

Sport participation and positive development in older persons

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Abstract In many Western countries, more and more people are living longer. As part of this demographic shift, increasing numbers are participating in Masters sport. In the past, sport was considered important for the development of young people; however, the potential for sport participation to affect positive development across the lifespan is now recognized. The purpose of this paper is to introduce conceptual frameworks from developmental psychology that are being used to understand youths' positive development through sport, and to explore these frameworks in the context of sport as an avenue for positive development in older persons. To achieve this aim, we outline research on sport participation as it applies to youth development and consider relevant aspects as they broadly apply to development later in life. This discussion highlights the inherent paradox of sport participation—that it has the potential to provide considerable positive growth but also the potential for significant negative consequences. Finally, we explore areas of future research related to positive development in older persons through sport.

Keywords Masters athlete · Health · Age

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One of the most robust and intriguing trends over the past century and a half is the consistent increase in the human lifespan. From 1840 to the present, lifespan has increased 3 months each calendar year, to the point where children born today in the most advantaged countries in the world can expect to live upwards of 80 years [1]. Putting the obvious benefits of longer life aside, such longevity poses certain challenges from both an individual and societal perspective. The leading edge of the 'baby boom' generation are now entering their 60s in North America [2] and in other developed countries the 'senior' population is increasing dramatically. This trend will continue for the next 20 years [3]. In 2006, the Heart and Stroke Foundation of Canada expressed concern with this demographic shift, particularly considering the poor health of many in the baby boom generation. Their report indicated that 52% of boomers are sedentary and 30% are obese, and that both of these numbers had increased dramatically in the last 10 years. The Heart and Stroke Foundation called for a national strategy in Canada that would increase levels of physical activity in this cohort, and across the entire population. Similar strategies have been advocated in the United States and Australia. For example, the *Active Australia* campaign was launched by the Australian Sports Commission in 1996 to promote participation in sport and physical activity as part of a strategy to improve overall health outcomes [4]. In 2001, the Australian Sports Commission and the Department of Veteran Affairs produced the *Older, smarter, fitter* document as a guide for providers of sport and physical activity programs targeting older Australians [5]. In the United States, the American Association of Retired Persons et al. developed the *National blueprint for increasing physical activity among adults aged 50 and older* in response to the economic and social concerns of an 'unhealthy' aging population [6].

While many people accept the health benefits of exercise, this acceptance does not always equate to regular involvement. For example, Ory, Hoffman, Hawkins, Sanner, and Mockenhaupt [7] noted that 98 percent of adults over the age of 50 recognize the importance of physical activity to maintaining health, yet only a small minority of these adults meet the minimum daily physical activity recommendations [8], as participation in sport and physical activity tends to decrease with age [4, 8, 9]. This gap between what people know to be important and their actual health behaviors remains a critical concern for researchers and policy makers alike.

Given the negative stereotypes towards aging and the elderly that prevail in Western society [10, 11], perhaps the tendency of seniors to avoid physical activity and sport is not overly surprising [12, 13]. Certain studies suggest that seniors themselves internalize these negative attitudes and stereotypes [14], which in turn influence their decisions to partake in physical activity, sport, and other health-promoting behaviors [13, 15]. In particular, evidence suggests many older women believe activities that involve exertion and are physically fatiguing are too risky for their health; consequently, they tend to avoid sport and exercise [16–18].

Seniors who stay active above and beyond recommended levels may perform an important social role, as they can alter societal expectations of what it means to grow old. For example, Ed Whitlock, at age 69, set a world record for being the oldest person to run a marathon in less than 3 h. [19] Now 75, Whitlock has the only three sub-3-h performances by a septuagenarian [20]. Considering that in 1908 the world record for a man of *any age* was 2:55 h, Whitlock's accomplishments seem all that much more impressive. Older athletes, like Whitlock, appear to be a somewhat select or privileged group who possess the time, ability, health, desire, and disposable income to regularly train and travel to sites of competition. Nevertheless, older athletes have become an identifiable (and growing) group in contemporary Western society whose experiences and lives we know very little about [21].

Past research has focused primarily on the health benefits of seniors' involvement in physical activity, with significantly less research focused on outcomes associated with older persons' participation in organized sport [21, 22]. This trend mirrors research in younger populations. While studies outlining the benefits of physical activity to children and adolescents' health and wellbeing are well documented [23], much less empirical research has focused on the physical and psychosocial outcomes associated specifically with sport participation [24]. However, with the emergence of psychology research focused on 'positive psychology' and 'positive development' [25], several conceptual frame-

works are currently being used to study children's positive development through sport [26].

Although researchers examining human development have typically focused on youth populations, development occurs across the lifespan [27]. In the past, developmental theorists argued that growth and character building happened primarily in childhood and adolescence; hence, sport was considered important for young people and not necessary for older people [28]. More recently, however, many have argued the potential benefits of leisure involvement to healthy development in later life [29, 30]. In particular, sport participation is now promoted to older people as a means to maintain their health and wellbeing. Given that the surge in retiring baby boomers may lead to a significant increase in the number of older adults participating in Masters sport [21], the physical, psychological, and social outcomes of sport for older adults are worth examining [12, 31, 32]. Masters sport is a unique context that provides opportunities and outcomes that extend beyond regular involvement in physical activity, such as walking or doing an exercise class. Masters sport allows older people to regularly compete against others within a similar age range in a variety of individual and team activities. Competitions range from weekly occurrences in one's locality to major national and international multi-sports events that are held every 2 or 4 years, respectively, in different countries. Despite competition being inherent in Masters sport, the core values and social discourses underpinning this movement are participation for 'fun, friendship and fitness' [21], which is quite similar to how youth sport is framed (i.e., it is often assumed that children play sport to have fun, make friends, and keep fit). The purpose of this paper is to introduce conceptual frameworks from developmental psychology that are being used to understand youths' positive development through sport, and to explore these frameworks in the context of positive development in older persons through sport. We acknowledge that there are quite distinct differences between younger and older people from a developmental perspective; however, in applying such models to the specific context of sport participation, there appears to be similar outcomes experienced, regardless of age. In the sections that follow, we outline research on sport participation as it applies to youth development, consider relevant aspects of youth development as they broadly apply to development later in life, and explore areas of future research related to positive seniors' development through sport.

Positive youth development

Positive youth development research emerged from practitioners' and researchers' growing concern for the health

and wellbeing of adolescents. In the past, the approach to dealing with adolescent problems and issues was a top-down “deficit reduction” approach [33], where the problem was identified (e.g., childhood obesity) and funding was provided to address the problem. However, as Pittman [34] pointed out, youth who are “problem free” are not necessarily “fully prepared” to be engaging and contributing members of society. As such, positive youth development research generally applies a bottom-up “asset-building” approach to youth development, where youths’ strengths are identified and built upon [33].

Youths’ extra-curricular activities have been proposed as tools through which positive youth development can be fostered [35]. Sport, as the most popular type of youth program, [36, 37] has been of particular interest to developmental and sport psychology researchers alike. In recent years, numerous studies have examined varying aspects of youth development, some of which have obvious application to older persons. Of particular interest in this paper are studies suggesting that sport participation provides something meaningful and meritorious above and beyond that achieved through regular, non-competitive involvement in physical activity.

Qualities related to sport participation in youth

Sport participation is often extolled as an optimal avenue for the development of positive characteristics like sports-personship, fair play, empathy, and graciousness [38]; however, there is very little empirical research examining the evidence for this position. There is abundant research (both quantitative and qualitative) on the associations between sport participation and qualities such as moral values, moral reasoning, and sportspersonship; however, prior work in this area has been drawn largely from cross-sectional designs which do not allow for an identification of cause and effect [38].

Lerner, Fisher, and Weinberg [39] advocated that youth activities (including sport) should emphasize the development of *the 5 Cs*: competence, character, connection, confidence, caring/compassion. They suggest that if these five desired outcomes are fostered in youth, youth will in turn develop into contributing members of society (the sixth “C”). Specifically, youth will give back to society and contribute to the positive development of the next generation of youth.

Similarly, Benson and colleagues [33, 40–43] developed a list of core developmental processes, resources, and experiences for children and adolescents based on scientific literature and practitioner’s wisdom. These 40 developmental assets are divided into two broad categories (external and internal assets), and further divided into eight sub-categories

(support, empowerment, boundaries and expectations, constructive use of time, commitment to learning, positive values, social competence, and positive identity). Examinations of these assets have confirmed their role in preventing negative outcomes in youth development (e.g., [41]) and promoting positive outcomes [e.g., [42]]. Fraser-Thomas and her colleagues [24] noted that sport is an ideal activity for the development of many of these assets. In particular, sport programs appear to be unique from other extra-curricular activities (including unstructured physical activity), given sport programs’ facilitation of several key developmental attributes (e.g., goal-setting, effort, time management, emotional regulation, physical skills, teamwork, social skills, leadership, diverse peer relations). A recent qualitative study examining adolescents’ positive and negative developmental experiences in competitive swimming [44] pinpoints some of the mechanisms and processes by which youths’ positive development may be occurring. In particular, swimmers highlighted how the time and effort required to achieve results (e.g., early morning practices, volume and length of practices, intensity of training camps) and the sport’s focus on self-improvement (e.g., personal best times, graded time standards) contributed to their development of a strong work ethic, commitment, discipline, and perseverance. Findings suggesting that sport may also foster negative experiences are of some concern; however, recent work [45] proposes that negative experiences such as stress can lead to positive development as adolescents learn how to overcome issues, a notion that is further explored in the next section.

Positive youth development through growth experiences

A critical component of positive youth development seems to be involvement in experiences that challenge or ‘stretch’ the participant’s abilities. Through focus groups with adolescents highly involved in school and community-based extra-curricular activities (e.g., sports, arts, clubs), Dworkin, Larson, and Hansen [46] explored youths’ growth experiences, defined as “experiences that teach you something or expand you in some way, that give you new skills, new attitudes, or new ways of interacting with others” (p. 20). Six key areas of growth experiences were outlined: (a) identity, (b) initiative, (c) basic skills, (d) interpersonal relationships, (e) teamwork and social skills, and (f) adult networks. Of interest, follow-up research led to the identification of negative experiences in extra-curricular activities in five areas: (a) stress, (b) negative peer interactions, (c) social exclusion, (d) negative group dynamics, and (e) inappropriate adult behavior [47].

Hansen et al. [48] examined the growth experiences of American high school students in five activity categories (i.e., sports, faith-based/service, academic/leadership, per-

formance/fine arts, and community/vocational) and noted that although adolescents involved in sport activities reported moderately high rates of growth experiences in some areas (i.e., self-knowledge, goal-setting, effort, time management, emotional regulation, physical skills, teamwork, social skills, leadership, and diverse peer relations), they also reported the highest rates of negative experiences in all areas (i.e., stress, negative peer interactions, social exclusion, negative group dynamics, and inappropriate adult behavior). These results highlight the inherent paradox of sport participation—that it has the potential to provide considerable positive growth but also the potential for significant negative consequences.

What does sport develop in the older participant?

Masters athletes are unique because they continue to train and compete well into old age. It appears that this continued involvement in sport has its benefits. Sport scientists [19, 49, 50] have suggested that prolonged training by Masters athletes plays a critical role in the maintenance of athletic performance even in the face of predicted age-related decline. The physiological changes that occur with age are well documented—age changes for maximal heart rate [51] and aerobic capacities [52–54] are significant. Yet, age-related physiological decline is not as severe in Masters athletes.

Pollock et al. [55] investigated the aerobic capacity and body composition of Masters track athletes and evaluated the relationship to age and maintenance of training over a 10-year period. Competitive athletes who maintained their training intensity over the 10-year period prior showed no significant changes in aerobic capacity, whereas individuals who reduced their training intensity showed a significant decline. A similar study by Hagberg et al. [51] compared older elite runners to their sedentary peers and to younger elite runners. The older sedentary subjects exhibited a maximal oxygen uptake that was 47% lower than Masters athletes'; furthermore, most of the difference between Masters athletes and younger elite runners was attributable to the lower maximal heart rate exhibited by the Masters. Combined, the results from Hagberg et al. and Pollock et al. demonstrate that maintaining training intensity helps individuals sustain a higher level of aerobic performance with aging.

Much of the evidence pertaining to Masters athletes illustrates they are the physical elite and 'best preserved' of their age cohorts; however, these examinations have been largely physiological in nature. A more critical question for the current review is whether involvement in Masters sport provides additional psychosocial benefits akin to those suggested for youth involvement in sport and whether those effects go beyond those derived from general engagement

in physical activity. There is a paucity of research considering this issue; however, the results have been largely consistent and provide a fertile ground for further work in this area. The following discussion suggests sport participation can facilitate positive development in older adults by negotiating the aging process, providing continued motivation for physical activity, and challenging age-related stereotypes.

Helps negotiate the aging process

Qualitative research by Dionigi [21, 22, 31, 56, 57] highlights how sport participation can assist the management of an aging identity. Dionigi conducted short semi-structured interviews with 110 Masters athletes (aged 55–94; even gender split) at the Eighth Australian Masters Games and held in-depth interviews with 28 athletes (15 women, 13 men, aged 60–89) who had competed in these Games. The themes to emerge from this research were common across participants, regardless of individual differences (i.e., age, gender, team sport or individual event, exercise history). Discussions with these older athletes about why they compete in sport and what it means to them revealed that participation in Masters sport was a key strategy for negotiating the aging process. The participants' words and actions relating to the management of aging reflected two broad (interacting) themes: "I'm out here and I can do this!" and "Use it or lose it."

"I'm out here and I can do this!" describes how the older participants in Dionigi's study perceived themselves as 'an exception to the rule.' That is, they set themselves apart from 'other' inactive older people and expressed pride in the belief that they were different to the 'stereotypical' older person (i.e., someone who is frail, dependent, lonely, ill, and most likely living in an aged care facility). Many felt that competing in Masters sport kept them "young" because they were connecting with and competing against younger people, maintaining physical, mental, and social health, and were fully engaged in life. For the majority of participants, "the satisfaction of knowing that [they were] not losing it" was extremely important. In other words, by monitoring their performance in the context of sport, the participants demonstrated that "I can still do it [i.e., compete]! I'm not too old." In particular, some participants described how they challenged themselves and pushed their body to its limit in order to get the greatest health benefits from their sport participation. These feelings of strength, confidence, and competency generalized into an overall perceived sense of control and independence, which was encapsulated in the common phrase, "I can do everything I want to." All of the above feelings and experiences indicated to the older athletes (and others) that they were adapting to the aging process and not yet experiencing ill health, disability, isolation, or dependency in old age.

As a result, the participants expressed a sense of personal empowerment and control over their body and lives that they saw as direct benefits of their involvement in competitive sport. This finding highlights that their sport participation is (in part) a story of resilience, enthusiasm, pride, determination, lives well lived, and lives lived to their potential. Furthermore, the older athletes constructed and perceived themselves as a person of ‘social worth’ who is conscientious about maintaining good health, helping to reduce health care costs, capable of success in competition, and deserving of public recognition.

On the other hand, the “Use it or lose it” theme points to the tenuous nature of these feelings of competency, connectedness, confidence, satisfaction, and personal empowerment and highlights the many concerns older people express about aging. All of the participants in Dionigi’s study indicated a desire to fight the aging process (i.e., use their mind and body as much and for as long as possible) by remaining competitive in sport. In the words of the participants, they were strongly motivated by the concern that if they stopped being active through sport they will become “old,” “rusty,” “age badly,” “dependent on others,” or “end up in [an aged care] home.” Underlying their participation in sport were beliefs that they were “making these latter years as enjoyable as [they] can by keeping fit” or “setting [their] own quality of life by being fit and active.” These findings are supported in other work examining older persons’ sport participation. For example, Max, an 88-year-old runner from the study by Roper et al. [58] said that his competitive running career was predominantly linked to leading a healthy lifestyle. Similarly, Phoenix and Sparkes [32] found that for Fred, a 70-year-old Veteran football/soccer player, “being fit and healthy” was a key factor in his construction of a positive aging identity.

Many older athletes believe that if they lose their “physical ability,” they will also lose their independence, health, sense of control over their life, and sense of self. Many older athletes recognize that fragility, dependency, and illness are possible outcomes of long life. Simultaneously, however, they express the undesirability of these ‘risks’ and believe that one should attempt to delay their onset for as long as possible—with competitive sport being one practice to avoid or delay these potential threats. For some participants, this meant they were “turning a blind eye” to the possibilities of aging by remaining extremely active and competing in sport until a factor beyond their control stopped them. A minority of participants said that they would rather “die on the court” or in the field of play in an attempt to avoid ill health and dependency in old age altogether. The majority of participants, however, adopted the “it’s life” attitude and spoke of the necessity to “keep going” for as long possible in order to make the most out of life in the time that remained. As one female athlete said,

“keep battling on...you have just got to face life and make the most of it.” This latter finding indicates an acceptance of aging and a return to the idea that these individuals are adapting to the aging process by experiencing a sense of challenge, growth, and enjoyment in the context of sport (and beyond). Evidently, sport can help older persons fight/resist, monitor, adapt to, avoid, and/or accept the aging process. In other words, participation in sport has the potential to assist in the process of negotiating an aging identity.

Provides continued motivation for physical activity

Given the robust relationship between continued involvement in physical activity and maintenance of physical and cognitive functioning [59], possession of an adaptive exercise motivational profile is a desirable quality for older persons. Motivation research conducted on Masters athletes thus far suggests they participate in sport for many reasons, including enjoyment, desire for personal achievement and winning, social affiliation and recognition, and health and fitness reasons [60]. The accumulated findings provide valuable insight into the motives behind Masters athletes’ participation. The conclusions are limited, however, because most studies were exploratory in nature and conducted mainly in recreational rather than competitive sport settings. For instance, a recent study [61] found that recreational Masters marathon runners reported a greater degree of functional commitment, which was related to feelings of satisfaction and opportunities associated with participation in Masters sport (e.g., health or social benefits). Findings from a review of the literature on the motives and perceived benefits of older persons’ involvement in competitive (rather than recreational) sport by Dionigi [22] suggest that Masters athletes have an adaptive motivation profile for continued physical activity. However, additional research in this area is critical.

The nature of a Masters athlete’s commitment can be derived from the persistence of behavior motivated through either volitional feelings of personal preference or a sense of external control and compulsion [62]. Scanlan et al. [63] suggested that there were two major reasons why an individual would commit to sport participation, ‘because they want to’ continue participating and ‘because they have to’. Feelings of enjoyment and self-identification with the activity reflect functional commitment which is adaptive, whereas social pressures or constraints may lead to a feeling of obligatory commitment which is maladaptive. Weiss and Ferrer-Caja [64] found a higher burnout rate for individuals who reported feeling compelled to continue participating in their sport (i.e., who participated because ‘they have to’).

In relating these general studies on motivation and commitment in sport to older persons, it could be argued that socio-cultural pressure, such as current health promo-

tion and its link to ‘successful aging’, if internalized, can make an older person feel that ‘they have to’ keep physically, mentally, and socially active in order to ‘age well’. Many older people believe that competing in Masters sport is one way they can achieve the goal of aging ‘successfully’ [21]. For example, the common ‘use it or lose it’ catch-phrase used by older Masters athletes (discussed above) indicates a desire to use the body and mind as much as possible before one inevitably loses these abilities due to aging. In other words, many older athletes (regardless of when they started or how long they have been competing) simultaneously feel ‘they have to’ and ‘want to’ play sport to (a) continue an active, healthy, happy, and engaged life, and (b) avoid ill health, disability, dependency, and isolation in old age [21, 56]. However, the maintenance of intense physical activity may indicate a denial of existential issues (e.g., self-reflection on the meaning of life, bodily limitations, ill health, and death) which could pose challenges to identity management and development in later life [29, 30].

Challenges age-related stereotypes

Some researchers have suggested that Masters athletes are important role models for an aging society. Levy and Banaji [65] noted the potential of these ‘exemplars’ to influence societal attitudes towards the elderly. Indeed, older individuals who accomplish remarkable athletic feats are often profiled in the popular media, which may influence the way that society as a whole views the elderly and the aging process. Less clear, however, is how these aging athletes affect other seniors. Ory et al. [7] suggested that elite-level Masters athletes were likely to intimidate others in the same age cohort, potentially discouraging them from partaking in physical activity. The authors indicated that seniors were most likely to respond positively to images of exercise that included social interaction (i.e., seniors out for a walk with friends) and featured ordinary people doing ordinary things. Subsequent research by Horton and colleagues [66] adds some complexity to these assertions. Qualitative interviews with seniors investigated their reactions to an elite Masters level runner. Reactions fell into three distinct groups: (a) those who found his example inspirational, (b) those who thought that he might be inspirational for a certain group of seniors who were already moderately active, and (c) those who found his example distinctly unappealing.

Generally speaking, there was a slight tendency for participants who reported more daily physical activity in their own lives to categorize the elite athlete as an appropriate role model for seniors. There were, however, exceptions to this—sedentary participants who considered him inspirational, and active participants who did not. In fact, one participant, who reported walking 2 h per day and

working out with weights on a daily basis, considered the image of the elite athlete to be distinctly unappealing: “I look at him as an aberration. I mean... to look at the picture to me is almost stressful to look at. No, that doesn’t do anything for me. It turns me right off.” Further examination of how seniors react to exemplars of physical fitness from their own age group is an intriguing area of future research, particularly considering current demographic trends, the prevalence of sedentary lifestyles in older populations, and the health consequences of such lifestyles [7].

Limitations of current knowledge and directions for future research

The discussion above regarding Masters athletes’ deconstruction of aging stereotypes reinforces how little we know about the role of sport in the lives of older persons. Furthermore, much of the information presented in this discussion paper is drawn from research in indirectly related areas. More to the point, almost none of the research presented comes from empirical studies explicitly designed to test the primary postulation driving this paper—the potential for participation in sport to provide older adults with beneficial qualities that can be used to improve the quality of their aging experience. If we return to the conception of Lerner et al. [39] of the 5 C’s (competence, character, connection, confidence, and caring and compassion), and Benson and colleagues’ notion of developmental assets [33], it is likely that sport participation facilitates the development of similar attributes in older persons. Although the specific assets change, existing research suggests that the type of external and internal assets developed through sport participation may be similar. Table 1 presents a proposed modification to Benson’s framework, which could become the basis for future work in this area. For example, older adults may feel particularly supported by family and friends (external asset) and challenged to further enhance their abilities and skills (internal asset) through their engagement in Masters sport programs. Furthermore, older people may believe that maintaining health and fitness through sport participation is a constructive use of their time (external asset) that provides them with a sense of personal empowerment (internal asset). On a broader spectrum, moving forward requires addressing two key questions, which we consider below.

Question 1—are there benefits from sport participation that do not come from general physical activity involvement?

Generally, previous research suggests that higher doses of physical activity are associated with improved health. For

Table 1 Examples of potential assets developed in older sport participants

Asset type	Examples
External assets	
Support	Presence of social support from family members and friends
Empowerment	Empowered by those around them, reinforcement of positive attitudes towards older persons
Boundaries and expectations	Encouragement from those around them to do well, has friends that model positive behavior
Constructive use of time	Limited time spent ‘unengaged’ with life, time spent in productive activities
Internal assets	
Commitment to learning	Continued challenge of current abilities and skills
Positive values	Continued reinforcement of concepts of fair play, sportspersonship, etc.
Social competencies	Continued development and reinforcement of empathy, sensitivity and friendship skills
Positive identity	Sense of personal power and a positive view of personal future

example, greater rates of physical activity are related to decreased sick days at work [67], lower rates of cardiovascular disease [68], and reduced total adiposity [69]. At present, it is unclear whether the benefits afforded to older adults described in this paper are related to participation in sport or simply a by-product of engagement in physical activity. Moreover, existing studies that have examined the relationship between physical activity and health outcomes have typically examined only single dimensions of health (e.g., physical or psychological health; [70, 71]) and have not considered individuals at the highest end of the physical activity involvement continuum (e.g., Masters athletes) as a separate group. As a result, we have little understanding of how the extreme approach to physical activity associated with Masters athletes’ participation may affect health outcomes. Further research is necessary with study designs utilizing highly athletic (i.e., Masters athletes) versus recreationally active older adults (i.e., who meet regular physical activity guidelines) versus non-active older adults. The recent qualitative research on older athletes [e.g., [12, 57, 58]] has indicated the importance of competition, performance, and training in offering unique benefits (e.g., enjoying winning and breaking records, appreciating the medals, recognition, and status, being able to constantly monitor and test performance levels in comparison to one’s previous standards, and/or others of a similar or a significantly younger age). These perceived benefits from sport participation seem to go beyond what is commonly derived from physical activity, further reinforcing the need for more work in this area.

Question 2—are there negative consequences of sport participation in older adults?

As previously outlined, there is a growing body of research that suggests numerous negative experiences and outcomes are associated with youth sport settings [44, 46]. Potential negative experiences and outcomes of sport participation in

older adults should also be examined. For example, there is mounting evidence that the dose–response relationship between physical activity and health outcomes is not linear. Excessive aerobic training is associated with increased risk of overuse injuries [72] and immune system dysfunction [73]. Moreover, ‘exercise abuse’ [74, 75] is a growing area of concern among researchers and medical practitioners. The dose–response relationship between physical activity involvement and health benefits may vary depending on the health outcome under consideration.

Moreover, there is a fine line between pursuing large amounts of physical activity because of one’s passion for sport and desire for a healthy lifestyle, and engaging in too much because of one’s obsession with physical training or (in the case of older persons) feeling ‘they have to’ keep active to age successfully. Vallerand and colleagues [76, 77] found that individuals can have two distinct types of passion. Obsessive passion refers to controlled internalization that creates internal pressure to engage in the activity. For example, an athlete with an obsessive passion for running would report having no choice but to attend a scheduled running workout. Harmonious passion refers to an autonomous internalization that leads one to choose to engage in the activity. An athlete with harmonious passion would be able to put aside the workout if the need arises. Their research with adolescent and young-adult athletes suggests that obsessive passion is associated with negative affective and behavioral consequences and that harmonious passion is related to positive consequences. It remains to be seen if this holds true for Masters athletes.

Training occurring over several decades that has become an obsessive pursuit may not be indicative of positive or ‘successful’ aging. For instance, due to the eventuality of decline and disability commonly associated with a long life, attempting to resist or avoid the aging process by continuing an extremely active lifestyle and physical training can become problematic for an aging identity

[21], especially if it indicates a denial or avoidance of issues that have to be faced in later life. In particular, when older athletes can no longer participate in sport, some may find it hard to cope [21]. Such an experience may be accompanied by feelings of guilt, shame, and worthlessness. This desire to ‘fight aging’ also has the potential to (re)produce a heightened fear or undesirability of ill health in old age (both personally and culturally; [10, 78]). The extent to which these potential negative consequences of continued sport participation affect development in later life needs further exploration.

Concluding remarks

In the sport and exercise psychology field, very little research has been conducted with older participants [79, 80]. This realization is particularly troubling considering the potential impact of this population on the sustainability of health care systems in many countries [81–83]. This discussion paper is a call to researchers for further work in this area to contribute to our understanding of how physical activity in general, and sport participation in particular, affects development across the lifespan.

An important concern in moving this research forward relates to the hazard of applying frameworks from youth development to older persons. Infantilization of older persons (i.e., relating to an older person as you would a child) is common [84] and has negative consequences for health and wellbeing [85]. As a result, it is paramount that researchers in this area recognize the differences in development as it pertains to younger and older cohorts. Historically, developmentalists have almost exclusively focused on childhood and youth as the primary window of development. The present review extended this discussion to older persons primarily due to the extreme shift in population demographics most industrialized nations are currently experiencing. A central question is whether participation in sport provides desirable outcomes *throughout the lifespan* that go above and beyond those garnered from simple engagement in general physical activity. Future work in this area will inform public health messaging regarding involvement in sport and physical activity at all ages.

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