

**When the final whistle blows: Social identity pathways support mental health and life satisfaction after retirement from competitive sport**

Catherine Haslam<sup>1</sup>, Ben C. P. Lam<sup>1,2</sup>, Jie Yang<sup>3</sup>, Niklas K. Steffens<sup>1</sup>, S. Alexander Haslam<sup>1</sup>, Tegan Cruwys<sup>4</sup>, Filip Boen<sup>5</sup>, Niels Mertens<sup>5</sup>, Koen De Brandt<sup>6</sup>, Xinyan Wang<sup>7</sup>, Clifford J. Mallett<sup>8</sup> and Katrien Fransen<sup>5</sup>.

<sup>1</sup>School of Psychology, University of Queensland, Brisbane, Australia

<sup>2</sup>Centre for Healthy Brain Ageing, School of Psychiatry, University of New South Wales, Sydney, Australia

<sup>3</sup>School of Business, Guilin University of Electronic Technology, Guilin, China

<sup>4</sup>Research School of Psychology, The Australian National University, Canberra, Australia

<sup>5</sup>Department of Movement Sciences, KU Leuven, Leuven, Belgium

<sup>6</sup>Department of Movement and Sport Sciences, Vrije Universiteit Brussel, Brussels, Belgium

<sup>7</sup>Research Center for Innovation and Strategic Human Resource Management, Jiangxi University of Finance and Economics, Nanchang, China

<sup>8</sup>School of Human Movement and Nutrition Sciences, University of Queensland, Brisbane, Australia

**Corresponding author:** Jie Yang, School of Business, Guilin University of Electronic Technology, Guilin, China; E-mail: yang66@263.net

**Abbreviated Title:** Social identity and sport retirement

**Journal:** Psychology of Sport and Exercise

**Declaration of Interests:** None

### **Abstract**

For many athletes, retirement from higher levels of competitive sport poses significant challenges. Research has shown that athletic identity is a key predictor of adjustment trajectories, but the mechanisms through which this affects outcomes are less clear. Added to this, there has been limited research on the role that wider social identities, and the resources they enable, play in adjustment. Addressing both these issues, we examined theoretically derived social identity pathways to retirement adjustment in athletes who had played sport at higher competitive levels and two potential mechanisms, or psychological resources, through which adjustment might be enabled. This was examined in two samples: retired athletes from countries in Western ( $n = 215$ ) and Eastern ( $n = 183$ ) regions. Loss of athletic identity, social group memberships (multiple, maintained and new), psychological resources (perceived meaning in life and control), and adjustment (life satisfaction, depression, and perceived physical health) were assessed. In both samples, the loss of athletic identity undermined adjustment by reducing meaning in life and perceived control. Path analysis showed that both maintained and gained social group memberships counteracted the negative effects of athletic identity loss on adjustment. Evidence that these pathways enabled access to psychological resources was found primarily in Chinese athletes, with maintained groups influencing personal control and new groups influencing meaning in life. These findings highlight the importance of social identity processes to retirement from higher levels of competitive sport and the mechanisms through which they can either support or undermine adjustment.

**Key words:** athletic identity, social identity model of identity change, mental health

**When the final whistle blows: Social identity pathways support mental health and life satisfaction after retirement from competitive sport.**

## **1. Introduction**

Retirement is often a difficult transition, but for those who compete in sport at world class and higher competitive levels it can be particularly challenging. In line with this, for up to 39% of athletes, it comes with psychological distress and costs to well-being (Mannes, 2018); a figure that is almost double that associated with general workforce retirement (Pinquart & Schindler, 2007). A number of factors are known to influence athlete adjustment, but *identity change and loss* are among the most impactful (Menke & Germany, 2018; O'Halloran & Haslam, 2020; Park et al., 2013). While development of a strong athletic identity is beneficial in driving motivation and performance, the associated cost is that its loss is felt deeply when an athlete exits their profession in ways that can be hazardous to health and well-being (Cosh et al., 2015; Giannone et al., 2017).

Athletic identity is defined as the degree to which an individual identifies with an athlete role (Brewer et al., 1993). This is understood to have an impact on athletes' self-definition, their pursuit and engagement in sport, the importance they attach to their sport, and the meaning it gives to their lives. However, a broader conceptualisation of identity has recently been applied to sport, which recognises the contribution that *groups* — both related and unrelated to sport — make to athletes' lives (S.A. Haslam et al., 2020; Rees et al., 2015). The characteristics that a person shares with others in these groups — for example, shared pride in particular events, faith, views and values — inform their social self or *social identity* (e.g., their sense of themselves as 'us members of Team X', us Australians, us Catholics). For athletes performing at semi- and competitive-elite levels, group memberships will include those that are central to their sporting careers; whether they are aligned with a particular sport (e.g., as *us* rugby players) or their clubs and teams (e.g., us All Blacks).

Social groups such as these are fundamental to how people respond, and adjust, to a range of life changes (see C. Haslam et al., 2021; Jetten et al., 2014). Extending on this previous research,

the purpose of the present paper is to explore whether and how social group memberships influence adjustment to retirement from competitive sport. This was addressed in a survey study conducted with retired athletes from both Western and Eastern countries.

## 1.2 Retirement adjustment from competitive sport

As it does for members of the general workforce, retirement from sport involves a process of identity transition (e.g., Wylleman, 2019; Wylleman et al., 2020). However, there are notable differences in the particular factors that predict adjustment in each setting. Those that are particularly relevant to higher levels of competitive sport are the strength of an individual's athletic identity and the challenge of finding alternative meaning to life on career termination, the degree to which sporting career goals have been achieved, the extent to which retirement is voluntary or planned, and the age at which athletes retire (e.g., Douglas & Carless, 2009; Filbay et al., 2019; Hickey & Roderick, 2017; Martin et al., 2014; Park et al., 2013). However, of these factors, it is strength of athletic identity that emerges most consistently as the key, typically negative, predictor of adjustment in both qualitative and quantitative studies of sport retirement (Cosh et al., 2015; Giannone et al., 2017; Grove et al., 1997). This is not surprising when we consider the enormous effort and resources invested in building athletic identity to support elite culture and performance. Indeed, where athletic identity is strong it is often associated with a marked decline in mental health and life satisfaction upon career termination (e.g., Carless & Douglas, 2009; Lavallee & Robinson, 2007; Park et al., 2013). In this particular context, then, reconstructing one's identity can be a major challenge — as indicated by the comments of the athletes interviewed by Menke and Germany (2019) who remarked “*once that final whistle blows, it all stops*” (p. 21) “*For me, it ended in depression*” (p. 22), and “*if you don't find something else to fill it, it will eat you up*” (p. 22). Nevertheless, it is clear that not all sportspeople experience adjustment problems. This also includes many who retain a strong athletic identity (Martin et al., 2014). So what determines the course of these adjustment transitions?

Existing career termination and transition models, which are reviewed extensively in the sport

retirement literature (see Lavalley, 2000; Stambulova & Samuel, 2020; Wylleman et al., 2004), suggest that successful adjustment is dependent on the resources that people are able to draw upon to support them in the transition. This adjustment is reflected, for example, in Taylor and Ogilvie's (1994, 2001) *athletic career termination model*, and highlights the importance of personal and situational factors in its three components: (i) causes of retirement, (ii) factors related to adjustment that include identity processes and perceptions of control, and (iii) available resources to support adjustment such as coping skills, pre-retirement planning, and social support. The key prediction from this model is that adjustment will be more positive to the extent that athletes have more resources, diversity in identity, and perceived control over retirement. Subsequent models have taken a broader perspective, to recognise that the retirement transition is part of wider career and lifespan experiences that might also contribute to adjustment. Stambulova's (2003, 2016) *athletic career transition model* considers retirement as one of multiple career transitions in sport that include stages of initiation, development, and mastery, in addition to discontinuation. Wylleman's (2019) *holistic athletic career model* takes this a step further in a lifespan perspective that recognises these stages occur across all levels of development, to affect psychological, psychosocial, vocational, financial, and legal domains; not only athletic. The resources and challenges specific to the retirement transition in these models are similar to those identified in Taylor and Ogilvie's model and the wider sport retirement literature. But the advance in later holistic models is to acknowledge that retirement adjustment is not just the result of factors relevant to one particular transition in sport. Rather, it is the product of an interaction between experiences and influences over the course of a career and life.

A common theme in these models is the importance of the accessible resources and strategies that an individual brings to a situation to support their personal adjustment (e.g., see also Smismans et al., 2021). These are clearly important, but many resources also have a social (i.e., group-based) dimension. While these are acknowledged in existing models, their theoretical underpinnings are not clearly articulated. Social support, for example, is recognised as vital in reducing stress,

improving self-confidence, and enhancing performance among athletes (e.g., Freeman et al., 2009; Freeman & Rees, 2010), and as a key factor in the adjustment of those transitioning to retirement (e.g., Stambulova, 2020; Wylleman, 2019). Such support is recognised as having a range of potential sources; an athlete's coach or another player, but also groups of others such as family or team members. However, in the career transition context, there is little interrogation of the nuances of support that answers questions about when and from whom such support is sought, or the extent to which it is likely to be effective when provided. Speaking to this is a recent review by Rees et al., (2015) draws on social identity theorising to explain these group-based dimensions of social support in sport; arguing that it is most effective when sourced from, and given by, others with whom one has a common basis for identification and belonging. We argue that this theorising can be applied more widely, to help us understand how group-related resources, including social support, can be harnessed to enhance adjustment to sport retirement. This is the main advance that we propose and test in the present research.

### **1.3 Sport retirement: A social identity perspective**

The social identity approach emphasises the impact that social group memberships and associated social identities have on the behaviour, cognition, and emotion of athletes (S.A. Haslam et al., 2020; Rees et al., 2015). These influences are evident across recreational and competitive sport participation. In the context of career transitions, the approach argues that athletes' group memberships are critical because they are a key means via which resources that are integral to adjustment are unlocked (e.g., C. Haslam et al., 2018a). Because it is central to our present concerns, the logic here is worth unpacking in a bit more detail.

Social identity refers to that part of a person's identity that is informed by the social groups to which they belong (Tajfel, 1974). Social groups are diverse in nature. They include family, neighbourhood, professional, religious, and sporting groups, but also groups that capture one's demographic characteristics (e.g., gender, culture) and ideological and political views (e.g., feminism, libertarianism). Central to social identity theorising is the idea that when they are

psychologically meaningful to a person, these groups can be internalised to form part of their sense of self (i.e., ‘who I am’). Accordingly, what this approach recognises is that individuals are not only defined by their unique personal attributes (e.g., *I, Cathy Freeman*), but also by characteristics and attributes that they share with others in the social groups they belong to and identify with (e.g., us sprinters, us Olympians, or us Aboriginal Australians). Moreover, when the social self is salient, a person’s thoughts, emotions and behaviour are determined and driven by the group(s) that define them in that context — so that ‘who I am’ dictates ‘what I think, feel and do’ (e.g., to fly the Aboriginal and Australian flags, in a lap of honour after winning the 400 metre race at the 2000 Sydney Olympics).

Rees and colleagues (2015) applied this theorising to explain sporting behaviour across a range of domains that include skill development, performance, and stress appraisals. Amongst other things, following Turner (1982) they argued that an athlete’s social identification with a sport team is what makes teamwork possible — enabling them to take on board shared sporting goals (e.g., to win games, trials, or competitions), to work collectively with teammates and coaches to achieve these goals and to buffer the stress inherent in high performance sport (see also Adams et al., 2015; Coffee & Rees, 2011; Hartley et al., 2020; Haslam & Reicher, 2006). The impact of such identification is also seen in the actions and sacrifices that athletes make to meet these goals; at times to the detriment of their own health and well-being.

Central to this analysis, and the present study, are the *psychological resources* that group identification provides athletes with in these various contexts. These resources are multiple and include enhanced belonging, meaning in life, self-esteem, perceived control, and emotion regulation in addition to social support (e.g., Cruwys et al., 2014; Greenaway et al., 2015; Jetten et al., 2015; Kinsella et al., 2018; Turner-Zwinkels, 2015). Although identified in other contexts, some of these resources — belonging and support in particular — have been reported to be among the key benefits that flow from sport-based group memberships (e.g., Brown et al., 2018; Walseth, 2006). Moreover, when mobilised effectively, these resources are argued to be vital to the protection of

health and well-being when people face challenge and adversity — most typically in periods of life change (C. Haslam et al., 2021). Indeed, when considered through a social identity lens, we can begin to understand why retirement poses such a threat to athletes' health and well-being. This is because the transition is likely to undermine their social group memberships and associated social identities in ways that deprive them of access to the psychological resources they need to manage this threat.

In line with these arguments, previous research provides some evidence of the contribution that psychological resources make to the mental health and well-being of athletes. In particular, the importance of support for athletes' well-being in general, and in the context of retirement specifically, is well established (e.g., Hartley et al., 2020; Wylleman, 2019). Less clear is the contribution that resources of perceived control and meaning in life might provide in this context. Although a social identity perspective would suggest that both of these resources should enhance adjustment, they have yet to be examined systematically.

In contrast, the sport retirement literature and transition models do provide some insight into these resources. In particular, we know that loss of athletic identity through involuntary retirement can reduce athletes' sense of control and hinder adjustment (e.g., Butt & Molnar, 2009). It is also the case that for many athletes sport is an activity that furnishes them with a sense of meaning in life, and hence loss of sporting identity following retirement can often reduce that sense of meaning (e.g., Kerr & Dacyshyn, 2000). However, despite the recognised importance of these factors, to date no study has examined their contribution to the processes of identity change in the sporting context.

### **1.3.1 Sport retirement as a process of social identity change**

We can take the foregoing analysis and theorising one step further to spell out more precisely how group memberships support adjustment to life change following retirement. This explanation is provided by work which has drawn on social identity theorising to develop the *Social Identity Model of Identity Change* (SIMIC; C. Haslam et al., 2021). This model extends the above reasoning to detail more specifically how social group processes support people in periods of life change. In



this model, *multiple group membership* is understood to be a key protective factor — so that the more important group memberships a person has before a given life change, the more resources they can draw on to manage that change effectively. This protection is enabled through two pathways. First, the more groups a person is a member of (and identifies with) prior to a transition, the more likely it is that at least some of their old group memberships will remain intact after a life-changing event — thereby providing a sense of *social identity continuity*. However, in retirement, such continuity is neither always possible (e.g., because injury or illness undermines a person's capacity to maintain group ties) nor always desired (e.g., if professional relationships have been a source of stress).

As a consequence, it is not unusual for people to lose or let go of identities because life change requires them to give up particular group memberships. To counteract any negative effects of such loss, SIMIC points to the importance of a second pathway associated with *social identity gain*. Here it is argued that after major life change the development of new group memberships and associated social identities helps people to counteract experiences of loss and change by providing them with a basis for self re-definition. Here the group memberships and social identities that are gained can again be a source of psychological resource (e.g., of support, meaning, and control) that people can draw on to counteract any negative effects of life change.

There is now a considerable body of evidence that supports SIMIC's key propositions and pathways. This has been obtained in a wide range of contexts, including the transition to university study (Cruwys et al., 2020; Iyer et al., 2009; Praharso et al., 2017), to becoming a parent (Seymour-Smith et al., 2017), to developing and recovering from addiction (e.g., Dingle, et al., 2015), and to recovering from brain injury (C. Haslam et al., 2008; Kinsella et al., 2018). It has also been examined in the context of retirement, but only for members of the general workforce (C. Haslam et al., 2018b; Lam et al., 2018). Here, research has shown that multiple and new group memberships reduce the risk of premature death (Steffens et al., 2016a), and that multiple group memberships achieve this by providing the basis for social support (Steffens et al., 2016b). Support for SIMIC

has also been generated across cultural contexts, with the importance of multiple group memberships recently replicated in a study of Chinese retirees (Lam et al., 2019).

#### **1.4 The Present Research**

Drawing the above key findings together, theory and evidence point to several pathways through which identity processes might influence adjustment to retirement from competitive sport. First, previous research shows that loss of athletic identity can compromise health and well-being following retirement. In particular, evidence suggests that this is because identity loss undermines athletes' sense of control and meaning in life. Second, SIMIC extends this analysis by introducing a broader social conceptualisation of, and theoretical basis for, identity and self that speaks to the role of social group memberships — specifically, multiple, maintained and new group memberships — in supporting adjustment. Here SIMIC argues that the more meaningful social group memberships that athletes maintain and gain in retirement the better their adjustment will be. This is because these group memberships provide access to a range of psychological resources that are known to protect health and well-being in retirement.

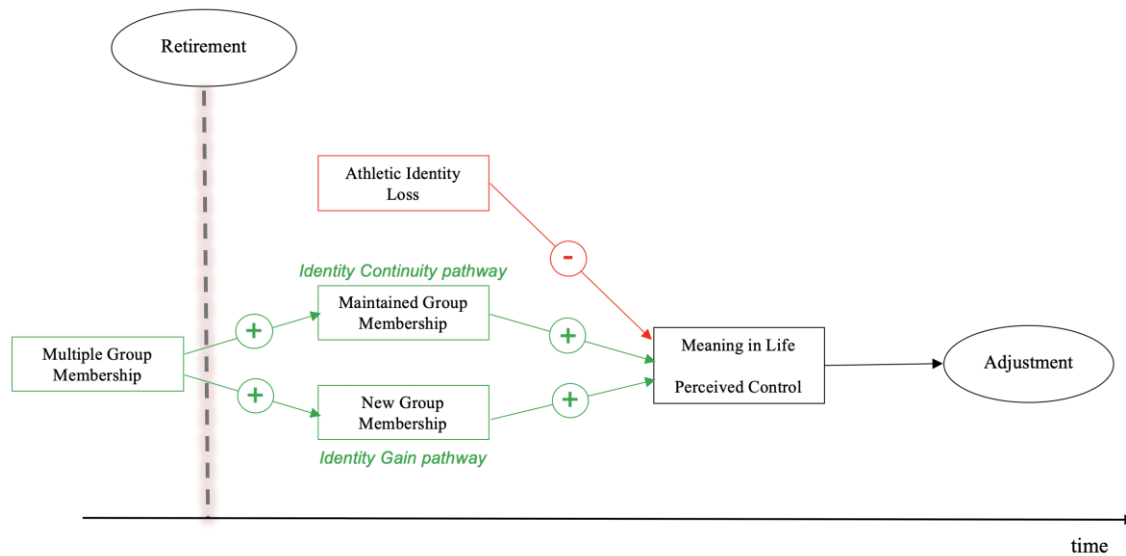
Although there are multiple resources that an athlete can draw on, the present research focuses on two resources in particular — perceptions of personal control and meaning in life. There are two reasons for this focus. First, both are central to social identity theorising and transition models in sport retirement. As noted earlier, enhanced control and meaning in life are recognised resources that group membership and identification enable (e.g., Greenaway et al., 2015; Turner-Zwinkels, 2015). Both are also factors known to affect successful adjustment to sport retirement, with control reflected in transition models (e.g., Taylor & Ogilvie, 1994, 2001) and meaning in life affected by changes in athletic identity (e.g., Douglas & Carless, Hickey & Roderick, 2017). Second, despite the relevance of these two resources to the sport and social identity literatures, we have no knowledge of the extent to which they account for adjustment in sport retirement. This is a gap the present study addresses.

The primary goal of the present research is to apply SIMIC to the context of retirement from higher levels of competitive sport and to assay its capacity to account for relevant adjustment outcomes in this context. More specifically, a cross-sectional survey was conducted with retired athletes who performed at higher competitive sport levels to test the contribution of (i) athletic identity loss, (ii) SIMIC's social identity gain and continuity pathways, and (iii) psychological resources of perceived control and meaning in life, to retirement adjustment. Our key focal outcome was adjustment, which was indexed through measures of life satisfaction, depression symptoms, and perceived physical health. This was examined in two samples: Western and Chinese retired athletes. Recruiting both populations allowed us to simultaneously test the model's relevance and generalisability across cultures.

The adapted model that the research was designed to test is represented schematically in Figure 1. In line with previous research, we hypothesised that athletic identity loss would have a negative impact on retirement adjustment (H1). We also hypothesised that this would be because identity loss reduces athletes' access to resources of meaning in life (H1a) and perceived control (H1b). Second, we hypothesised that SIMIC's identity continuity pathway (H2) — in which multiple group membership before retirement are seen to provide a basis for maintaining group memberships after retirement — would support adjustment because group maintenance increases both meaning in life (H2a) and perceived control (H2b). Third, we hypothesised that SIMIC's identity gain pathway (H3) — in which multiple group memberships before retirement provide a basis for joining new groups after retirement — would also support adjustment, with new groups achieving this through by providing a basis for increased meaning in life (H3a) and control (H3b).

**Figure 1.**

*Hypothesised identity pathways following retirement from competitive sport.*



*Note:* Social identity pathways specified by SIMIC are in green, those associated with athletic identity loss are in red.

## 2. Method

### 2.1 Participants

Samples of Western and Chinese retired athletes were recruited through (a) national sporting organisation websites and newsletters, (b) organisations that supported athletes indirectly (e.g., the elite sports career guidance of the Flemish Sport Department, Sport Vlaanderen), (c) social media (e.g., WeChat and the QQ platform in China), and (d) snowballing whereby participating athletes shared the survey via their networks. Recruitment criteria were that athletes were recognised as having competed in sport at the semi-elite to competitive-elite levels by their respective country and sporting federations. Our definition of higher-level competitive athlete was broad and included athletes performing at international, national and regional levels representing a mix of semi-elite, competitive-elite, and successful-elite (as described in Swann et al., 2015). Additionally, they must have been retired partially or fully from their sporting career.

The Western sample comprised 215 athletes recruited from Belgium ( $n = 134$ ; 62.33%), the Netherlands ( $n = 16$ ; 7.44%), Italy ( $n = 16$ ; 7.44%), Spain ( $n = 12$ ; 5.58%), Australia ( $n = 9$ ;

4.19%), and Germany ( $n = 5$ ; 2.33%). The mean age of participants was 28.95 years ( $SD = 7.08$ , range = 16-48 years) and about half were female (58.14%;  $n = 125$ ). The sports that respondents competed in were broad and covered baseball, basketball, badminton, bobsled, boxing, cricket, cycling, fencing, football, golf, gymnastics, handball, hockey, judo, kayaking, rugby, shooting, skating, skiing, swimming, synchronized swimming, taekwondo, tennis, track and field, trampoline, triathlon, volleyball, water polo, and weightlifting. Before retirement, 169 of these mostly semi- and competitive-elite athletes had competed at the international level (78.60%), 40 at the national level (18.60%), and one at the state level. The average length of participants' sporting career was 16.30 years ( $SD = 5.82$ ) with athletes retired for an average of 3.15 years ( $SD = 2.87$ ). The most common reasons for retirement in this sample were wanting more time to build personal relationships, experiencing injury or other health problems, and having achieved most of their career goals (see Supplementary Materials for the full list and descriptive data). Approximately 52% of the sample indicated that retirement was completely voluntary, and this compared to 9% who said it was not voluntary at all. The retirement transition was viewed as gradual by 10%, while 18% indicated it was sudden. Additionally, 27% and 2% of the sample thought the timing was too early or too late, respectively. The remaining respondents judged the voluntariness and timing of their retirement to fall between these extremes. Additionally, the majority of respondents, 82%, had engaged in some form of retirement planning.

The Chinese sample comprised 183 participants whose mean age of 29.87 ( $SD = 9.05$ , range = 16-56 years) was similar to that of Western respondents, as was the gender breakdown (51.37% female;  $n = 94$ ). As in the Western sample the sports that these retired athletes competed in were diverse and comprised badminton, basketball, fencing, football, gymnastics, handball, hockey, judo, kayaking, martial arts, rowing, sailing, shooting, skating, swimming, table tennis, taekwondo, tennis, track and field, and volleyball. Most had competed at the national level (58.46%;  $n = 107$ ), 20.77% ( $n=38$ ) at international, and 20.77% ( $n=38$ ) at provincial (i.e., state) levels. On average their sporting careers were 10.63 years long ( $SD = 4.37$ ) and they had been retired for 7.52 years ( $SD =$

8.05). The top three reasons for retirement in this group were experiencing injury or other health problems, wanting more time to build personal relationships, and declining performance (see Supplementary Materials). Among those who competed at the provincial level, approximately 53% reported winning international or national titles during their career. Moreover, given the size of the country and high level of competition in China, these provincial level athletes are likely to have had comparable status to Western athletes who competed at international and national levels. While 29% of athletes felt their retirement was completely voluntary, 6% thought it was completely involuntary. The transition was viewed as a gradual process by 10%, while 9% thought it was sudden. The timing was too early or too late for 14% and 6%, respectively. Again, the remaining respondents judged the voluntariness and timing of their retirement to fall between these extremes. Similar to the Western sample, 84% reported engaging in some retirement planning.

## **2.2 Measures**

Nine measures indexed key constructs of athletic identity loss, group membership, resources and adjustment as hypothesised in our model.

### **2.2.1 Athletic identity loss**

No scale specifically measures athletic identity loss and thus a new measure, based conceptually on the Job Deprivation Scale (Simpson et al., 1966; see also George & Maddox, 1977), was developed for this purpose. This three-item scale indexed the degree to which respondents felt they had lost their identity as an athlete ( $\alpha_{\text{Western}} = .74$ ;  $\alpha_{\text{Chinese}} = .83$ ). The items were: “I feel I have lost an important part of myself since retiring from competitive sport,” “I have questioned who I am since I retired from competitive sport”, and “I have missed being an elite athlete, since retiring from my sporting career.” Each item was rated using a five-point scale (1=*strongly disagree*, 5=*strongly agree*), with higher scores indicating greater loss of athletic identity.

### 2.2.2 Social group memberships

Measures of group membership were taken from the Exeter Identity and Transition Scale (Haslam et al., 2008). These standard scales, used in numerous studies across different populations (see the Measures of identity health and wellbeing Appendix in Haslam et al., 2018a), are standard measures of SIMIC constructs central to our hypothesised model. Responses to items in each scale were made using a five-point scale (1=*strongly disagree*, 5=*strongly agree*).

**Pre-retirement multiple group memberships** ( $\alpha_{\text{Western}} = .93$ ;  $\alpha_{\text{Chinese}} = .85$ ). This scale indexes the extent to which people perceive themselves to belong to multiple social groups; in this case prior to retirement. Four items measured this construct (e.g., “I belonged to lots of different social groups before retirement”).

**Maintained group memberships** ( $\alpha_{\text{Western}} = .83$ ;  $\alpha_{\text{Chinese}} = .86$ ). Four items measured the extent to which respondents felt they had maintained their pre-existing group memberships after retirement from sport (e.g., “I still belong to the same groups I was a member of before retiring from sports”).

**New group memberships** ( $\alpha_{\text{Western}} = .90$ ;  $\alpha_{\text{Chinese}} = .95$ ). Four items assessed the extent to which respondents had acquired new group memberships after retirement from sport (e.g., “I have joined one or more new groups since retiring from my sporting career”).

### 2.2.3 Psychological resources

Two measures assessed respondents’ perceptions of meaning in life and control. The response scale for each was the same and required respondents to rate items on a five-point scale (1=*strongly disagree*, 5=*strongly agree*).

**Meaning in life** ( $\alpha_{\text{Western}} = .89$ ;  $\alpha_{\text{Chinese}} = .95$ ). This was measured by the five-item Presence of Meaning subscale in the Meaning in Life Questionnaire (Steger, Frazier, Oishi, & Kaler, 2006). This subscale measures how full respondents feel their lives are of meaning. An illustrative item is “I understand my life’s meaning.” This scale was developed by Steger and colleagues in response to criticism over weak pre-existing measures of the construct, and in three studies they showed the

presence of meaning subscale was reliable, had a stable factor structure and strong convergent and discriminant validity.

**Perceived control** ( $\alpha_{\text{Western}} = .71$ ;  $\alpha_{\text{Chinese}} = .77$ ). Three items measured the extent to which respondents felt in control of their life (e.g., “I feel in control of my life”). These items were taken from Greenaway et al. (2015) who used these items in several studies to examine the effect of social identification on perceived control.

#### 2.2.4 Adjustment outcomes

**Life Satisfaction** ( $\alpha_{\text{Western}} = .84$ ;  $\alpha_{\text{Chinese}} = .90$ ). This was assessed by the five-item Satisfaction with Life Scale (e.g., “I am satisfied with life”). This scale was developed to index perceptions of subjective well-being and has been shown to be reliable and valid, and appropriate for use across populations and age groups (Diener et al., 1985; Pavot & Diener, 1993). The five-point scale described above was used with items averaged for use in analysis.

**Depression** ( $\alpha_{\text{Western}} = .86$ ;  $\alpha_{\text{Chinese}} = .87$ ). Depression symptoms were assessed using the eight-item version of the Centre for Epidemiologic Studies-Depression Scale (CES-D; Radloff, 1977; Van de Velde et al., 2009). This brief version of the scale has been shown to be a valid and reliable measure of depressive symptomatology, in comparison to the original 20-item version and has been used in large national surveys (Van de Velde et al., 2010; Zivin et al., 2010). Each item (e.g., “How often have you felt depressed during the past week?”) was rated on a four-point scale anchored by 0 (*rarely or none of the time*) and 3 (*most or almost all the time*). Ratings were summed (with higher scores indicating more severe symptoms of depression) before being entered into analysis.

**Physical health.** A single item was used to index self-rated physical health (“How would you rate your overall physical health these days?”) often used in national surveys and epidemiological studies (e.g., Miilunpalo et al., 1997; Koenig et al., 2004). Again responses were made on a five-point scale (1=*poor*, 5=*excellent*).



### 2.3 Procedure

The study received approval from the lead and last authors' institutional Human Research Ethics Committees (Approval No. 2018001127 and G-2018 12 1427, respectively). The survey was conducted using Qualtrics or Lime platforms. The initial survey was first developed in English. For the Western sample the survey was either conducted in English or Dutch, with the translation for the latter completed by an independent researcher and then reviewed by the last member of the authorship team. The internal consistency of the Dutch translated scales were comparable to those of the English scales, with both falling within an acceptable range (English  $\alpha$  range= .71-.90; Dutch  $\alpha$  range= .71-.93). For the Chinese sample the survey was translated into Chinese by the third and tenth members of the author team and then reviewed by the second member of the team. While, the conventional method of back-translation was not used, the translation was conducted by researchers who were bilingual speakers to support equivalence in meaning of constructs and questions across languages, with discrepancies resolved through discussion. Measurement equivalence was, however, explicitly examined across the Western and Chinese samples (see Results and Supplementary Materials).

Respondents received a link to this survey through the recruitment sources listed earlier. They were first provided with information about the research and study expectations and those who consented to take part proceeded to complete the survey. The survey took about 30 minutes to complete, and on completion respondents were debriefed about the study's purpose.

### 3. Results

Analysis was performed in several stages. The first involved multigroup confirmatory factor analysis to examine measurement equivalence across the samples. The measurement model comprised latent factors of variables indexing identity loss, social group membership, process, and adjustment variables and analysis indicated that invariance was achieved after relaxing two constraints (see Supplementary Materials). This showed that responses from Western and Chinese athletes on these measures could be meaningfully compared. The remaining analyses reported here

include (i) missing data analysis, (ii) correlational analysis, and (iii) multigroup path analysis to test hypothesised relationships.

### **3.1 Missing data analysis**

All Chinese respondents who consented to take part completed the full survey, which is likely due to the cultural expectations of following a survey through to completion once consenting to participate. However, in the Western sample, 137 of the 215 participants (64%) provided complete data on all the major variables. The percentage of missing data across variables ranged between 22% to 36%. The completers and non-completers did not differ significantly in age, gender, length of career, length of retirement, or level of competition. Little's Missing Completely At Random (MCAR) test was not significant ( $\chi^2(18) = 11.07, p = .89$ ), providing no evidence that the assumption of MCAR should be rejected. Full Information Maximum Likelihood (FIML) was used to handle missing data in the path models.

### **3.2 Descriptive data and correlational analysis**

Means and correlations between variables are presented in Tables 1 and 2 for Western and Chinese retired athletes, respectively. The means suggest moderate levels of life satisfaction and perceived physical health in both samples. While there are no normative data available for the CES-D specific to these samples, the mean for both samples was below the clinical cut-off score of 9 recommended for diagnosis of depression in older adults (see Briggs et al., 2018). Independent t-tests or the Mann-Whitney U tests (where there was violation to assumptions of normality) were conducted to determine if the two groups of retired athletes differed on these variables. Results revealed that Western retired athletes reported significantly higher pre-retirement multiple group memberships ( $p < .001$ ) and new group memberships ( $p < .01$ ), and greater perceived control ( $p < .001$ ), life satisfaction ( $p < .001$ ), and physical health ( $p < .05$ ) than their Chinese counterparts. Both maintained group membership ( $p < .001$ ) and depression ( $p < .01$ ) were significantly higher among Chinese retired athletes.

Correlational analysis revealed similar associations across the two samples. As one would expect, there were significant intercorrelations between psychological resources and adjustment outcomes. These indicated that a greater sense of meaning in life and personal control were associated with higher life satisfaction, perceived physical health, and lower depression. Athletic identity loss was negatively associated with meaning in life and perceived control. Loss of athletic identity was also negatively associated with perceived physical health and life satisfaction, and positively associated with depression. Importantly too, athletic identity loss was not associated with group membership measures, suggesting that these constructs were largely independent.

**Table 1.***Means, standard deviations, and bivariate correlations among variables in Western retired athletes.*

	Mean	SD	1	2	3	4	5	6	7	8	9
1. Athletic identity loss	3.17	1.03	-								
2. Pre-retirement multiple groups	3.08	1.00	-.00	-							
3. Maintained groups	3.14	0.85	-.09	.20*	-						
4. New groups	3.87	0.82	-.10	-.07	-.11	-					
5. Meaning in life	3.65	0.76	-.34***	.02	.02	.06	-				
6. Perceived control	3.87	0.62	-.28**	-.08	-.06	.21*	.52***	-			
7. Life satisfaction	3.67	0.72	-.32***	.02	.13	.11	.56***	.59***	-		
8. Depression <sup>a</sup>	5.63	4.40	.43***	-.11	-.18*	-.28**	-.40***	-.37***	-.56***	-	
9. Physical health	3.18	0.98	-.18*	-.00	.07	.19*	.27**	.32***	.29***	-.24**	-

*Note.* <sup>a</sup>The score for depression was the sum of the eight items in the Centre for Epidemiologic Studies-Depression Scale (CES-D). \* $p < .05$ ; \*\* $p < .01$ , \*\*\* $p < .001$ ; all two-tailed.

**Table 2.***Means, standard deviations, and bivariate correlations among variables in Chinese retired athletes.*

	Mean	SD	1	2	3	4	5	6	7	8	9
1. Athletic identity loss	3.06	1.08	-								
2. Pre-retirement multiple groups	2.54	0.94	.02	-							
3. Maintained groups	3.61	0.87	.11	.18*	-						
4. New groups	3.63	0.82	-.03	.25**	.47**	-					
5. Meaning in life	3.68	0.86	-.19**	.13	.11	.23**	-				
6. Perceived control	3.55	0.77	-.20**	.16*	.20**	.16*	.65***	-			
7. Life satisfaction	3.19	0.89	-.39***	.12	.07	.19*	.53***	.57***	-		
8. Depression <sup>a</sup>	7.14	4.62	.47***	-.02	-.13	-.16*	-.53***	-.51***	-.57***	-	
9. Physical health	2.92	1.21	-.22**	.10	.08	.07	.28***	.24**	.36***	-.39***	-

*Note.* <sup>a</sup>The score for depression was the sum of the eight items in the Centre for Epidemiologic Studies-Depression Scale (CES-D). \* $p < .05$ ; \*\* $p < .01$ , \*\*\* $p < .001$ ; all two-tailed.

### 3.3 Model testing

We tested our hypothesized model (see Figure 1) by conducting multigroup path analysis in the *lavaan* package in R (Rosseel, 2012). In the model, residuals of maintained group memberships and new group memberships were allowed to covary, in line with previous research (Cruwys et al., 2020), as were residuals of meaning in life and perceived control. Model fit was evaluated collectively by multiple indicators, namely, the comparative fit index (CFI), root mean square of error of approximation (RMSEA), and standardized root mean square residual (SRMR), with acceptable model fit indicated by  $CFI > 0.95$ ,  $RMSEA < 0.06$ , and  $SRMR < 0.08$  (Hu & Bentler, 1999). Two nested models were constructed and compared to investigate whether effects were similar or different across the two samples. In the unconstrained model, all the structural paths in the model were estimated separately in each of the two groups (Western and Chinese). In the fully constrained model, effect sizes were constrained on all structural paths to be equal in the Western and Chinese samples. If the paths were equivalent between samples, model fit would not change significantly, as indicated by a change in  $CFI < 0.01$  when comparing unconstrained and constrained models (Cheung & Rensvold, 2002). If model fit was reduced after introducing equality constraints, then this would indicate that some paths differed between the samples, and a partially constrained model relaxing some constraints would need to be examined. Indirect and direct effects related to our hypotheses were computed and tested with 5,000 bootstrapped samples, with 95% bias-corrected confidence interval excluding 0 indicated a significant effect (Preacher & Hayes, 2008). These effects were compared across groups using nonlinear constraints.

The initial fit of the unconstrained model that only specified indirect, but not direct, effects of the SIMIC variables was not strong,  $\chi^2(43) = 119.14$ ,  $p < .001$ ,  $CFI = .89$ ,  $RMSEA = 0.10$ , and  $SRMR = 0.07$ . This suggests that the effects of identity loss and maintained group memberships could not be explained by the proposed psychological resources of meaning and control alone. To address this, direct paths from identity loss to adjustment and from maintained group memberships to adjustment were added to the model on the basis of previous evidence and theory supporting

these associations (e.g., see Park et al., 2013, for the influence of athletic identity loss on outcomes, and C. Haslam et al., 2021, for the role played by group maintenance in health and well-being) and their significant associations in the present dataset. Adding these two paths significantly improved model fit ( $\Delta\chi^2(1) = 54.95, p < .001; \Delta CFI = 0.08$ ) and the revised model showed good fit to the data:  $\chi^2(42) = 64.19, p < .05, CFI = .97, RMSEA = 0.06$ , and  $SRMR = 0.05$ . Predictors in this final model explained 63% and 77% of the variance of the latent adjustment factor in the Western and Chinese samples, respectively.

Comparison of the unconstrained and fully constrained models indicated a marked reduction in model fit when all structural paths were constrained to be equal across groups (see Table 3). Two paths were found to differ between the two groups that were relaxed in the partially constrained model. These involved associations between (i) identity loss and adjustment, and (ii) multiple group memberships and new group memberships. Figure 2 shows these differences between the two groups. This indicates, first, that the direct effect of identity loss on adjustment was stronger in the Chinese than in the Western sample. And, second, existing multiple group memberships provided a basis for forming new group memberships after retirement among Chinese, but not Western, retired athletes. No indirect effect differed significantly between the two samples. Given these differences we analysed the Chinese and Western samples separately.

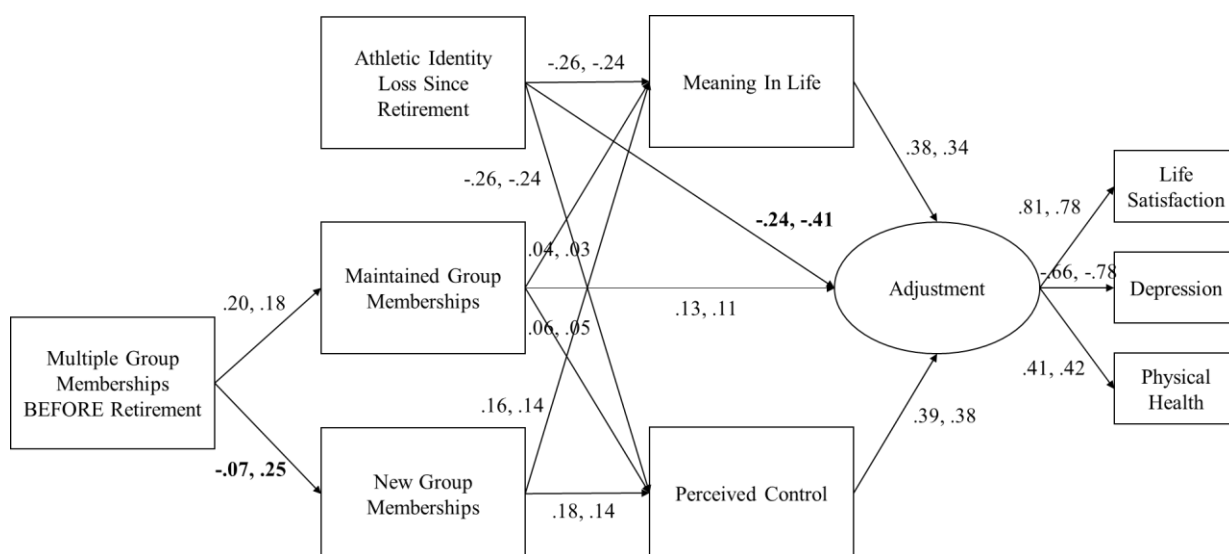
**Table 3.**

*Comparison of model fit indices from multigroup path analysis*

Model	$\chi^2$ (df)	CFI	RMSEA	SRMR	$\Delta CFI$
Unconstrained <sup>a</sup>	64.19 (42)*	0.97	0.06	0.05	-
Fully constrained	89.45 (51)**	0.94	0.07	0.06	0.02
Partially constrained <sup>b</sup>	73.85 (49)*	0.96	0.05	0.05	0.004

*Note.* <sup>a</sup>Two direct effects are added. <sup>b</sup>Constraint on two structural paths are relaxed; the partially constrained model is compared to the unconstrained model.

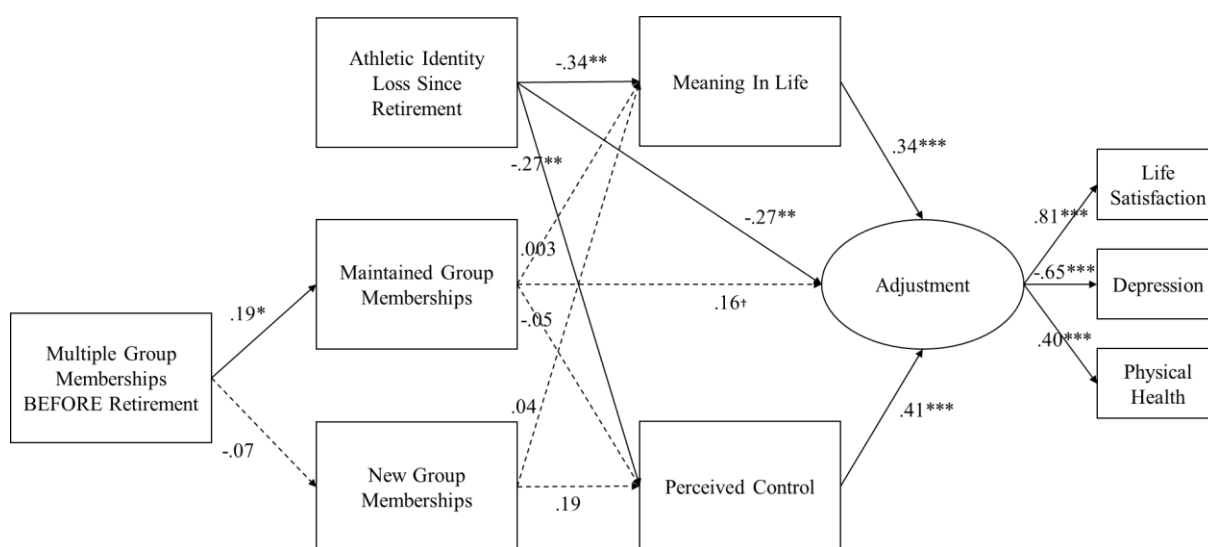
**Figure 2.** Results of the partially constrained model



Note. Standardized coefficients are reported; covariances are not presented. Coefficients for the Western sample are presented first, followed by the coefficients for the Chinese sample. Coefficients that significantly differ across groups are in bold.

**Figure 3.**

Results of path analysis for Western retired athletes

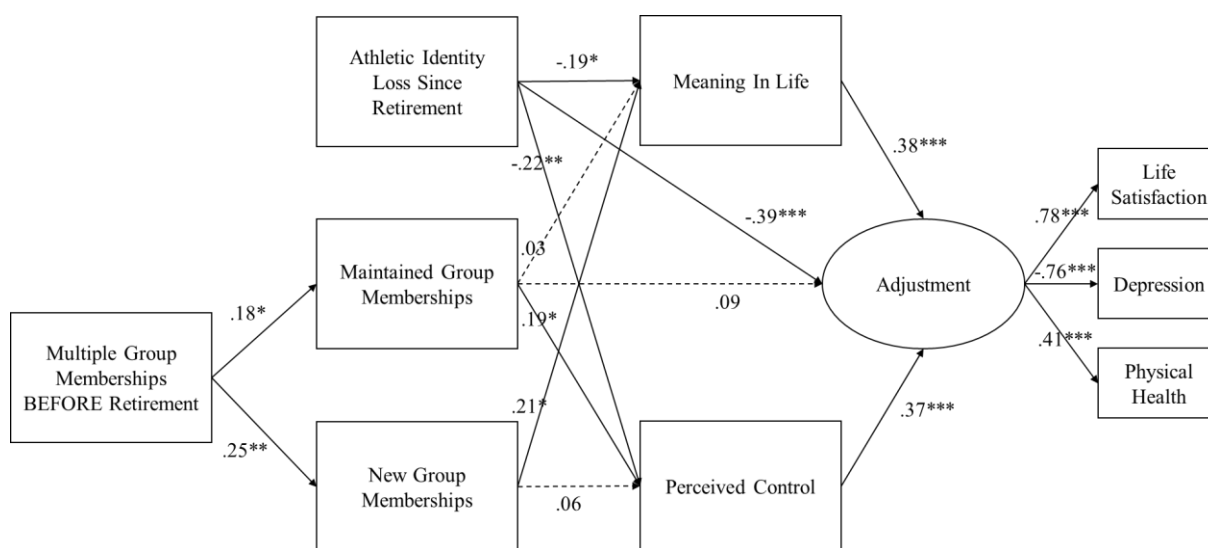


Note. Standardized estimates are reported; covariances are not presented. Dotted lines indicate non-significant paths at  $\alpha = .05$ . \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ . † $p < .10$ .

Results of path analyses for the Western athletes are presented in Figure 3. In the unconstrained model, athletic identity loss was negatively associated with adjustment outcomes, consistent with H1. This was observed both directly (Direct Effect = -0.43, 95% CI [-0.07, -0.69]) and indirectly through reduction in both meaning in life (supporting H1a; Indirect Effect = -0.18, 95% CI [-0.03, -0.33]) and perceived control (supporting H1b; IE = -0.18, 95% CI [-0.07, -0.51]). As hypothesised, though, SIMIC processes appeared to counteract this effect, primarily through the social identity continuity pathway. Specifically, consistent with H2, belonging to multiple groups before sport retirement had a positive effect on adjustment by providing a basis for maintaining group memberships in retirement (IE = 0.05, 95% CI [0.001, 0.17]). However, this did not occur through the predicted mechanisms of enhanced meaning in life (H2a; IE = 0.00, 95% CI [-0.02, 0.31]) or perceived control (H2b; IE = -0.01, 95% CI [-0.05, 0.02]). There was no support for H3 in so far as multiple group memberships before retirement did not predict new group memberships.

Results of path analyses for the Chinese sample are presented in Figure 4. Supporting H1, in this sample, athletic identity loss was again negatively associated with adjustment, both directly (DE = -0.75, 95% CI [-0.47, -1.04]) and indirectly through meaning in life (supporting H1a; IE = -0.14, 95% CI [-0.03, -0.32]) and perceived control (supporting H1a; IE = -0.16, 95% CI [-0.05, -0.32]). Again, though, the negative effects of identity loss were counteracted by both maintained and new group memberships, though not entirely as we predicted. Speaking to SIMIC's continuity pathway (H2), belonging to multiple groups before retirement was positively associated with maintained group memberships in retirement and this also predicted enhanced control. There was support for H2b as the indirect effect of control in the relationship between multiple groups, maintained groups and adjustment was significant (IE = 0.03, 95% CI [0.002, 0.09]). Speaking to SIMIC's identity gain pathway (H3), belonging to multiple group memberships before retirement was positively associated with new group memberships, and this was associated with enhanced meaning in life, and the indirect effect on adjustment was significant (supporting H3a; IE = 0.04, 95% CI [0.01, 0.11]).



**Figure 4.***Results of path analysis for Chinese retired athletes*

*Note.* Standardized estimates are reported; covariances are not presented. Dotted lines indicate non-significant paths at  $\alpha = .05$ . \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

In summary, this analysis provided evidence of three key relationships. First, supporting H1, the loss of athletic identity undermined retirement adjustment in both samples, and did so by reducing perceived meaning in life and control (supporting H1a and H1b). The direct effect of athletic identity loss on adjustment was stronger for retired Chinese athletes. Second, in line with H2, SIMICs identity continuity pathway provided some protection against these negative consequences. In the Western sample, multiple group memberships supported adjustment directly by increasing the likelihood of maintaining some of these groups in retirement. Among the Chinese athletes, maintained group memberships improved adjustment outcomes by increasing the psychological resources of perceived control (supporting H2b). Third, in line with H3, there was support for SIMICs identity gain pathway in the Chinese sample, such that new group memberships enabled greater meaning in life and through this contributed to adjustment (supporting H3a).

#### 4. Discussion

This cross-sectional study explored several pathways through which identity processes might influence adjustment in a broad sample of higher-level competitive athletes. In particular, it examined the impact of athletic identity loss on the psychological resources of meaning and control, and the impact of maintained and acquired group memberships in counteracting these effects on adjustment outcomes.

Across both samples there was clear evidence that the loss of athletic identity reduced retired athletes' sense of meaning and control in life, providing full support for H1, H1a and H1b. Though, the direct effect of athletic identity loss was stronger in the Chinese athletes than it was in Western athletes. There was also evidence that SIMIC identity pathways involving group maintenance and gain contributed to adjustment by counteracting some of these effects. However, they did so in slightly different ways across the two samples. Supporting H2, in both samples multiple group memberships before retirement supported adjustment by providing a basis for maintaining group memberships after retirement. However, it was only in the Chinese sample that maintaining group memberships contributed to adjustment by enabling a greater sense of perceived control (thereby providing support for H2b). There was also some support for H3 among Chinese retired athletes, where adjustment was supported by the social identity gain pathway. Specifically, providing support for H3a, there was evidence that the acquisition of new group memberships in this sample was associated with greater meaning in life in retirement and better adjustment as a result.

Supporting previous research, these results point to the important role that athletic identity plays in the adjustment of retired athletes who competed at higher levels of sport competition (e.g., Cosh et al., 2015; Grove et al., 1997; Lavalley & Robinson, 2007; Park et al., 2013). The stronger respondents' sense of athletic identity loss was, the more diminished their retirement adjustment; a finding that emerged in both Western and Chinese samples. However the present research makes several advances on previous investigations of this issue. First, we show that as well as experiencing a reduction in the strength of their athletic identity, this experience of a sense of loss

also influences their adjustment. Second, we provide some insight into why loss of this identity undermines adjustment — specifically, because it reduces athletes' sense of meaning in, and control over, life. In demonstrating this, we support previous findings and transition models in the sport retirement literature that highlight the importance of these constructs in understanding athlete adjustment (e.g., Taylor & Ogilvie, 1994; Stambulova, 2003; Wylleman et al., 2019). Though, through application of social identity theorising, we can emphasise the value of these constructs as *psychological resources* that can be developed and nurtured to support athletes over the course of the transition. Third, there is evidence that the direct effect of identity loss on adjustment was felt more keenly by Chinese retired athletes. Why this was the case is unclear. In particular, it does not appear related to the extent of athletic identity loss per se, which was slightly higher in the Western sample. Instead, then, it may reflect other differences between the samples, such as length of time since retirement, the nature of the competitive sport (which among the Chinese was predominantly Olympic and likely state funded), or other factors not assessed here that may influence adjustment (e.g., differences in culture and support given to retiring athletes). These socio-cultural differences may extend to education and work (with Olympic Chinese athletes potentially engaged in dual careers), but also to relational ties (given differences in the collectivist and individualistic cultures of the two samples). As this suggests, there are a range of factors that might be interrogated across these cultural groups with a view to better understanding their impact of identity change and loss in the context of sport retirement. Nevertheless, together these findings suggest that in addition to recognising the impact of identity loss, we might also look to manage this by focusing on restoring the sense of meaning in life and control that it may undermine. As we discuss further below, one way to do this is by investing in social group memberships that can support athletes in the process of retirement.

In line with previous retirement research conducted with the general workforce, there was evidence that SIMIC pathways were implicated in adjustment outcomes. More specifically, social identity maintenance was implicated in adjustment in both samples and there was some evidence

that social identity gain played a role in the adjustment of the Chinese sample. This provides evidence corroborating the value of understanding and working with group memberships to support people who are undergoing significant life change, while doing so for the first time in the context of semi- to competitive-elite sport. Nevertheless, we failed to find evidence of a contribution of identity gain in Western retired athletes. Perhaps where the impact of identity loss is greater, as it was in Chinese athletes, the additional resources enabled by both pathways may be needed. Clearly, this is only a hypothesis, but one that warrants further research to better understand the influence of SIMIC pathways among athletes.

A key development in the present research was to consider questions around mechanism. That is, how precisely do group memberships support adjustment outcomes in periods of life transition? In this study we focused on mechanisms of control and meaning in life. Here again our analysis indicated that both psychological resources were important in mediating the effects of group memberships, but that they played out in slightly different ways in the two samples. In Chinese athletes, both resources mediated the contribution of group memberships to adjustment outcomes, but in the Western sample group memberships were associated with adjustment but not indirectly via these resources as we had hypothesised. Why these resources would have a differential role in these samples is unclear, and again needs to be resolved through further research. As this is the first demonstration of the contribution of these resources to the retirement of athletes performing at a range of higher levels of competitive sport across multiple sports, it will also be important for that research to seek to replicate these effects.

#### **4.1 Strengths, limitations and future directions**

This study has a number of strengths — particularly, its relatively large sample of retired semi- to competitive-elite athletes, its cultural and geographic diversity and the novel examination of SIMIC in retirement from higher levels of competitive sport. But, as with many studies of this type there are a number of limitations that affect the strength of conclusions that can be drawn. The most significant of these is the fact that the study was correlational, and hence does not allow us to

address questions of causality. Experimental and longitudinal research is therefore needed to allow us to draw stronger conclusions about the impact of athletic identity loss and social group memberships on psychological resources and adjustment outcomes.

Second, the present research focused specifically on psychological resources of meaning in life and control. However, these are only two of a number of resources that have been understood to be important in this context (others include social support and belonging; see Greenaway et al., 2016; C. Haslam et al., 2018a). Relatedly, there were other factors that were not assessed in the present study (e.g., differences in retirement management across countries and within particular sports), but that might influence outcomes. Accordingly, future research should include a broader range of measures with a view to gaining a more complete understanding of the role that psychological resources and wider variables play in this life transition. Another limitation related to measurement is our focus on loss of athletic identity specifically, which may not capture the complexity of changes in multiple group memberships that are affected by athlete retirement. In particular, it is likely that the loss of identities that occurs in retirement relates not only to the sport itself, but also to membership of the club and team as well as other sport-related groups. Moreover, the extent of change and loss in these group memberships will vary across athletes. These nuances point to the importance of interrogating more fully in future research what athletic identity loss involves and means for athletes over the course of the retirement transition.

Finally, the length of retirement in our samples varied, with the Chinese athletes having been retired for almost twice as long on average as the Western athletes. Though, this alone cannot explain the greater influence of new group memberships on the retirement adjustment of the Chinese athletes given respondents mean strength of association with newly acquired groups was greater in the Western sample. Nevertheless, despite this difference in years retired, similar identity pathways appeared to be present in both samples. This suggests that following athletes through the retirement transition (as Smismans et al., 2020, suggest) to understand how identity processes, and

the psychological resources they may or may not enable, fluctuate over time and thereby influence retirement (and possibly other career) transitions.

On a more practical level, the present findings highlight the importance of sporting organisations, sport psychologists and coaches working with athletes to better manage identity loss and change in the transition to retirement. While considerable efforts are often made to build athletic identity given its recognised effects on performance, comparatively little is done to explicitly manage its loss. In this, we would argue that supporting a second or dual career alone may be insufficient. The present data suggest we need to target directly the role that athletes' group memberships, in and outside of sport, play and how they influence reconstruction of the self in the retirement transition. This involves explicit discussion of, and planning around, the social groups that athletes belong to and the influence they have on their lives (such as their importance, capacity for support, and positivity). One tool that may support such a discussion is Social Identity Mapping (SIM; Bentley et al., 2020; Cruwys et al., 2016) as this is designed to provide this information whilst simultaneously creating a visual illustration (i.e., map) of people's social group worlds. This tool, while important in understanding people's social identities, does not deal with identity change management directly. However, this is where the social identity derived intervention, GROUPS 4 HEALTH (G4H; Cruwys et al., 2019; C. Haslam et al., 2016, 2019), can provide support. This program incorporates SIM and was originally developed to help people build and maintain social group connectedness in ways that support their health. A number of adaptations of the program that target specific life transitions are currently in various stages of development and piloting. Relevant to the present research are adaptations for workforce and sport retirement (G4H: Retirement and G4H: Sport, respectively) which can provide organisations, psychologists and coaches with evidence-based strategies and tools to support athletes in the transition. Importantly, the data obtained from these intervention studies should also go some way to addressing the methodological limitations of the present cross-sectional research.

## 4.2 Conclusions

In the context of semi- to competitive-elite sport, group processes play an important role not only in underpinning achievement but also in supporting athletes' adjustment to career termination. In this regard, the present study extends on previous work by uncovering how athletic identity loss impacts on long-term adjustment and on psychological resources more generally. More specifically, to the extent that this loss is felt deeply, we find that athletes are more likely to question the meaning of their life and the control they have over it in ways that undermine their adjustment. Beyond this, though, the present research shows that social group memberships that are maintained and acquired in the context of this life transition can help to counteract these effects — so that athletic identity loss is compensated for by social identity continuity or gain.

These findings have important implications for intervention and career management. For they suggest that to understand identity processes in retirement we need to look not only at those identities associated with sport, but also other social identities associated with broader group memberships. Moreover, as well as looking at identity loss we need also to explore processes of identity maintenance and gain. Not least, this is because our findings suggest that these might be used to inform intervention to help athletes build valuable social group resources in retirement. To date, these social identity processes have tended to be pushed to the sidelines when managing athletes' careers. However, the present data suggest that helping athletes to maintain and develop new group ties in the context of life change might offer a new and potentially more impactful solution to the identity threats that they typically face when retiring. Indeed, by attending to these, we might ensure that when the whistle blows at the end of an athlete's career it is not a full stop that signals the end of group life, but rather a comma that signals a change in identity focus.

### Acknowledgements

This work was supported by an Australian Research Council Discovery grant (DP160102514) and the National Science Foundation of China (No. 71762013). These funding sources did not contribute to the study design, data collection, analysis, data interpretation or writing of the paper.

### References

- Adams, C., Coffee, P., & Lavalley, D. (2015). Athletes' perceptions about the availability of social support during within-career transitions. *Sport and Exercise Psychology Review, 11*(2), 37-48. <http://hdl.handle.net/1893/22228>
- Bentley, S.V., Greenaway, K., Haslam, S. A., Cruwys, T., Steffens, N.K., Haslam, C., & Cull, B. (2020). Social identity mapping online. *Journal of Personality and Social Psychology, 118*(2), 213-241. <https://doi.org/10.1037/pspa0000174>
- Brewer, B. W., Van Raalte, J. L., & Linder, D. E. (1993). Athletic identity: Hercules muscles or Achilles heel? *International Journal of Sport Psychology, 24*, 237–54.
- Briggs, R., Carey, D., O'Halloran, A.M., Kenny, R.A., & Kenneally, S.P. (2018). Validation of the 8-item Center for Epidemiological Studies Depression Scale in a cohort of community-dwelling older people: Data from the Irish Longitudinal Study of Ageing (TILDA). *European Geriatric Medicine, 9*, 121-126. <https://doi.org/10.1007/s41999-017-0016-0>.
- Brown, C.J., Webb, TL, Robinson MA, Cotgreave, R. (2018). Athletes' experiences of social support during their transition out of elite sport: An interpretive phenomenological analysis. *Psychology of Sport and Exercise, 36*, 71-80. <https://doi.org/10.1016/j.psychsport.2018.01.003>
- Butt, J & Molnar, G (2009) Involuntary career termination in sport: a case study of the process of structurally induced failure, *Sport in Society, 12*(2), 240-257, <https://doi.org/10.1080/17430430802591027>
- Carless, D. & Douglas, K. (2009). “We haven’t got a seat on the bus for you” or “All the seats are mine”: Narratives and career transition in professional golf. *Qualitative Research in Sport and Exercise, 1*, 51–66. <https://doi.org/10.1080/19398440802567949>
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling, 9*(2), 233–255. [https://doi.org/10.1207/S15328007SEM0902\\_5](https://doi.org/10.1207/S15328007SEM0902_5)



- Coffee, P., & Rees, T. (2011). When the chips are down: Effects of attributional feedback on self-efficacy and task performance following initial and repeated failure. *Journal of Sports Sciences, 29*(3), 235-245. <https://doi.org/10.1080/02640414.2010.531752>
- Cosh, S., Crabb, S., & Tully, P.J. (2015). A champion out of the pool? A discursive exploration of two Australian swimmers' transition from elite sport to retirement. *Psychology of Sport and Exercise, 19*, 33-41. <https://doi.org/10.1016/j.psychsport.2015.02.006>
- Cruwys, T., Haslam, S.A., Dingle, G.A., Haslam, C., & Jetten, J. (2014). Depression and social identity: An integrative review. *Personality and Social Psychology Review 18*, 215-238. <https://doi.org/10.1177/1088868314523839>.
- Cruwys, T., Haslam, C., Walter, Z.C., Rathbone, J., & Williams, E. (2019). The Connecting Adolescents to Reduce Relapse (CARR) trial: Study protocol for a randomized controlled trial comparing the efficacy of Groups 4 Health and cognitive behaviour therapy in young people. *BMC Public Health, 19*, 78. <https://doi.org/10.1186/s12889-019-7011-y>.
- Cruwys, T., Ng, N. W.K., Haslam, S. A., & Haslam, C. (2020). Identity continuity protects academic performance, retention, and life Satisfaction among international students. *Applied Psychology*, <https://doi.org/10.1111/apps.12254>
- Cruwys, T., Steffens, N.K., Haslam, S.A., Haslam, C., Jetten, J., & Dingle, G. (2016). Social Identity Mapping (SIM): A procedure for visual representation and assessment of subjective group memberships. *British Journal of Social Psychology, 55*, 613-642. <https://doi.org/10.1111/bjso.12155>
- Diener, E., Emmons, R., Larsen, R.J., & Griffin, S. (1985). The Satisfaction With Life Scale. *Journal of Personality Assessment, 49*(1), 71-75. [https://doi.org/10.1207/s15327752jpa4901\\_13](https://doi.org/10.1207/s15327752jpa4901_13)
- Douglas, K., & Carless, D. (2009). Abandoning The Performance Narrative: Two Women's Stories of Transition from Professional Sport. *Journal of Applied Sport Psychology, 21*(2), 213-230. <https://doi.org/10.1080/10413200902795109>

- Filbay, S., Pandya, T. P., Thomas, B., McKay, C., Adams, J., & Arden, N. (2019). Quality of life and life satisfaction in former athletes: A systematic review and meta-analysis. *Sports Medicine*, *49*, 1723-1738. <https://doi.org/10.1007/s40279-019-01163-0>
- Freeman, P., & Rees, T. (2010). Perceived social support from team-mates: Direct and stress-buffering effects on self-confidence, *European Journal of Sport Science*, *10*:1, 59-67, <https://doi.org/10.1080/17461390903049998>
- Freeman, P., Rees, T., & Hardy, L. (2009). An Intervention to Increase Social Support and Improve Performance. *Journal of Applied Sport Psychology*, *21*(2), 186-200, <https://doi.org/10.1080/10413200902785829>
- Dingle, G.A., Cruwys, T., & Frings, D. (2015) Social identities as pathways into and out of addiction. *Frontiers in Psychology*, *6*: 1795. <https://doi.org/10.3389/fpsyg.2015.01795>
- George, L. K., & Maddox, G. L. (1977). Subjective adaptation to loss of the work role: A longitudinal study. *Journal of Gerontology*, *32*(4), 456-462. <https://doi.org/10.1093/geronj/32.4.456>
- Giannone, Z.A., Haney, C.J., Kealy, D., & Ogradniczuk, J.S. (2017). Athletic identity and psychiatric symptoms following retirement from varsity sports. *International Journal of Social Psychiatry*, *63*(7), 598–601, <https://doi.org/10.1177/0020764017724184>
- Greenaway, K. H., Haslam, S. A., Branscombe, N. R., Cruwys, T., Ysseldyk, R., & Heldreth, C. (2015). From "we" to "me": Group identification enhances perceived personal control with consequences for health and well-being. *Journal of Personality and Social*, *109*(1), 53-74. <https://doi.org/10.1037/pspi0000019>
- Grove, JR, Lavalley, D, & Gordon, S. (1997) Coping with retirement from sport: The influence of athletic identity, *Journal of Applied Sport Psychology*, *9*(2), 191-203, <https://doi.org/10.1080/10413209708406481>

- Hartley, C., Haslam, S. A., Coffee, P., & Rees, T. (2020) Social support. In S.A. Haslam, K. Fransen, & F. Boen. *The new psychology of sport and exercise: The social identity approach* (pp. 245-264). London: Sage.
- Haslam, C., Cruwys, T., Chang, M., Bentley, S.V., Haslam, S. A., Dingle, G., & Jetten, J. (2019). GROUPS 4 HEALTH reduces loneliness and social anxiety in adults with psychological distress: Findings from a randomised controlled trial. *Journal of Consulting and Clinical Psychology*, 87, 787-801. <https://doi.org/10.1037/ccp0000427>
- Haslam, C., Cruwys, T., Haslam, S.A., Dingle, G.A., & Chang, M.X-L. (2016). Groups 4 Health: Evidence that a social-identity intervention that builds and strengthens social group membership improves health. *Journal of Affective Disorders*, 194, 188-195. <https://doi.org/10.1016/j.jad.2016.01.010>
- Haslam, C., Haslam, S. A., Jetten, J., Cruwys, T., & Steffens, N. K. (2021). Life change, social identity and health. *Annual Review of Psychology*, 72, 635-661. <https://doi.org/10.1146/annurev-psych-060120-111721>
- Haslam, C., Holme, A., Haslam, S. A., Iyer, A., Jetten, J., & Williams, W. H. (2008). Maintaining group memberships: Social identity continuity predicts well-being after stroke. *Neuropsychological Rehabilitation*, 18, 671-691. <https://doi.org/10.1080/09602010701643449>
- Haslam, C., Jetten, J., Cruwys, T., Dingle, G. A., & Haslam, S. A. (2018a). *The new psychology of health: Unlocking the social cure*. London and New York: Routledge.
- Haslam, C., Lam, B.C.P., Branscombe, N .R., Steffens, N.K., & Haslam, S.A. Cruwys, T., Fong, P., & Ball, T.C., (2018b). Adjusting to Life in Retirement: The Protective Role of Membership and identification with New Groups. *European Journal of Work and Organizational Psychology*, 27, 822–839. <https://doi.org/10.1080/1359432X.2018.1538127>
- Haslam, S. A., Fransen, K., & Boen, F. (2020). *The new psychology of sport and exercise psychology: The social identity approach*. London: Sage Publications

- Haslam, S. A., & Reicher, S. D. (2006). Stressing the group: Social identity and the unfolding dynamics of responses to stress. *Journal of Applied Psychology, 91*, 1037-1052.  
<https://doi.org/10.1037/0021-9010.91.5.1037>
- Hickey, C., & Roderick, M. (2017). The presentation of possible selves in everyday life: The management of identity among transitioning professional athletes. *Sociology of Sport 34(3)*, 270-280. <https://doi.org/10.1123/ssj.2017-0018>
- Hu, L.-t., & Bentler, P. M. (1999). Cut-off criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6(1)*, 1–55.  
<https://doi.org/10.1080/10705519909540118>
- Iyer, A., Jetten, J., Tsivrikos, D., Postmes, T., & Haslam, S. A. (2009). The more (and the more compatible) the merrier: Multiple group memberships and identity compatibility as predictors of adjustment after life transitions. *British Journal of Social Psychology, 48*, 707-733.  
<https://doi.org/10.1348/014466608X397628>
- Jetten, J., Branscombe, N. R., Haslam, S. A., Haslam, C., Cruwys, T., Jones, J. M., . . . Zhang, A. (2015). Having a lot of a good thing: Multiple important group memberships as a source of self-esteem. *PLoS ONE, 10(6)*, e0131035. <https://doi.org/10.1371/journal.pone.0124609>
- Jetten, J., Haslam, C., Haslam, S. A., Dingle, G., & Jones, J. J. (2014). How groups affect our health and well-being: The path from theory to policy. *Social Issues and Policy Review, 8*, 103-130.  
<https://doi.org/10.1111/sipr.12003>
- Kerr, G., & Dacyshyn, A. (2000). The retirement experiences of elite, female gymnasts, *Journal of Applied Sport Psychology, 12:2*, 115-133. <https://doi.org/10.1080/10413200008404218>
- Kinsella, E.L., Muldoon, O.T., Fortune, D.G., & Haslam, C. (2018). Collective influences on individual functioning: Multiple group memberships, self-regulation, and depression after acquired brain injury. *Neuropsychological Rehabilitation, 30(6)*, 1059-1073.  
<https://doi.org/10.1080/09602011.2018.1546194>

- Koenig, H.R., George, L.K., & Titus, P. (2004). Religion, spirituality, and health in medically ill hospitalized older patients. *Journal of the American Geriatric Society*, *52*, 554-562.  
<https://doi.org/10.1111/j.1532-5415.2004.52161.x>
- Lam, B.C.P., Haslam, C., Haslam, S.A., Steffens, N., Cruwys, T., Jetten, J., & Yang, J. (2018). Multiple social groups support adjustment to retirement across cultures. *Social Science and Medicine*, *208*, 200-208. <https://doi.org/10.1016/j.socscimed.2018.05.049>
- Lam, B.C.P., Haslam, C., Steffens, N., Yang, J., Haslam, S.A., Cruwys, T., & Pachana, N.A. (2019). Longitudinal Evidence for The Effects of Social Group Engagement on the Cognitive and Mental Health of Chinese Retirees. *Journal of Gerontology: Psychological Sciences*, <https://doi.org/10.1093/geronb/gbz134>
- Lavallee, D. (2000). Theoretical perspectives on career transitions in sport. In D. Lavallee & P. Wylleman (Eds.). *Career transitions in sport: International perspectives* (pp. 1-28). Morgantown, WV (USA): Fintess Information Technology.
- Lavallee, D., Gordon, S., & Grove, J.R. (1997). Retirement from sport and the loss of athletic identity, *Journal of Personal & Interpersonal Loss*, *2*(2), 129-147,  
<https://doi.org/10.1080/10811449708414411>
- Lavallee, D., & Robinson, H. K. (2007). In pursuit of an identity: A qualitative exploration of retirement from women's artistic gymnastics. *Psychology of Sport and Exercise*, *8*, 119-141.  
<https://doi.org/10.1016/j.psychsport.2006.05.003>
- Mannes, Z.L., Waxenberg, L.B., Cottler, L.B., Perlstein, W.M., Burrell II, L.E., Ferguson, E.G., .... & Ennis, E. (2018). Prevalence and correlates of psychological distress among retired elite athletes: A systematic review, *International Review of Sport and Exercise Psychology*, *12*(1), 265-294, <https://doi.org/10.1080/1750984X.2018.1469162>
- Martin, L.A., Fogarty, G.J., & Albion, M.J. (2014). Changes in Athletic Identity and Life Satisfaction of Elite Athletes as a Function of Retirement Status. *Journal of Applied Sport Psychology*, *26*(1), 96-110, <https://doi.org/10.1080/10413200.2013.798371>

- Menke, D. J., & Germany, M-L. (2019). Reconstructing Athletic Identity: College Athletes and Sport Retirement. *Journal of Loss and Trauma, 24(1)*, 17-30.  
<https://doi.org/10.1080/15325024.2018.1522475>
- Miilunpalo, S., Vuori, I., Oja, P., Pasanen, M., & Urponen, H. (1997). Self-rated health status as a health measure: The predictive value of self-reported health status on the use of physician services and on mortality in the working-age population. *Journal of Clinical Epidemiology, 50(5)* 517–528. [https://doi.org/10.1016/s0895-4356\(97\)00045-0](https://doi.org/10.1016/s0895-4356(97)00045-0).
- Martin, L.A., Fogerty, G.J., & Albion, M.J. (2014). Changes in athletic identity and life satisfaction of elite athletes as a function of retirement status. *Journal of Applied Sport Psychology, 26*, 96-110. <https://doi.org/10.1080/10413200.2013.798371>
- O'Halloran, L., & Haslam, C. (2020). Career transitions in sport. In S. A. Haslam, K. Fransen, & F. Boen (Eds.). *The new psychology of sport and exercise psychology: The social identity approach* (pp. 285-300). London: Sage Publications
- Park, S., Lavalley, D., & Tod, D. (2013). Athletes' career transition out of sport: a systematic review, *International Review of Sport and Exercise Psychology, 6(1)*, 22-53,  
<https://doi.org/10.1080/1750984X.2012.687053>
- Pavot, W. G., & Diener, E. (1993). Review of the Satisfaction with Life Scale. *Psychological Assessment, 5*, 164-172. <https://doi.org/10.1037/1040-3590.5.2.164>
- Pinquart, M., & Schindler, I. (2007). Changes of Life Satisfaction in the Transition to Retirement: A Latent-Class Approach. *Psychology and Aging, 22(3)*, 442-55. <https://doi.org/10.1037/0882-7974.22.3.442>
- Praharso, N.F., Cruwys, T., & Tear, M. (2017). Stressful life transitions and wellbeing: A comparison of the stress buffering hypothesis and the social identity model of identity change. *Psychiatry Research, 247*, 265-275. <https://doi.org/10.1016/j.psychres.2016.11.039>

- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*(3), 879–891. <https://doi.org/10.3758/brm.40.3.879>
- Radloff (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurements*, *1*, 385-401.  
<https://doi.org/10.1177/014662167700100306>
- Rees, T., Haslam, S. A., Coffee, P. & Lavalley, D. (2015). A Social Identity Approach to Sport Psychology: Principles, Practice, and Prospects, *Sports Medicine*, *45*:1083–1096.  
<https://doi.org/10.1007/s40279-015-0345-4>
- Rosseel, Y. (2012). lavaan: An R Package for Structural Equation Modeling. *Journal of Statistical Software*, *48*(2), 1-36. <http://www.jstatsoft.org/v48/i02/>.
- Seymour-Smith, M., Cruwys, T., Haslam, S. A., & Brodribb, W. (2017). Loss of group memberships predicts depression in postpartum mothers. *Social Psychiatry and Psychiatric Epidemiology*, *52*(2), 201-210. <https://doi.org/10.1007/s00127-016-1315-3>
- Simpson, I. H., Back, K. W., & McKinney, J. C. (1966). Work and retirement (pp. 75-89). In I. H. Simpson & J. C. McKinney (Eds.), *Social aspects of aging*. Duke Univ. Press, Durham, NC: Duke University Press.
- Sinclair, D. A., & Orlick, T. (1993). Positive transitions from high-performance sport. *The Sport Psychologist*, *7*(2), 138–150.
- Smismans, S., Wylleman, P., De Brandt, K., Defruyt, S., Vitali, F., Ramis, Y., Torregrossa, M., Lobinger, B., Stambulova, N. B., & Cecić Erpič, S. (2021). From elite sport to the job market: Development and initial validation of the Athlete Competency Questionnaire for Employability (ACQE). *Cultura, Ciencia y Deporte*, *16*(47), 39-48.
- Stambulova, N. B. (2003). Symptoms of a crisis-transition: A grounded theory study.(pp. 97-109). In N. Hassmén (Ed.), *Svensk Idrottspsykologisk Forening*. Orebro, Sweden: Orebro University Press.

- Stambulova, N. (2016). Athletes' transitions in sport and life: Positioning new research trends within existing system of athlete career knowledge. In R. J. Schinke, K. McGannon, & B. Smith (Eds.). *The Routledge international handbook of sport psychology* (pp. 519–535). London: Routledge.
- Stambulova, N.B., & Samuel, R.D. (2020). Career Transitions. In D. Hackfort and R. J. Schinke (Eds.). *Routledge encyclopedia of sport and exercise psychology* (pp. 119–134). London: Routledge
- Steffens, N., Cruwys, T., Haslam, C., Jetten, J., & Haslam, S.A. (2016a). Social group memberships in retirement are associated with reduced risk of premature death: Evidence from a longitudinal cohort study. *BMJ Open*, *6*:e010164. <https://doi.org/10.1136/bmjopen-2015-010164>.
- Steffens, N. K., Jetten, J., Haslam, C., Cruwys, T., & Haslam, S.A. (2016b). Multiple identities enhance health post-retirement because they are a basis for giving social support. *Frontiers in Psychology*, *7*, 1519. <https://doi.org/10.3389/fpsyg.2016.01519>
- Steger, M.F., Frazier, P., Oishi, S., & Kaler, M. (2006). The meaning in life questionnaire: Assessing the presence of and search for meaning in life. *Journal of Counseling Psychology*, *53*(1), 80–93. <https://doi.org/10.1037/0022-0167.53.1.80>
- Swann, C., Moran, A., & Piggot, D. (2015). Defining elite athletes: Issues in the study of expert performance in sport psychology. *Psychology of Sport and Exercise*, *16*, 3-14. <https://doi.org/10.1016/j.psychsport.2014.07.004>.
- Tajfel, H. (1974). Social identity and intergroup behaviour. *Social Science Information*, *13*, 65–93.
- Taylor, J. & Ogilvie, B. C. (1994). A conceptual model of adaptation to retirement among athletes. *Journal of Applied Sport Psychology*, *6*, 1–20.
- Turner, J.C. (1982). Toward a cognitive redefinition of the social group. In Tajfel, H. (Ed.) *Social Identity and Intergroup Relations* (pp. 15-40). Cambridge: Cambridge University Press.



- Turner-Zwinkels, F.M., Postmes, T., van Zomeren, M. (2015) Achieving Harmony among Different Social Identities within the Self-Concept: The Consequences of Internalising a Group-Based Philosophy of Life. *PLoS ONE*, *10(11)*, e0137879. <https://doi.org/10.1371/journal.pone.0137879>
- Van de Velde, S., Bracke, P., Levecque, K., Meuleman, B. (2010) Gender differences in depression in 25 European countries after eliminating measurement bias in the CES-D 8. *Social Science Research*, *39(3)*, 396–404. <https://doi.org/10.1016/j.ssresearch.2010.01.002>
- Van de Velde, S., Levecque, K., & Bracke, P. (2009). Measurement equivalence of the CES-D 8 in the general population in Belgium: a gender perspective. *Archives of Public Health*, *67*, 15–29. <https://doi.org/10.1186/0778-7367-67-1-15>
- Walseth, K. (2006). Sport and belonging. *International Review for the Sociology of Sport*, *41(3-4)*, 447-464. <https://doi.org/10.1177/1012690207079510>
- Wylleman, P. (2019). *A developmental and holistic perspective on transiting out of elite sport*. In M. H. Anshel, T. A. Petrie, & J. A. Steinfeldt (Eds.), *APA handbooks in psychology series. APA handbook of sport and exercise psychology, Vol. 1. Sport psychology* (pp. 201–216). American Psychological Association. <https://doi.org/10.1037/0000123-011>
- Wylleman, P., Alfermann, D. & Lavallee, D. (2004). Career transitions in sport: A European perspective. *Psychology of Sport and Exercise*, *5*, 7–20. [https://doi.org/10.1016/S1469-0292\(02\)00049-3](https://doi.org/10.1016/S1469-0292(02)00049-3)
- Wylleman, P., De Brandt, K., & De Knop, P. (2020). Career development. In D. Hackfort & R. J. Schinke (Eds.), *The Routledge International Encyclopedia of Sport and Exercise Psychology* (1st ed., Vol. 2, p. 714). Routledge, Taylor & Francis Group.
- Zivin, K., Llewellyn, D.J., Lang, I.A., Vijan, S., Kabeto, M.U., Miller, E.M., & Langa, K.M. (2010) Depression among older adults in the United States and England. *American Journal of Geriatric Psychiatry*, *18(11)*, 1036–1044. <https://doi.org/10.1097/JGP.0b013e3181dba6d2>

### Supplementary Material

#### Reasons for Retirement

Table S1 shows the means and standard deviations of participant responses to a list of 14 reasons that contributed to their decision to retire from their sporting career (adapted from Sinclair & Orlick, 1993). Each reason was rated on a 5-point scale ranging (1=*not at all* to 5=*to a great extent*).

**Table S1.** Summary of means and standard deviations on reasons for retirement

	Western athletes	Chinese athletes
	Mean (SD)	Mean (SD)
I was tired of the sporting lifestyle (e.g., traveling, training, stress).	2.64 (1.40)	2.66 (1.31)
I had achieved most of my career goals.	<b>2.70 (1.28)</b>	2.31 (1.20)
I had a poor relationship with coaching staff.	2.09 (1.32)	1.77 (1.18)
I wanted more time to build personal relationships (e.g., with family, partner).	<b>3.01 (1.41)</b>	<b>3.13 (1.37)</b>
I had financial difficulties	1.79 (1.16)	2.36 (1.28)
I struggled with the sporting organisation.	1.87 (1.25)	1.66 (1.04)
I experienced injury or other health problems.	<b>3.00 (1.60)</b>	<b>3.14 (1.44)</b>
My performance declined.	2.27 (1.17)	<b>2.96 (1.25)</b>
I was not selected to be part of a team.	1.73 (1.20)	1.77 (1.17)
I found a job outside of sport.	1.97 (1.37)	2.03 (1.49)
I lacked support from family and/or friends.	1.31 (0.79)	1.57 (1.01)
I could not achieve my career goals.	2.11 (1.19)	2.73 (1.43)
I had a poor relationship with my teammates.	1.30 (0.74)	1.34 (0.80)
I reached the age for retirement.	2.14 (1.31)	2.69 (1.47)

*Note.* Top 3 reasons in each sample are shown in bold.

### Measurement Invariance

Measurement invariance across the two groups of athletes was examined using multigroup CFA which was implemented in the lavaan package in R (Rosseel, 2012). The measurement model comprised six latent factors comprising items from measures of athletic identity loss, pre-retirement multiple group memberships, maintained group memberships, new group memberships, meaning in life, and personal control. An additional latent factor of adjustment was included in the model indexed by life satisfaction, depression, and physical health, that captured the general effects of group memberships on mental and physical health and well-being in sport retirement as predicted by SIMIC. The latent factors were allowed to covary. Model fit was evaluated collectively by multiple indicators, namely, the comparative fit index (CFI), root mean square of error of approximation (RMSEA), and standardized root mean square residual (SRMR), with acceptable model fit indicated by  $CFI > 0.90$ ,  $RMSEA < 0.08$ , and  $SRMR < 0.08$  (Hair, Black, Babin, & Anderson, 2010). Change in CFI ( $\Delta CFI$ ) was used to evaluate invariance in nested models, with a value smaller than 0.01 indicating invariance (Cheung & Rensvold, 2002). Where full invariance is not achieved, constraints on factor loadings and intercepts are relaxed based on modification index to establish partial invariance.

The configural model (no constraints) showed acceptable fit:  $\chi^2(556) = 874.48, p < .001$ ,  $CFI = 0.94$ ,  $RMSEA = 0.06$ , and  $SRMR = 0.06$ . After constraining the factor loadings to be equal across groups except for one item from the athletic identity loss scale, partial metric invariance was established:  $\chi^2(581) = 935.68, p < .001$ ,  $CFI = 0.93$ ,  $RMSEA = 0.06$ , and  $SRMR = 0.08$ ;  $\Delta CFI = 0.008$ . Additionally, after constraining the intercepts to be equal across groups except for this one athletic identity loss item, partial scalar invariance was also established:  $\chi^2(599) = 991.58, p < .001$ ,  $CFI = 0.92$ ,  $RMSEA = 0.06$ , and  $SRMR = 0.08$ ;  $\Delta CFI = 0.007$ . Model fit indices are provided in Table S2. Overall, these findings indicate that responses to these measures by Western and Chinese retired athletes can be meaningfully compared.

**Table S2.** Summary of model fit indices from multigroup CFA

Model	$\chi^2$ (df)	CFI	RMSEA	SRMR	$\Delta$ CFI
Configural	874.483 (556)**	0.936	0.060	0.062	-
Metric	945.189 (582)**	0.926	0.063	0.081	0.010
Partial metric <sup>a</sup>	935.681 (581)**	0.928	0.062	0.080	0.008
Scalar	1018.455 (600)**	0.915	0.066	0.082	0.011
Partial scalar <sup>b</sup>	991.576 (599)**	0.921	0.064	0.081	0.007

<sup>a</sup>Constraint on factor loading of one items from the athletic identity loss scale is relaxed; the partial metric model is compared to the configural model.

<sup>b</sup>Constraint on factor loading of one athletic identity loss item and constraint on intercept of one athletic identity loss item are relaxed; the partial scalar model is compared to the configural model.