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ORIGINAL ARTICLE

Motivation for sport participation in older Italian athletes: the role of age, gender and competition level

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Abstract This study aimed at identifying whether age, competition level and gender influence motivation for sport participation in Italian senior athletes. Four hundred and thirty-three athletes aged 45–80 years participated in the study by completing the SMS questionnaire validated for this population. Separate scores for the 7 Extrinsic Motivation (EM), Intrinsic Motivation (IM) and Amotivation (AM) subscales of the SMS questionnaire, as well as a global self-determination index, were calculated. Psychometric testing did not fully support the factor structure of the SMS due to the presence of cross-loading items, suggesting that some items should be revisited to better fit the older athlete population. The analyses of the effects of age, competition level and gender on sport motivation of senior athletes showed a significant interaction between age (45–55, 55–65, >65 years) and competition level (local, regional, national, international) both for the global self-determination index and for the EM scale score. It suggests that the oldest athletes competing at local level are less supported by self-determination as compared to their younger counterparts or to age-matched athletes competing at national or international level and that EM may be a key motivational factor for the ageing athlete depending on his/her competition level. Despite the hypothesised influence of stereotyped gender role socialisation on self-determination of older athletes, no gender difference emerged.

Key words Self-determination theory · Intrinsic motivation · Extrinsic motivation · Amotivation · Senior athlete

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Introduction

In western countries, almost 50% of adults over the age of 65 years are sedentary and only 25% participate in regular physical activity [1]. The less active lifestyle associated with retirement highly contributes to the observed age-related deficits of physiological and psychosocial functions [2]. Despite the generalised trend toward hypokinesia at older ages, there is an increasing number of older athletes who keep training and competing in age categories [3]. Senior competitions are relatively new in the athletic world and participation in competitive sport may represent an important strategy for older adults in adapting to later life, providing a context for them to express youthfulness and negotiate the meanings of older age. In fact, the master athletes who maintain a high fitness level and outstanding physical abilities throughout their life span have been proposed as an ideal model to determine successful ageing [2, 4, 5].

Long-term involvement in sport seems to render the performance of older athletes more similar to that of young athletes than of the co-aged sedentary population [4, 5]. Nevertheless, the role of age in master athletes cannot be ruled out due to physiological (e.g., loss of muscle mass, aerobic and anaerobic capacities), psychological (e.g., loss of sense of control over life and self-confidence) and contextual differences (e.g., lack of technical and financial support) when compared to younger athletes. Older athletes train less frequently and intensively than younger ones and have less technical and psychosocial support for their participation [2]. Also, in contrast to youth sport where performance tends to improve by the year, senior athletes must cope with the age-related trend of performance decline within the five-year age class organisation of their championships.

From the psychological point of view, the motivational peculiarities of senior athletes must be taken into account, since motivation is a crucial factor influencing behavioural variables such as persistence, learning and performance in sport and exercise [6–8]. Understanding the primary motives for older adults to participate in competitive sport may contribute to the development of effective long-term strategies to support the trend of increasing sport commitment at older ages. Unfortunately, the age specificity of motivations to sport and exercise renders the predictors of adherence identified in younger individuals unreliable for older populations [9]. Nevertheless, there is a substantially smaller body of literature concerning sport participation motivation of older athletes [10, 11] than on youngsters and younger adults (e.g. [8]). The importance attributed by sport practitioners to various personal goals seems to be age-sensitive. For instance, a cross-sectional study on motivation across the lifespan for participating in competitive swimming [12] highlighted that its competitive characteristics represent a weaker motive for involvement of older athletes as compared to youngsters and younger adults, whereas fun is most important for both older adults and young children. In contrast, when considering the motives of older adults for participating in non-competitive, health-related physical activity, the priorities within the personal goals are not the same as in the competitive sports domain. As an example, older training individuals indicated mental alertness as a more important goal than enjoyment, while the factor that shows the greatest similarity between age groups is the feeling of being in good shape [13].

To provide insight into the motivational processes of older adults practising sports and physical activity, three main social cognitive theories of motivation may be usefully applied to sport and exercise settings [10]: self-efficacy [14], achievement goal [15] and self-determination theory [16, 17]. When viewing motivation from the multidimensional perspective of self-determination theory, three main constructs have been identified as crucial for understanding the psychological processes that underlie commitment in various contexts [16, 18, 19] and specifically in the context of sport and exercise [20, 21]: intrinsic motivation (IM), extrinsic motivation (EM) and amotivation (AM). They are hypothesised to vary in terms of their level of self-determination along a continuum ranging from the lowest level of AM to the highest level of IM. IM refers to engaging in an activity purely for the pleasure and satisfaction derived from doing it. On the contrary, EM pertains to a wide variety of behaviours that are engaged in as a means to an end not for their own sake. Finally, amotivated individuals do not perceive contingencies between their actions and the outcomes of their actions and they no longer identify any good reasons for why they continue to train. Intrinsic and extrinsic motivation have been further differentiated into more specific motives in a tridimensional perspective [18], which has been applied also to sport [22, 23]. These different types of motivation are related to patterns of sport involvement and outcomes in young athletes [17, 21, 24]. In fact, intrinsic motivation has been associated with greater sport adherence and better sportsmanship [25]. In contrast, high extrinsic motivation has been associated with sport participation focused on rewards or prizes [26] and with sport drop-outs [27].

Self-determination theory has been applied to the study of motivation across the lifespan [28] and specifically at older ages [29]. However, at present, only one study [11] has investigated sport participation motivation of older athletes by means of Pelletier's Sport Motivation Scale (SMS) [23]. Although the results confirmed the fine-graded 7-factor structure, the model fit was limited by the presence of items loading on more than one factor. Thus, the authors called for caution when applying this instrument to older athlete populations. Since their sample of senior athletes was homogeneous as to state provenance and level of competition, Shaw and colleagues [11] called for further research assessing motivation in senior athletes competing at various levels in different countries. The discriminative power of their research might have been limited also by the fact that their data were collapsed across a wide age range and gender, which are critical factors in the interpretation of results on master athletes [2].

Thus, the present research is aimed at testing whether the theoretical relations hypothesised in the SMS model are generalisable to Italian older athletes and assessing whether the motivation for their sport participation varies as a function of age and/or competition level. It was hypothesised that the factorial structure of sport participa-

tion motivation of older Italian athletes should be consistent with that reported for other co-aged athlete populations [11] and that older athletes persisting in competitive sport might be supported by an underlying motivational style that is suited to their competition level and age class.

Since gender is often assumed to underline differences in sport participation and achievement [3, 30, 31], this issue was also considered in relation to motivation. Stereotyped gender roles influence the decision about gender-appropriateness of sport behaviour and, consequently, sport motivation and participation of males and females [32–34]. Older competitors often exhibit a lifelong history of sports participation that leads directly to their sport participation in later life [35]. The stereotyped masculinity of sports should negatively influence sport participation of older women, since sport practice was strongly at odds with their gender role socialisation at a younger age [2]. In most literature concerning motivation for sport participation [23, 36, 37], women show higher levels of intrinsic motivation and lower levels of extrinsic motivation (especially EM external regulation) and amotivation than men (but see [38] for contrasting evidence). However, further research is needed to investigate gender differences in sport motivation of older athletes within a more comprehensive theoretical framework. We hypothesised that sport participation motivation of older female athletes should be quite similar to that of their male counterparts. In fact to override the lack of social encouragement in sport participation for women, to get involved and persist in competitive sport participation across the lifespan, female athletes should have a motivational style similar to that of men.

Methods

Subjects

To have a representative sample of the total older athlete population practising swimming and track and field with an error <4% [39], 430 senior Italian swimmers and track and field athletes (348 males and 82 females) were randomly pooled to participate in this study. The smaller number of female athletes mirrors the gender differences in participation in athletic competition in the last few decades [32]. The athletes, ranging in age from 45 to 80 years, were assigned to three age subgroups according to the developmental literature [2]: 45–55 years: 229 (53%); 56–65 years: 114 (27%); and >65 years: 87 (20%). All participants had at least 10 years of previous training and most of them had a lifelong history of sport participation (65%), even though 47% of them discontinued their training for some years. Seventy-two respondents competed at local level (16.7%), 122 at regional level (28.4%), 153 at national level (35.6%) and 83 at international level (19.3%). This distinction takes into account that different motivations might underlie sport participation of master classes athletes competing at different levels. For instance, older high-level competitors may be disposed towards participation in away competitions with travelling expenses generally not supported by athletic grants [2]. Each athlete signed a consent form prior to his/her participation in the study.

Questionnaire

The SMS questionnaire [23] is designed to represent the self-determination continuum [16, 24] and aims at assessing individual's motivation for sport participation. It consists of seven subscales made up of four items each measuring three types of intrinsic motivation (IM knowledge, IM accomplishment, IM stimulation), three types of extrinsic motivation (EM identified regulation, EM introjected regulation, EM external regulation) and amotivation, respectively. The extent to which the item corresponds to the participant's participation motive is assessed on a 7-point Likert scale, ranging from (1) "not at all" to (7) "exactly". The questionnaire was translated into Italian by a bilingual individual and back-translated by an English native speaker. The senior athletes participating in the present study individually answered the SMS questionnaire before his/her training session.

Data analysis

Preliminary study

Confirmatory factor analyses (CFA) were run using structural equation modelling to evaluate the adequacy of the actual measurement both to the 7-factor model of the SMS [23] and/or to potential modified models that might better fit the Italian senior athlete population. The internal reliability of the seven subscales of the SMS was assessed using Cronbach's alpha, and correlation coefficients between SMS sub-scales were calculated to highlight eventual multi-collinearities between sub-scales, indicating information redundancy.

Main study

To analyse the participants' responses to the SMS by using a multivariate design, the scales of IM, EM and AM

were analysed jointly. Thus, a 3 (Age: 45–55 vs. 56–65 vs. over 65 years)×2 (Gender: male vs. female)×2 (Competition level: local/regional vs. national/international) MANOVA ($p<0.05$) with the three dependent variables (IM, EM and AM) was applied. When significant results were found, separate ANOVAs were performed for the IM, EM and AM scales to ascertain the significance of the effects of age, competition level and/or gender on each of these main types of motivations.

Furthermore, to adopt a more synthetic approach, an overall self-determination index generated by the sum of scales, respectively weighted by degree of self-determination [40], was submitted to a 3 (Age: 45–55 vs. 56–65 vs. over 65 years)×2 (Gender: male vs. female)×2 (Competition level: local/regional vs. national/international) ANOVA to test global differences ($p<0.05$) in sport motivation of master athletes.

Since a large sample size can lead to significant results for marginal differences, effect size measures (η^2) were calculated for all significant findings. Post-hoc comparisons were performed by means of Fisher's LSD test and the Bonferroni alpha level correction was applied to eliminate an inflated type 1 error in the case of multiple comparisons.

Results

Preliminary study

Table 1 shows Cronbach's alpha reliability coefficients and factor loadings, whereas Table 2 reports model fit statistics. Cronbach's alpha values (range: 0.66–0.78; Table 1) were comparable to the literature [23], indicating an adequate internal consistency of the subscales for the Italian older athletes. The hypothesised 7-factor model (M1 in Table 2) did not fit the senior population well. Modification indices (MIs) ranging from 4.1 to 33.1 revealed the existence of cross-loading items. The criterion for inclusion was values exceeding the upper bound of 95% confidence interval for the mean; using this, four highly cross-loading items (2, 11, 17 and 28) were identified. Thus, we tested

Table 1 Factor loadings from the CFA of the 7-factor structure of the SMS

Item	Intrinsic motivation			Extrinsic motivation			Amotivation
	KNLDG	ACCOMP	STIMU	IDENT	INTRO	EXTER	AMOTV
T2	0.514						
4	0.772						
23	0.679						
27	0.840						
8		0.611					
12		0.609					
15		0.662					
20		0.660					
1			0.655				
13			0.758				
18			0.688				
25			0.622				
7				0.682			
11				0.481			
17				0.487			
24				0.791			
9					0.502		
14					0.739		
21					0.593		
26					0.511		
6						0.712	
10						0.657	
16						0.502	
22						0.625	
3							0.593
5							0.712
19							0.648
28							0.533
Cronbach's alpha	0.784	0.728	0.775	0.696	0.661	0.717	0.712

KNLDG, knowledge; STIMU, stimulation; ACCOMP, accomplishment; IDENT, identified regulation; INTRO, introjected regulation; EXTER, external regulation; AMOTV, amotivation

All factor loadings were significant ($p<0.05$)

Table 2 Model fit indices of the SMS structure obtained by means of CFA

Model		Model fit measures		Test of fit improvement
		CFI	RMSEA	Likelihood ratio
M1	Standard model, with each item loading on only one within 7 factors	0.765	0.083	2 (13)=365.08, $p<0.001$
M2	Model allowing items 2, 11, 17 and 28 to load on additional factors	0.805	0.077	2 (22)=772.85, $p<0.001$
M3	Final model, after freeing 22 error covariance terms of M2	0.900	0.060	

RMSEA, root mean square error or approximation. Likelihood ratio, test used to assess the significance of improvement in the fit of the model

Table 3 Correlation coefficients (Pearson's *r*) between the 7 sub-scales of the SMS

Item	Intrinsic motivation			Extrinsic motivation			Amotivation
	KNLDG	ACCOMP	STIMU	IDENT	INTRO	EXTER	AMOTV
KNLDG	1						
ACCOMP	0.78*	1					
STIMU	0.51*	0.80*	1				
IDENT	0.31*	0.45*	0.48*	1			
INTRO	0.15*	0.47*	0.55*	0.35*	1		
EXTER	0.42*	0.38*	0.49*	0.45*	0.19*	1	
AMOTV	0.01	0.10	–0.05	0.18*	–0.21*	0.45*	1

KNLDG, knowledge; STIMU, stimulation; ACCOMP, accomplishment; IDENT, identified regulation; INTRO, introjected regulation; EXTER, external regulation; AMOTV, amotivation
*$p<0.05$

a further model (M2) allowing free loading of these items on the following factors: item 2 on IM stimulation, IM accomplishment, EM identified regulation and EM introjected regulation; item 11 on IM knowledge, IM stimulation, IM accomplishment and EM introjected regulation; item 17 on IM knowledge and IM accomplishment; and item 28 on IM knowledge, IM stimulation and IM accomplishment. However, M2 still revealed some degree of model misfit (Table 2) due to some abnormally large error covariances between various items. Realistically, observed data rarely fit theoretical models and incorporating correlated error terms into CFA does not necessarily invalidate the factorial structure tested [41]. Therefore, error covariances with the highest MIs were freed sequentially until a satisfactory threshold of model fit was reached (i.e., comparative fit index (CFI) ≥0.9 and root mean square error of approximation (RMSEA) ≤0.6). This was obtained after adding 22 covariance terms to M2 (see M3 in Table 2), partially confirming and extending what was reported by Shaw and colleagues [11] for senior athletes.

Also correlation coefficients between SMS sub-scales were computed (Table 3). No significant correlations (range: –0.05 to 0.10) emerged between IM sub-scales and the AM subscale, which lies at the opposite extreme on the motivational continuum. Low but significant correlations (range: 0.18–0.45) emerged between EM and IM or AM sub-scales. Moderate and significant correlations (range: 0.51–0.80) emerged between IM sub-scales, indicating the presence of multi-collinearity. Therefore, further analyses were performed both on an overall self-determination index [40] and on separate EM, IM and AM scale scores. The former reduces redundant IM information by averaging the scores of its sub-scales prior to weighing them according to the self-determination continuum.

Main study

ANOVA performed with the self-determination index showed a main effect for competition level, $F(1.418)=10.246$, $p<0.001$, $\eta^2=0.024$, and a significant Age× Competition Level interaction, $F(2.418)=4.21$, $p=0.041$, $\eta^2=0.032$. Since the main effect is included in the two-way interaction, only the last one will be described. According to Bonferroni's technique, alpha level for post-hoc comparisons was set at 0.002. Post-hoc analysis showed significant differences between age classes only for athletes belonging to the local competition level, with athletes aged >65 years scoring lower in self-determination than their younger counterparts (Fig. 1). Significant differences in self-determination as a function of competition level emerged only in the oldest age class, with athletes com-

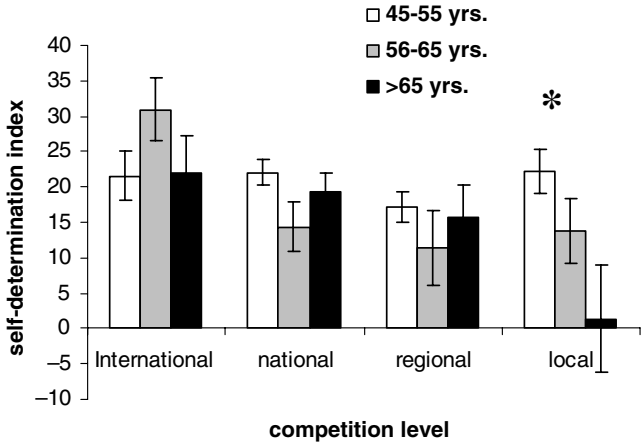

Fig. 1 Means and standard errors of self-determination as a function of age in athletes competing at local, regional, national or international level (*p<0.05)

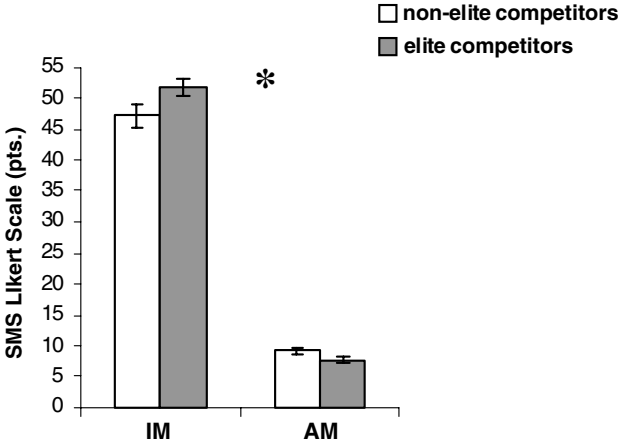

Fig. 2 Means and standard errors of IM and AM as a function of competition level (*p<0.05)

peting at the local level scoring lower in self-determination than athletes competing at national or international level (Fig. 1). However, it must be taken into consideration that the low partial η^2 values limit the usefulness of these results. Neither a main effect for gender, nor significant interactions of gender with the other factors emerged.

MANOVA performed with the three IM, AM and AM scale scores as dependent variables showed a main effect for age, Wilks' $\lambda(6.832)=5.89$, $p<0.001$, $\eta^2=0.041$, and for competition level, Wilks' $\lambda(3.416)=3.64$, $p=0.013$, $\eta^2=0.026$. Also, there was a significant Age×Competition Level interaction, Wilks' $\lambda(6.832)=2.85$, $p=0.009$, $\eta^2=0.020$. Neither a main effect for gender nor significant interactions of gender with the other factors emerged.

Univariate analyses (ANOVAs) showed that the main effect for age was significant only for the EM scale, $F(2.418)=8.28$, $p<0.001$, $\eta^2=0.038$, whereas the main effect of competition level was significant for the IM scale, $F(1.418)=4.37$, $p=0.037$, $\eta^2=0.010$ and for the AM scale, $F(1.418)=5.76$, $p=0.017$, $\eta^2=0.014$. Post-hoc comparisons indicated that EM significantly increases with age (38.1 SD=0.8 vs. 40.7 SD=1.4 vs. 45.5 SD=1.4 pts. up to the oldest age class). Instead, IM and AM were affected by the competition level, with national/international competitors being more internally motivated and less amotivated than their counterparts competing at local/regional level (Fig. 2).

Also, univariate analyses showed that the Age× Competition Level interaction was significant for the EM scale, $F(2.418)=5.42$, $p=0.005$, $\eta^2=0.025$ (Fig. 3), and approached significance for the AM scale, $F(2.418)=2.44$, $p=0.088$, $\eta^2=0.012$ (Fig. 4). Post-hoc comparisons indicated that EM increases with age only in the case of older athletes competing at lower levels, but remains stable across age classes in the case of high-level competitors.

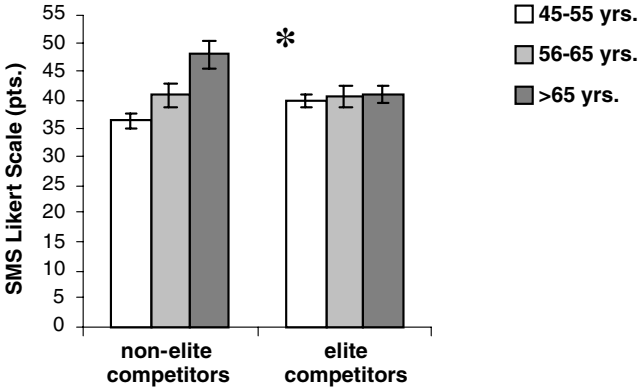

Fig. 3 Means and standard errors of EM as a function of competition level×age (*p<0.05)

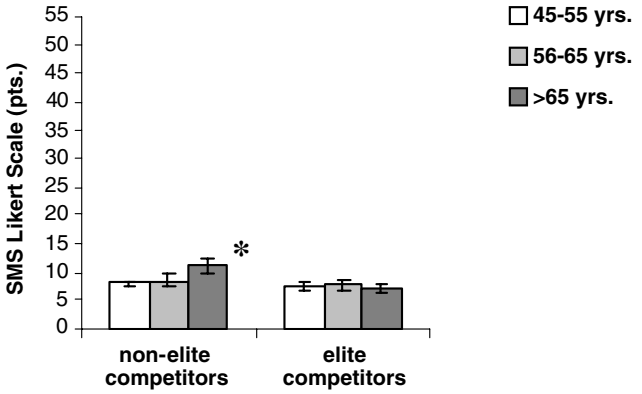

Fig. 4 Means and standard errors of AM as a function of competition level×age (*p<0.05)

Discussion

Older adults tend to reduce their activity level dramatically [1], despite the fact that an active lifestyle is strongly related to significant reductions of risks for disease and to sustained independent living [42]. On the other hand, an increasing number of older athletes keep training and competing in age categories. Thus, competitive sport commitment may represent an important means to ensure healthy ageing [2]. Since motivation is a crucial aspect for sport participation, it is surprising that there is a paucity of information regarding the age-related changes in motivation to participate in competitive sport in later life, although research on this topic is strongly recommended [43]. Until now, to our knowledge, there has been only one study dealing with self-determination in older competitive athletes [11]. The authors highlighted the potential problems related to the use of SMS with senior athletes because of cross-loading items that may produce artificial correlations among the SMS sub-scales. However, the fact that their sample was homogeneous as to competition level and no test for age and gender differences was performed represented a major limitation for interpretation of results [2]. Thus, the aim of the present study was to verify the validity and reliability of the SMS for Italian older athletes and to assess whether their sport participation motivation is affected by age, gender and/or competition level.

The Italian version of the SMS questionnaire showed satisfactory internal consistency. Cronbach's alpha values were comparable to those reported by Pelletier and colleagues [23] in their first SMS validation and by Martens and Webber [44], Shaw and colleagues [11] and Doganis [45] for young, old and non-English native speaker athletes, respectively. However, the present results confirmed and even extended the problems evidenced by Shaw and colleagues [11] regarding the validity of the original 7-factor structure for senior athletes' populations. In fact, items 2, 11, 17 and 28 showed cross-loadings on multiple intrinsic and extrinsic motivation sub-scales. It is possible to speculate that the low discriminative power of these items is due to different reasons. Item 11 ("because it is one of the best ways I have chosen to develop other aspects of myself") and item 17 ("because it is a good way to learn a lot of things which could be useful to me in other areas of my life") share the importance attributed to the effects of sport on other personal and life domains. Their cross-loadings on IM and EM sub-scales (see Table 1) might reflect the high importance attributed by senior athletes to the relationship between sport practice and health, well-being and quality of life in later years in various life domains (see [2] for a review). In fact, senior athletes consider sport practice important in the prevention of their physical decline (i.e., EM introjected), to maintain their emotional health and mental alertness (i.e., IM stimulation), to guarantee adequate self-efficacy and self-esteem contrasting their age-related physical decline (i.e., IM accomplishment) and to stimulate on-going learning processes by learning new technical aspects of their sport (i.e., IM knowledge).

The cross-loading of item 2 ("for the pleasure it gives me to know more about the sport that I practice") on the IM accomplishment, IM stimulation, EM identified and introjected regulation sub-scales might be explained considering the multiple meanings that sport-related knowledge may have for a senior athlete. New knowledge may lead to social reinforcement and approval also outside the sport context (EM identified regulation) and may be conceived as a means to maximise the effects of sport practice on health maintenance and skill improvement at older age (EM introjected and IM accomplishment). Furthermore, since Italian senior swimmers and track and field athletes often train simultaneously with young and/or elite athletes, the exposure to new sport-related information might jointly support the intellectual and emotional components of their motivation to know and experience new techniques and skills (IM to know and IM stimulation).

Finally, the cross-loadings of item 28 ("I often ask myself: I can't seem to achieve the goals that I set for myself") on the three IM sub-scales (knowledge, accomplishment, stimulation), despite primarily belonging to the amotivation subscale, is not surprising and highlights the need to revisit the SMS items for the senior athlete population. Given the inevitability of an at least moderate decline of physical performance with ageing, item 28 might not necessarily reflect amotivation, but rather the sense of reality of older individuals in coping with their age-related physical decline [2, 11]. This interpretation fits offers a realistic base to anchor their desire to discover new sport techniques (IM knowledge), experience sport challenges (IM accomplishment) and enjoy sport involvement (IM stimulation).

Our results showed that age and competition level modulate motivation for sport participation in older individuals, whereas no relevant gender differences were observed.

Contextual factors can contribute to the age-related motivational changes of older athletes. For instance, with advancing age, there still may be an age-role inappropriateness for exercise and sport in the older population despite the fact that the master athlete has been proposed as an ideal model for successful ageing [2, 46]. According to our results, the age-related changes of sport motivation in older athletes cannot be clearly interpreted without considering the sport level at which older athletes

compete. Brodkin and Weiss [12] found that competition was not as important to the sport motivation of older adults as to the motivation of younger athletes, but suggested that this age-related difference in competitive orientation might be biased by the fact that their older athlete groups did not participate in a purely competitive oriented sport programme. Shaw and colleagues [11], who applied the SMS to a sample of elite older athletes, did not investigate the role of the competition level on sport participation motivation. Our results showed that sport participation motivation of athletes over 65 competing at national/international level is more self-determined than motivation of their age-matched counterparts competing at local level (Fig. 1). This result is at odds with previous research in the field of sport motivation of younger athletes [36, 37, 47]. Compared to co-aged recreational athletes, young athletes involved in competitive sport exhibit lower levels of intrinsic motivation [36]. Similarly, among young competitive athletes, higher performers exhibit higher levels of extrinsic motivation and amotivation than lower performers [37], and scholarship athletes exhibit less self-determined forms of motivation than non-scholarship athletes [47]. The cited authors suggested that high competitive pressure and rewards in sport may cause a shift toward a perceived external locus of causality in the athlete, which leads to a decrease in intrinsic motivation and an increase in extrinsic motivation and amotivation. The diverging results obtained in our study with older athletes highlights the age-related specificity of motivation to participate in elite and non-elite sport and indicate a need for further lifespan research.

The cross-sectional nature of the present study does not allow any interpretation in terms of age-related changes in motivation. However, the very low self-determination found for local competitors over 65 suggests that across the ageing process, they might change the source used to maintain their sense of competence by focusing on rewards and social comparison based on age norms of sport performance. It seems that in the case of older elite athletes competing at national or international level, the high competitive pressure does not induce a loss of perceived internal locus of causality and the ageing process does not cause the expected shift toward a self-evaluation based on comparison with co-aged individuals [48, 49]. On the contrary, continued participation in elite sport until later life seems to be supported by a high level of intrinsic motivation, which is necessary when considering the paucity of technical support and grants for the expensive participation in national and international competitions. Winning and extrinsic motivations seem to become an increasingly important factor for the ageing athletes that continue competing at a relatively low level at older age (Fig. 1). Their lowest degree of self-determination at oldest age might represent a risk factor for drop-out and interruption of the lifelong sport career [27]. The purpose of the present study was also to assess whether there are gender differences in sport motivation of senior athletes. The lack of significant difference between genders that emerged from the present study is presumably due to the older age of the studied population. Due to gender role socialisation, differences between men and women in sport and exercise participation still exist, with a lower involvement of women extending up to later life [50]. Since sport participation in later life seems to derive directly from sport participation at younger ages [35], it is possible that older female athletes who had to overcome higher social barriers to sport participation in their youth [2, 51], are a self-selected population that shares with males a sport-appropriate motivational style and competitive orientation. In conclusion, the study indicates that the SMS structure does not completely hold for the senior athlete population and a revision is needed to adapt to the specificity of age-related changes in the physical, psychosocial and cognitive domains. Nevertheless, this study also provides information that offers some insights into the complex relationship among sport motivation, age and competition level of the senior athlete. The motivational stability or change along the ageing process needs to be studied further to elaborate effective strategies that reinforce sport commitment of older athletes and enhance the probability of lifelong adherence. Furthermore, it could be useful to identify others potential variables (e.g., task and ego orientation, perceived locus of causality) to better clarify the sport motivational profile of the senior athlete.

Conflict of interest statement The authors declare that they have no conflict of interest related to the publication of this article.

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