficacy, and self-esteem; stress relief; and, improved quality of life. Physical health benefits include improved fitness and strength, skill mastery, and pain reduction. Social benefits include opportunities for social interaction and bonding with others (see Giacobbi et al., 2008; Martin, 2013; Wadey & Day, 2018). These benefits do not defer from those gained by individuals without impairments. However, in spite of the benefits reported, a significantly smaller number of persons with impairments actually participate in physical activities as a health-related, recreational, or competitive practice (Carlson et al., 2012; Tasiemski, Kennedy, & Gardner, 2006). For example, based on a systematic literature review of habitual physical activity in young persons with a disability, it has been reported that young people with cerebral palsy participated in up to 53% less habitual physical activity compared to typically developing peers (Carlson et al., 2012). Furthermore, levels of activity in the participants were approximately 30% lower than the suggested guidelines, while sedentary time was twice the maximum recommended amount. In another survey, Tasiemski, Kennedy, and Gardner (2006) indicated that physical activity was the most restricted recreational activity after injury. Almost 40% of the 985 respondents with spinal cord injury (SCI) (N = 985) reported discontinuing engagement in sports activities after becoming disabled. As a result of the restricted participation in physical activity, persons with disability are exposed to a 57% increased risk of being obese than adults without disabilities (CDC, 2017), and are 50% more likely to have a chronic disease such as heart disease, diabetes, stroke, or cancer than adults without disabilities (CDC, 2016). According to the ICF (WHO, 2001), environmental factors interact with personal factors, and play an important role in understanding people's functioning in different contexts. Personal factors include a person's health condition, size, weight, education, and age, and psychological factors include self-esteem, self-efficacy, and motivation. Environmental factors include physical factors such as climate, terrain,

accessibility of services, and social factors include attitudes and policies.

Environmental as well as personal factors may be considered by some individuals as barriers to physical activity participation, but as facilitators by others. For example, being equipped with a technologically-efficient prosthesis such as “running blades” may be considered “even better than the real thing”, and could become a facilitator for participating in running competitions (Thomas, 2012), while lacking such sophisticated equipment may be considered a barrier to participation (Deans et al., 2012). Another example is transportation. Not having proper transportation to activity venues was perceived by some participants in a study by Buffart et al. (2009) as a barrier to getting to a physical activity facility, while other participants mentioned that not having a car was what got them out wheeling, walking, or hand cycling to different places, and thus made them more active.

A personal factor labeled self-efficacy has often been regarded as a barrier or facilitator. It is based on Bandura's (1986) Social Learning Theory, which considers the degree of mastering a practice as the most significant and persistent motivator for action. Therefore, while preparing for a large-scale comparative cohort study, van der Ploeg and associates (2007) developed a useful model labeled the Physical Activity for People with a Disability (PAD) model. This model outlines antecedents of physical activity participation and is based on the framework of the ICF model (see Figure 1). The model outlines levels of physical activity functioning and determinants of physical activity participation. The dashed (dotted) arrows in the PAD model represent the pathway through which these factors contribute to physical activity participation. This model has provided a frame of reference for a number of studies related to barriers and facilitators of physical activity participation in persons with a disability (e.g., Batten, Lamont, Kuys, McPhail, & Mandrusiak, 2019; Buffart et al., 2009; Mulligan et al., 2012; Outermans et al., 2016; Pickering et al., 2013; van Adrichem et al., 2016), and will also be utilized as a conceptual framework for the current review. In accordance with the PAD classification of contextual barriers and facilitators, van Adrichem and associates (2016), who conducted their study with recipients of solid organ transplants, proposed for their qualitative data analysis a five-category scale indicating a range between (1) absolute barriers and (5) absolute facilitators. This approach may add transparency to the classification of individual perceptions of barriers and facilitators, but was not used in other studies encountered within this review.

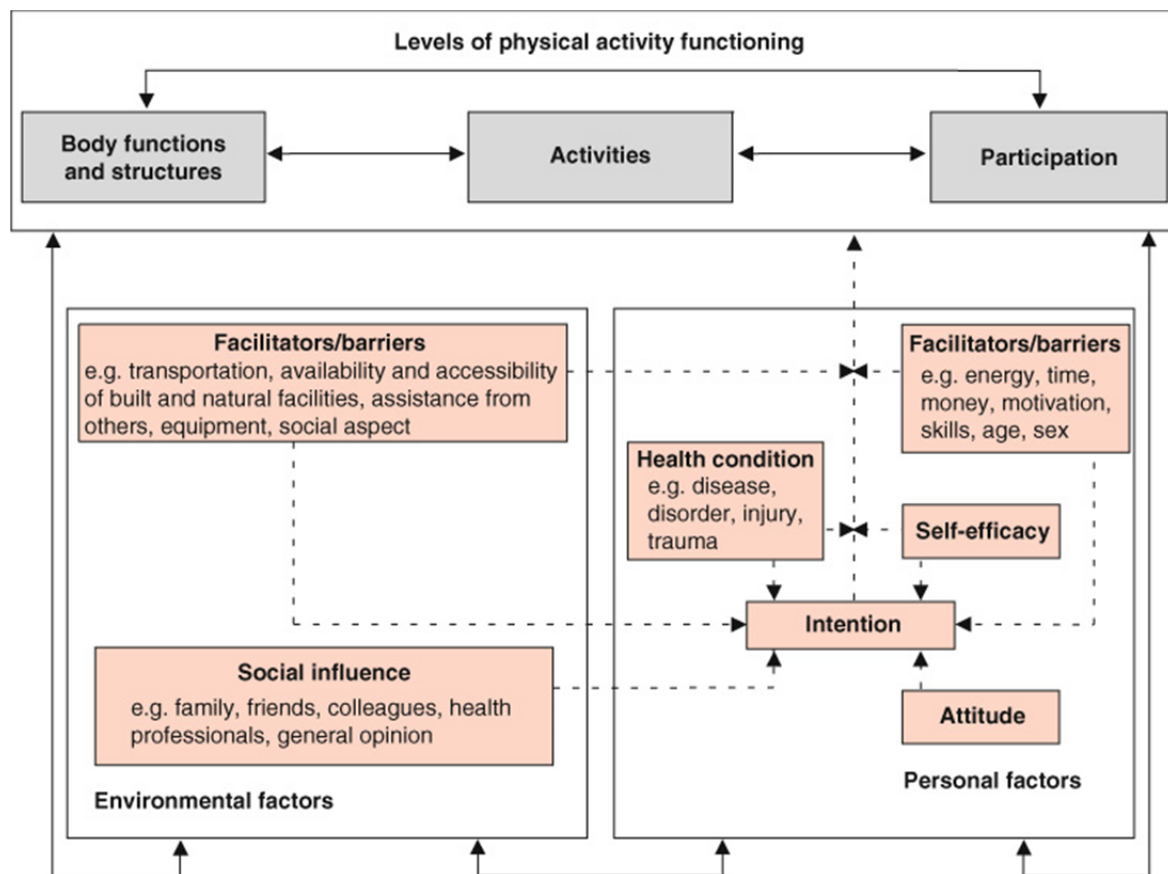


Figure 1. Physical activity for people with a disability (PAD) model. (Reprinted from van der Ploeg et al. 2004 under a CC BY license, with permission from Springer, original copyright 2004)

An additional theoretical framework warranting practical interest is the transtheoretical model of stages of change (Prochaska & Velicer, 1997). Based on this theory it has been suggested that the development of health promotion strategies should be directed to the individual stages of change, and thereby will likely facilitate a positive behavior change such as the enhancement of physical activity participation (Blissmer & McAuley, 2002). Kosma and colleagues (2006) studied the determinants of stages of change and physical activity among adults with physical disabilities. Based on a sample of 224 adults with physical disabilities, mostly females (Mean age = 45.4 years, SD = 10.78), the authors reported that behavioral and cognitive processes of change as well as self-efficacy significantly predicted physical activity participation. In an additional study, Kosma and colleagues (2007) developed an integrated conceptual framework of stages of change and reasoned action, and determined that health promotion interventions need to include both intention (e.g., goal setting) and behavior elements (stages of change) in order to reinforce the increased value of physical activity and eliminate participation barriers. Thus, it can be determined that the process of motivating persons with mobility impairments to become active participants in exercise, recreation, or sport activity is a complex one, and requires the consideration of a variety of personal and environmental factors, which can become either barriers or facilitators.

The purpose of this review paper is to summarize the scientific literature related to barriers and facilitators of physical activity participation for individuals with mobility impairments (i.e., in the movement system), to integrate the outcomes with a frame of theoretical constructs and waving them together into a narrative discussion of potential interventions designed to encourage these individuals to overcome barriers and commit to a healthy, active lifestyle and competitive sport career. Based on a synthesis of the reviewed data, a set of practices will be outlined for future use.

2. Method

An integrative review approach was followed (Whittemore et al., 2014) aimed toward synthesizing research and theory-based literature on barriers and facilitators to physical activity participation among persons with mobility impairments. We concentrated on research literature and integrated it with a strong theory base, seeking to develop new research and practice recommendations (Ferrari, 2015).

We performed the literature search for this review using EBSCO and Google Scholar search engines. We screened for articles published in English in academic peer-reviewed journals between 2000–2019. The key words used were: *physical disability* or *mobility impairment*; and *physical activity* or *exercise* or *sport* or *fitness*; and *barriers* and *facilitators* and *motivators*, and *interventions*. The EBSCO search revealed 273 articles and Google scholar revealed 14,324 articles. The articles were further screened for research methods (only research) and population (individuals with mobility impairments). After omitting duplicate articles and reviewing titles and abstracts, we remained with 46 articles relating to barriers and facilitators to physical activity participation experienced by individuals with mobility impairments; these included eight intervention studies. Research participants in the studies reviewed ranged from children to adults, and included persons with neurological (e.g., cerebral palsy, stroke, multiple sclerosis) as well as orthopedic (e.g., amputations; rheumatoid arthritis) disorders. The majority of the studies in the review were surveys that included quantitative or qualitative outcomes reporting barriers and/or facilitators (motivators) to participate in physical activity. Eight studies included interventions designed to increase physical activity participation, and reported pre- and post-intervention outcomes. In the following sections, data and theory-based results will be synthesized and discussed across three main categories: (a) personal factors, (b) environmental factors, and (c) programs designed to enhance physical activity participation. Barriers and facilitators to participation in physical activity will be addressed under these categories and under sub-categories, upon which we agreed.

3. Results and Discussion

3.1 Personal Factors

Due to the large societal and cultural variance, as well as the lack of clarity in the scope of personal factors, personal factors are not yet classified in the ICF (WHO, 2001). In the current review we will distinguish between the personal medical conditions which may most likely be related to mobility disability, and the psychological conditions that may be either related or unrelated to the medical condition.

3.1.1 Personal Medical Condition

Pain, fatigue, and poor health were the barriers identified by participants in most studies that reduced or prevented their involvement in physical activity (see Bragaru et al., 2013; Crawford et al., 2016; Dysterheft et al., 2016; Geertz et al., 2015; Jaarsma et al., 2016; Jaarsma et al., 2014; Karlsson et al., 2018; Littman et al., 2017; Wadey & Day, 2018). At the same time, perceiving oneself to be in good health was also mentioned as a reason

for not needing to engage in physical activity (Crawford et al., 2016).

According to Jaarsma et al. (2016), individuals who due to their disability required the use of assistive devices, such as wheelchairs or walkers, were less likely to engage in physical activity than those who did not require assistive devices. Bloemen et al. (2015) conducted personal and focus-group interviews with children with spina bifida aged 4–18 and their parents, in order to understand the personal and environmental factors that impact these individuals' physical activity involvement. A total of 43 parents and 33 children and youth participated in this study. In relation to assistive devices, the children explained that using them slowed them down and complicated the process of participating in activities. The parents added that these devices complicated the logistics of transporting children to activities. Littman et al. (2017) conducted semi-structured interviews with 27 veterans with lower-extremity amputation to understand the barriers and facilitators to physical activity engagement experienced by these individuals. The participants referred to the sport equipment (such as a sport tricycle or a running prosthesis) as a "hassle", because they needed to find ways to carry it for use upon completing their activity. Examples they shared required them to find ways to carry crutches on their bikes so that they could use them later for walking. Moreover, issues with the prostheses' fit caused or exacerbated injury and pain, thereby leading some of the participants to reduce or avoid physical activity. Issues with the fit of the prostheses causing barriers were supported by other studies involving individuals with amputation (e.g., Bragaru et al., 2013; Wadey & Day 2018).

Karlsson et al. (2018) investigated physical activity experiences of 16 women and two men suffering from chronic pain. Their findings show that although the participants valued physical activity, they did not all feel able to engage in it because they experienced their body as dysfunctional and uncooperative. Crawford et al. (2016) interviewed nine men with transtibial osteomyoplastic amputation who, in addition to phantom pain, reported that they felt limited during running and resistance exercises due to their low cardiovascular endurance.

3.1.2 Subjective Well-Being

From a personal factors view the perception of well-being is no less important than the objective disease. This subjective perception has been counted as a barrier on one hand, and a motivator on the other hand (Wadey & Day, 2018). The authors conducted a longitudinal study to explore barriers, facilitators, and benefits of leisure-time physical activity for people with amputation in England. In relation to subjective well-being, the findings indicated that some participants identified low subjective well-being as a barrier to engagement in physical activities, while for others it became a facilitator motivated by wanting to feel better. In their survey of 1223 adults with disabilities, Jaarsma et al. (2016) compared differences in perceived barriers and facilitators between those who chose to be physically active and those who did not. The researchers found that pain was a barrier for those who chose not to be active whereas for those who chose to be active, pain motivated physical activity as a means for reducing it. These findings are similar for participants with chronic pain (Karlsson et al. 2018) and for those with amputation (Bragaru et al., 2013; Littman, 2017; Wadey & Day, 2018). Participants in other studies were also motivated by the health benefits associated with leading a physically active life style, including weight loss and increased strength, fitness, and energy (Buffart et al., 2009; Crawford et al., 2016; Dysterheft et al., 2016; Giacobbi et al., 2008; Jaarsma et al., 2014; Jaarsma et al., 2016; Littman et al., 2017; Smith, 2013; Wadey & Day, 2018).

3.1.3 Personal Psychological Perception of Physical Activity Practice

Personal psychological barriers seemed most prevalent in many of the reviewed studies. One prevalent characteristic was feeling incompetent or ashamed of being incapable to perform (Buffart et al., 2009; Littman et al., 2017; Rimmer, 2005); others were the lack of motivation to perform (Bragaru et al., 2013; Crawford et al., 2016; Karlsson et al., 2018) or disliking disability sport (Wadey & Day, 2018). For example, a survey assessing the association between barriers and physical activity participation of 180 individuals with a spinal cord injury by Cowan et al. (2016), revealed that the most prevalent barrier was individuals not viewing themselves as exercisers. Participant responses to the survey further indicated disinterest in physical activity, poor time management, and the fear that physical activity will worsen existing injuries as barriers to participation in physical activity (Cowan et al., 2013). In another study, 16 adults with childhood onset of physical disabilities who participated in focus group interviews additionally mentioned fear of developing new injuries as a barrier to participating in physical activity (Buffart et al., 2009). Fear of getting injured was also mentioned by the men in the study by Crawford et al. (2016) and by patients with chronic pain in the study by Karlsson et al. (2018). In their study of 13 undergraduate students with physical disabilities, Dysterheft et al. (2016) found that participant definitions of physical activity influenced their perceptions of themselves as already being "active enough", due to the amount of exertion they experienced in activities of daily living such as getting in and out of their car. Due

to these perceptions, some of the participants may perceive themselves as incapable of engaging in physical activity such as taking an aerobics class or attending a local gym, or lack confidence in their ability to engage in physical activity (Rimmer et al., 2004).

In contrast, some other studies referred to the notion of belonging to a “sport family” (e.g., Allan et al., 2018). Parasport participants in this qualitative study experienced opportunities to participate alongside family and friends without a disability, thereby reflecting a sense of normalcy and healing. One of the emerging themes was labeled “letting go”, and participants reported finding “the right fit” – that is, becoming intrinsically rewarded and experiencing enjoyment of their participation in the sport activity.

Psychological facilitators of physical activity were evident when participants mentioned physical activity as a habit (Buffart et al., 2009), an integral part of their personality/identity (Karlsson et al., 2018; Wadey & Day, 2018), or routine (Littman et al., 2017). These notions were also manifested when participants with acquired disabilities described themselves as physically active prior to their injury, and therefore they returned to physical activity once rehabilitated (Littman et al., 2017). Physical activity involvement provided participants with a means to decrease the tension they experienced in their daily living (Bragaru et al., 2013; Buffart et al., 2009; Karlsson et al., 2018; Littman et al., 2017). Furthermore, for individuals with amputation, coming to terms with their amputation facilitated engagement in physical activity (Littman et al., 2017; Wadey & Day, 2018). Additionally, participants in the study by Wadey and Day (2018) discuss having the ability to ignore negative perceptions of others, or using engagement strategies such as body language or joking to change negative views of them exercising, facilitated their engagement in physical activity. In return, physical activity enhanced positive feelings about their bodies, as described by Littman et al. (2017), and enabled them to feel like they used to prior to their amputation. For some participants with chronic pain, participating in physical activity provided a sense of freedom and autonomy (Karlsson et al., 2018).

3.1.4 Self-Efficacy

University students with disabilities in the study by Dysterheft et al. (2016) mentioned that once they got into the mindset that physical activity was possible, they were more able and motivated to participate. Participants in a number of other studies mentioned enjoyment of physical activity and the sense of skill mastery it gave them, which facilitated and motivated further physical activity involvement (e.g., Giacobbi et al., 2008; Jaarsma et al., 2014; Jaarsma et al., 2016). Opportunities provided by professionals to master skills also contributed to enhanced self-efficacy in youth (Bloemen et al., 2015). This enhancement was expressed in comments related to increased confidence in one’s ability to handle situations in such as activities and to try new ones, and facilitated further involvement in physical activity. Self-efficacy was also instrumental in the engagement and persistence in physical activity of veterans with lower-extremity amputation (Littman et al., 2017). Individuals with chronic pain who were interviewed in a study by Karlsson et al. (2018) described strategies they developed in order to continue engaging in physical activity, despite the pain. Strategies included choosing appropriate types of activities and frequency of participation, breaking down exercises into stages and gradually completing each stage, respecting body limits, and setting exercise goals and adapting them as needed.

3.2 Environmental Factors

According to the ICF (WHO 2001, 212-213), environmental factors are “the physical, social and attitudinal environment in which people live and conduct their lives”. Our literature review revealed several repeated themes mentioned as environmental barriers and/or facilitators to participation of individuals with mobility impairments in physical activity. These themes could be divided between physical and social environmental factors, as follows.

3.2.1 Physical Environment

Research participants referred to several barriers and or facilitators associated with the physical environment. Themes identified under this domain were (a) access to facilities and exercise venues and/or equipment, (b) transportation, and (c) costs of activity participation.

3.2.1.1 Accessibility of Facilities and Equipment

The most well-known study on facility barriers was performed by Rimmer and colleagues (2004). The authors conducted focus-group interviews with a mixed sample of adults with disability, as well as with architects, fitness and recreation professionals, city planners, and park district managers. Participants indicated that the construction environment of many fitness and recreation facilities is inherently inaccessible. Accessibility issues included narrow doorways, lack of elevators or ramps, lack of curb adaptations, and reception desks being too high for individuals using wheelchairs. Vissers and associates (2008) reported a lack of accessibility to toilets;

showers and sport venues as a barrier.

In addition, lack of accessible and inclusive opportunities was the most frequent barrier mentioned by young people with a disability in the qualitative study of Wright and colleagues (2018). More specifically, the inaccessibility of playgrounds and sports facilities was mentioned as a major barrier for the participation of children with spina bifida (Bloemen et al., 2015).

3.2.1.2 Transport

Lack of transport was indicated in several studies as a significant barrier, and mainly by individuals who utilized a wheelchair or mobility aids – for example in post-stroke survivors (Nicholson et al., 2013). Interestingly however, some individuals with childhood onset of disabilities who participated in the study by Buffart et al. (2009) also mentioned having a car as a barrier to being physically active, as they found that they tended to drive to places where they would otherwise have gone in their wheelchair or hand cycle.

3.2.1.3 Costs

Several studies mentioned economic barriers, mainly participation costs, to physical activity involvement (e.g., Cowan, Nash, & Anderson 2013). Examples for such barriers are membership fees in fitness facilities, which in most cases are not lower for individuals with disabilities compared to the general population, and the cost of special transportation (Bloemen et al., 2015; Geertz et al., 2015; Jaarsma et al., 2016; Rimmer et al., 2005). The U.S. Census Bureau (2015) reported that the median income for persons with disabilities in the USA is only two-thirds of the income for people with no disability. Thus, it is apparent that the costs of services, the specialized equipment needed for participation, or the costs of personal training required in cases where no qualified professionals are available in the community, may reduce the likelihood that persons with a disability will engage in any kind of physical activity.

3.2.2 Social Environment

Within the social domain, the most common barriers and facilitators identified by research participants included the following themes: (a) professional staff training and support, (b) peer support, and (c) competition.

Professional staff support and training. Staff members who interact with persons with a disability may play an important role in the psychological reactions of persons with disability toward physical activity participation. Research reported contrasting reactions. For example, within the context of a university setting, Dysterheft et al. (2016) found that some undergraduate students with physical disabilities felt that the individuals assigned to assist them to participate in campus physical activity programs did not know them well enough to understand their specific needs. They also felt that the fitness instructors were impatient toward them. In contrast, Nettelson and associates (2017), who studied persons with walking impairments, reported that coaches who “know how to set-up a training program” left a positive perception in participants. Support information and guidance provided by professionals such as physical therapists, personal assistants, and instructors was addressed as a positive experience (e.g., Bloemen et al., 2015; Bragaru et al., 2013; Crawford et al., 2016; Dysterheft et al., 2016; Giacobbi et al., 2008; Jaarsma et al., 2014; Karlsson et al., 2018). Veterans with lower extremity amputation in the study of Littman et al. (2017) described the emotional support they received from doctors, physical therapists, and family members who helped them become and stay active through maintaining high expectations and providing accountability.

Specifically related to individuals with amputation, Bragaru et al. (2013) and Wadey and Day (2018) revealed that participants perceived the social environment as not accepting them, and indicated they did not have anyone with whom they could engage in physical activity. Children with physical disabilities and their parents echoed the notion of not feeling accepted by others in physical activity settings (Bloemen et al., 2015; Jaarsma et al., 2014). Participants in the study by Rimmer et al. (2004) also sensed that personnel in physical activity facilities were unfriendly to them. This perception was often connected to other comments relating to negative attitudes and behaviors of individuals without disabilities attending the facility, as well as to professionals working there. Additionally, they felt they did not receive enough support from family members and friends in order to attend events at physical activity facilities.

Jaarsma et al. (2014) conducted a mixed-methods study in which 30 children with physical disabilities, 38 parents, and 17 professionals participated. Children and parents responded to a questionnaire, whereas professionals participated in focus-group interviews. Four of the children indicated that they felt dependent on others to help them participate in physical activity. Participants' sense of dependency may be related to both the physical and the social environment of facilities, as parents and professionals tend to be overprotective of individuals with disabilities because they find the environment inaccessible or not safe, and thus try to help more

than necessary (Bloemen et al., 2015; Wadey & Day, 2018). In contrast, some veterans with lower-extremity amputation in the study by Littman et al. (2017) felt that their family members underestimated their abilities. This impression may have resulted from the experience of being “over-helped”. Participants in this study also described the emotional support they received from doctors, and from physical therapists who helped them become and stay active through maintaining high expectations and providing accountability.

3.2.2.1 Peer Support

One of the most often-reported social facilitators included having people with whom to exercise and have fun, and people who provide peer support and social encouragement (Buffart et al., 2009). In another study the participants gained perspective and inspiration from interaction with other individuals with amputation during physical activity (Littman et al., 2017). Similarly, some individuals with amputation in the study by Wadey and Day (2018) reported joining separate physical activity programs for persons with a disability, so that they could connect with other individuals with amputation who they would not otherwise have met. Interaction with other people who had similar experiences to theirs provided a sense of belonging. Wheelchair basketball players participating in a mixed-method study by Giacobbi et al. (2008) mentioned further that it was the people who were close to them who initially encouraged and convinced them to start participating in physical activity. Additionally, wanting to advocate for amputees or serve as role models contributed to goal setting related to physical activity for men with transtibial osteomyoplastic amputation (Crawford et al., 2016).

3.2.2.2 Competition

Feeling the need to compete against peers without disabilities served as a motivator for some of the men with transtibial osteomyoplastic amputation in the study by Crawford et al. (2016), while for others it served as a barrier, as they felt they were not able to keep up. In addition, Smith (2013), who conducted a narrative review with 17 men who had suffered a spinal cord injury, referred to competition as a potential barrier. One participant said that when he tried competitive sports such as wheelchair rugby, the competitive sport appeared as “overcompensating for being in a chair” (Smith 2013, 116), with which he didn’t identify.

3.3 Interventions Aimed at Increasing Physical Activity

We found eight programs aiming at improving physical activity participation and psychological attributes of persons with disability, that utilized movement, exercise, and sports. Program duration ranged from several hours to 12 months, and the disability varied from specific populations such as persons with spinal cord injury (SCI) or multiple sclerosis (MS), to non-specific participant populations. The main criteria of these programs are summarized in Table 1.

Table 1. Description of Intervention Programs Included in Review

Author	Disability	Mean Age	N	Intervention Program	Outcomes
Block et al., 2009	SCI; MS	Per Group 37 - 51	35	Shake it up 10 full days (2pM) Health promotion workshops	SE improved significantly in intervention compared to SE decline in controls
Froehlich-Grobe et al., 2014	Wheelchair users	45	128	Home-based exercise with extensive staff support vs minimal support (self-guided)	Similar increase in aerobic; strength performance. In extensive staff support only Barriers predicted activity; in the self-guided gr only SE predicted activity
Geertz et al., 2015	MS	50	30 Training 10 Waitlist	Exercise program: average 20 sessions of training tailored to their individual fitness at baseline over a course of 8–12 weeks	Stages of change and SE significantly improved in training group
Mandelbaum et al., 2015	MS	49.5	8	Salsa dancing: 4 weeks X 60 min per week	Significant improvements found in mobility measures baseline to 3-month follow-up

Ng et al., 2012	MS	49	129	4-day wellness program complimentary for support persons	Improvement in SE and health-related quality of life [SF36] in persons with MS
Silveira et al., 2018	SCI	44	72	Well on wheels (WOW) Six 4-hour in-person workshops in a 3-month period led by experts and peer-mentors	No significant differences in improvements in SE across practices
Thomas et al., 2011	SCI	43.6	21	Home-tailored program by knowledgeable health care professionals. + DVD	PA min per week tripled with a participant adherence rate of 87.5%. At the conclusion of the study. Sig changes in SE; Stages of Change
van der Ploeg et al., 2007	Rehab. clients	Per Group 46-47	1202	Sport stimulation program (R&S) and the daily Physical activity promotion program (AaR)	Intention-to-treat analyses in the R&S + AaR group showed borderline significant improvements in one sport OR = 1.66, p = .02) and both physical activity outcomes OR = 1.68, p = .01

Notes. MS=Multiple sclerosis; SCI=Spinal cord injury; SE=self-efficacy; OR=Odds ratio.

Ng and associates (2013) conducted a prospective study surveying the changes in physical activity, self-efficacy, and health-related quality of life in 129 individuals with multiple sclerosis (MS). The intervention was a four-day wellness program, which included psychological and physiological evaluations, lectures, and workshops. The measurements performed prior to, as well as 1, 3, and 6 months post-intervention determined positive changes in health-related outcomes, particularly self-efficacy, suggesting some stability over time.

Geertz et al. (2015) sought to examine the effects of a standardized fitness training program on motivational factors, including self-efficacy, intention to be active, perceived barriers, and counterstrategies, in persons with progressive MS. Forty individuals with MS were randomly assigned to either 20 sessions of a training group or a waiting-list control group. Training sessions were tailored to individual fitness and motivational variables, and consisted of activities such as bicycling and rowing. Data collection involved pre- and post-intervention questionnaires that assessed the participants' exercise behavior and intention to exercise, self-efficacy for exercise, social support available, perceived barriers, and physical performance. Results showed that most participants reported themselves as nonactive at baseline. The intervention group progressed in physical activity behavior measurements, while the control group regressed. However, in terms of physical activity involvement outside the study, 13 participants initially indicated that they participated in activity whereas at the end of the study only seven were still involved in physical activity outside the study, while 24 participants considered themselves to be physically active. Self-efficacy showed significant differences between pre- and post-study results, particularly because of the significant decrease in self-efficacy of participants in the waiting-list control group. Relating to perceived barriers, illness was a significant barrier at baseline, whereas post-intervention it remained significant in the control group while decreasing for the intervention group. Finally, the use of counterstrategies to overcome barriers differed between the intervention and control groups post-study. The authors conclude that a tailored endurance training program can contribute to enhanced self-efficacy and increased exercise motivation for individuals with MS.

In another intervention study, Thomas and associates (2011) investigated changes in physical activity behavior of 21 individuals with a spinal cord injury, in relation to their interaction with healthcare professionals and receiving a tailored home physical activity program. Participants were randomly assigned to two different intervention groups. Data were collected via questionnaires assessed during the intervention every three months. Questionnaires were based on the five stages of the transtheoretical model of health behavior change (Prochaska & Velicer, 1997). Results demonstrated that the provision of a home-based program along with DVDs and brochures was associated with a positive change in physical activity behavior. Participant involvement in physical activity increased from 36.3 minutes per week to 127.4 weekly minutes, and 70 % of participants in

both intervention groups reached stage five (maintenance) in the transtheoretical model of health behavior change by the end of the study. The authors conclude that a home-based physical activity program guided by knowledgeable healthcare professionals can positively impact the readiness to change physical activity behaviors and the actual participation of individuals with spinal cord injury.

Block and colleagues (2010) examined changes in self-efficacy of 35 individuals with spinal cord injury and other neurological impairments who participated in a health promotion and capacity-building program. Individuals were assigned to one of two intervention groups or to a waiting list control. The program involved ten full-day sessions of indoor and outdoor physical activities, as well as independent living and health promotion seminars twice a month for five months. Data collection involved the general self-efficacy scale, a personal activity log, and interviews. Participants were assessed prior to intervention, immediately following the intervention, and six months and 12 months post-intervention. Results showed significant differences in the change of self-efficacy scores between those who participated in the program and those who did not. Results of the follow-up assessments indicated that self-efficacy was maintained post-program. By promoting a social model perspective and exposing participants to activities they previously thought they could not do, individuals learned that impairment does not determine their ability to maintain a healthy lifestyle.

Silveira and associates (2018) considered self-efficacy as an important motivator in persons with SCI. They randomized 72 individuals with SCI to an intervention group ($n = 39$) or control group ($n = 33$). The intervention group was based on a "Well on Wheels" program aiming to increase self-efficacy, and in turn to increase engagement in health-promoting behaviors related to satisfaction with life (SWL). The intervention included six 4-hour in-person workshops, conducted over a 3-month period, led by experts and with peer-mentors who were available for support. The outcomes indicated an improvement in SWL, mainly in those participants who had low SWL at baseline. Furthermore, time post-injury, marital status, and age were associated with risk for low SWL, and therefore should be considered among healthcare providers when prioritizing allocations to such programs.

Two studies addressed the acquisition of a particular skill as a means for psychological empowerment. Mandelbaum and associates (2015) conducted a prospective pilot study in a group of 10 adults with MS who participated in two weekly 1-hour sessions of salsa as well as 30 min home exercise, during a course of four weeks. Participants indicated significant improvements in some balance and mobility measures but not in self-efficacy, perhaps due to lack of power. In another study, 17 children with cerebral palsy (CP) aged 2–18 were included in an adapted dynamic cycling (ADC) program, designed to teach them cycling skills. While SE was not specifically articulated within the interviews undertaken with the participants and their parents, the personal and social importance of developing children's skills were mentioned. Specifically, control of the bike, pedaling, steering, and using the brakes were mentioned as enablers of greater safety on the road. In another study (Froehlich-Grobe et al., 2014), 128 individuals with SCI were randomized into a staff-supported ($n=69$) and a self-guided ($n=59$) group, who were encouraged to practice physical activity at home. Outcome measures included daily activity, fitness measures, and several predictors including exercise self-efficacy. Findings suggested different best fit variables for each group. After accounting for other predictors, only exercise barriers (for the staff-supported group) and exercise self-efficacy (for the self-guided group) significantly predicted weekly minutes of participation in aerobic-type exercise throughout a period of 12 months.

Probably, the most comprehensive effort for developing a support program for rehabilitating clients with physical disability has been described in the research performed by van der Ploeg and associates (2007). These authors developed and reported outcomes of practicing two types of interventions to encourage rehabilitation clients to participate in physical activity. The first program consisted of a sport stimulation program entitled Rehabilitation & Sports (R&S). This program involved a 30-minute personalized, tailored counseling session with a sport counselor six weeks prior to the end of the rehabilitation period, followed by a 10-minute telephone interview six weeks after discharge from rehabilitation. An additional program also involved counseling before discharge, and was called Active after Rehabilitation (AaR). Participants in this program received an individual 40-minute counseling session from a physical activity counselor six weeks before the end of rehabilitation, and in addition three phone-based counseling sessions lasting 15 to 20 minutes two to eight weeks after the end of rehabilitation. This counseling program focused on identifying physical activity possibilities, integrating facilitators, overcoming barriers, and using strategies to become more physically active, based on the stage of change model referring to physical activity participation (Prochaska & Velicer, 1997). Based on the results obtained shortly after and one year following the interventions, the authors concluded that a long-lasting increase in physical activity behavior can likely be achieved, when continuing physical activity promotion programs into the period after discharge from rehabilitation. It should be acknowledged that practitioners in this program were

professional counselors who were sensitive to the principles of stages of change, and utilized various counseling strategies in this regard.

4. Implications and Recommendations

In this review we synthesized research aimed to describe and evaluate the barriers and facilitators to participation in physical activity. Based on the studies reviewed here, it appears that intervention programs aiming to increase health-related physical activity participation are based on a variety of exercise and skill repertoires and protocols. However, in any kind of physical activity intervention the perception of self-efficacy to perform the anticipated activity attracts one of the main foci of the stakeholders, and seems to be a major contributor to success in performance and participation. Furthermore, clinicians who are engaged in such programs need to be aware of the stage in which the individual anticipates an intended change in physical activity behavior. Wright and associates (2018) proposed a clinical intervention protocol for enhancing physical activity in young people using the stages of change and processes of change from the transtheoretical model of behavior change (Prochaska & Velicer, 1997). For example, in the first stage of pre-contemplation (i.e., not being aware of a problem and having no intention of making a change in the next six months), they proposed that clinicians should identify and illustrate the benefits of physical activity and encourage the young person to participate in it. However, without a preliminary positive experience of fun, social contact, and mastery, it would be extremely difficult to create an intention toward participation with persuasion-type counseling practices only. Therefore, experiential practices, such as a sports workshop or camp (Block et al., 2009; Ng et al., 2013; Silveira et al., 2018) appear very helpful in producing such a change. Within sports workshops lasting from a few hours to a few days, and supported with proper equipment and experienced support personnel including peer mentors, experiences can be gained that address a variety of strategies of change. Following are some examples: (a) Dramatic Relief – This is considered the emotional arousal related to a health behavior, which is very common in most sport activities. When properly adapting and slightly challenging the activity to a participant's current capabilities, it is likely to create a positive arousal; (b) Self-Reevaluation – This is understood as the self-reappraisal to realize that healthy behavior is part of who a person wants to be. While engaging in sports activity, trained peer participants often create positive models which may facilitate such an experience; (c) Social Liberation – This is understood as the environmental opportunities that are open to an individual to show that society is supportive of the healthy behavior. While engaging in a sport experience, social agents such as peer participants, staff, friends, and family members may provide additional confirmation of the personal and social opportunities that are opened through participation in the activity.

The United Nations (2011) statement on “Disability and Sports” affirms that “through sport, persons without disabilities interact with persons with disabilities in a positive context forcing them to reshape assumptions about what persons with disabilities can and cannot do. Sport changes the person with disability in an equally profound way by empowering persons with disabilities to realize their full potential and advocate for changes in society. Through sport, persons with disabilities acquire vital social skills, develop independence, and become empowered to act as agents of change.”

The perspective of “sports-based empowerment” in persons with disability was introduced by Hutzler (1990), and links empowerment to self-efficacy and perceived competence. According to this model, sport experience enables the individual to acquire control over personal and environmental resources, and to develop competencies usually deprived by disability (Hutzler & Bar-Eli, 1993; Hutzler & Sherrill, 1999). Sørensen (2003) added to this rather individualistic approach the perspective of societal and organizational empowerment through the sports environment. Based on questionnaires completed by 151 sport club members in Norway, the authors concluded that athletic identity and self-esteem were related to both general empowerment and sports empowerment. This finding articulates an additional aspect of social identity generated through sport and/or exercise activity participation. A personal story reported by an adult with no previous sport experience who suffered a spinal cord injury during a traffic accident further illustrates the social identity perspective. When lying in bed in the rehabilitation hospital, he viewed two stereotypes of rehabilitation service recipients. The first was of those lying back in a chair with an abandoned expression on their faces, and the other was of those who were moving back and forth in their chair and looked very vital. When he tried to figure out what the factor was that differed between the two stereotypes, he soon determined that it was sport participation that characterized the moving and vital participants. He said, “I wanted to be like them”. Given the information synthesized in this review, translating the stages of a change model and self-efficacy theory to the practice of physical activity promotion can be described as follows:

- 1) In the pre-contemplation phase search for alternative models of engagement with quality of life,

including experimentation of various physical activity options and contexts.

- 2) In the contemplation and preparation phase a major emphasis should be placed on minimizing both physical barriers (e.g., lack of transport; lack of appropriate equipment and financial support) and social barriers (e.g., lack of persons to train with; lack of family support), and on facilitating participation through peer and professional support.
- 3) In the action phase, caution should be exercised regarding the optimal mix of the program content, duration, and intensity, so as to address efficacy such as mastery, peer modeling, and positive and corrective feedback; occasional arousal (e.g., through local competitions) should be exercised as well.
- 4) In the maintenance phase, self-efficacy needs to be continuously addressed through continuous mastery experiences within gradually more demanding activities and contexts. In addition, social networking should be developed in order to facilitate the establishment of a particular members' identification (e.g., swimmer, athlete, cyclist, basketball player, specific sports club, etc.).

Practitioners and researchers are encouraged to utilize these recommendations and study the effectiveness of new programs designed to initiate and maintain sport careers as well as life-long exercise and recreational participation.

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