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THE ROLE OF SOCIAL GROUP SUPPORT IN OLDER ADULTS' MOTIVATION TO EXERCISE

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English Summary

In view of the progressive graying of the world population, the promotion of Successful Aging has become a priority in public health policy. Successful aging implies that older adults stay in a good physical and mental health, maintain their ability to cope independently with the demands of their life, and remain actively involved in life. Engaging in regular physical activity is a health behavior that is indispensible for achieving Successful Aging. However, the majority of older adults are insufficiently physically active to prevent aging-associated declines in their physical and mental health, functioning and well-being. Therefore stimulating older adults to engage in regular physical exercise constitutes a valuable strategy in the promotion of Successful Aging. Given that social support has been identified as a potent determinant of regular involvement in physical exercise among older adults, it is important to understand how and when social support affects this crucial health behavior.

The purpose of this PhD thesis was twofold: 1) to confirm and to extend the existent empirical evidence for the determining role of social group support – i.e., the support that is derived from being connected to groups – in older adults' (motivation for) exercise involvement; and 2) to elaborate the existing theory on the motivational processes that underlie this effect of social group support (i.e., Self-Determination Theory and the Social Identity Approach). Three studies were conducted, each from the perspective of a specific scientific domain: 1) a sociology-oriented survey; 2) a laboratory experiment in the tradition of social psychology; and 3) a field-intervention that is typical for exercise psychology. These studies evaluated predictions that were based on the assumptions of the leading theories in these domains on the effect of social group support on (the motivation for) exercise involvement, on health, and on well-being. The findings of these studies were described in five research papers, which constitute the empirical chapters of this PhD.

In **Chapter 1**, we examined the assumption that older adults' social capital of being connected to (the *groups* of) society and to their community benefits their physical health and well-being *partly* by promoting their involvement in exercise. A survey was conducted among a population-representative sample (n = 1,298) of older adults (age ≥ 55), including a baseline (n = 949) and a three-year follow-up (n = 409) survey. The study findings indicate that specified aspects of this social capital benefit older adults' present and, in a diminished extent, three-year future physical health and well-being. However, despite finding that older adults' exercise involvement potently benefits their physical health and well-being, the wholesome influence of older adults' social capital did not emerge as a result of promoting

their exercise involvement. Only the experience of safety in society, the only evaluated aspect of this social capital that essentially facilitated older adults' effectiveness in exercise involvement (e.g., to be able to walk safely in the streets/on route to the gym), predicts older adults' physical health and well-being in part by explaining their exercise involvement. In part by explaining older adults' involvement in exercise, the experience of safety in society is one of the few evaluated aspects of this social capital that predicts older adults' three-year future physical health. The findings confirm that social capital and exercise involvement predominantly benefit older adults' physical health and well-being *independently*. In order for social capital to promote older adults' exercise involvement, social capital should provide them with resources that facilitate (them to feel effective in) their exercise involvement. It is concluded that promoting older adults to have such social capital could enhance their physical health and well-being through the beneficial outcomes of both social connectedness and exercise involvement.

In **Chapters 2 and 3**, we examined if and in which circumstances older adults' perceptions of social age *group* normative support for involvement in exercise determine their autonomous motivation (i.e., the motivation arising from their self) to exercise. Based on a proposed, elaborated integration of Self-Determination Theory (Ryan & Deci, 2000) and the Social Identity Approach (Haslam, 2004), we expected that older adults' perceptions of the norms for exercise involvement that are associated with the social identity 'older adult' (i.e., with the social age group of older adults) would determine their autonomous exercise motivation *only* when they identify themselves as an older adult (i.e., they feel positively connected to the social age group of 'older adults'). Only when they identify themselves as an older adult, they would experience the social older adult identity norms to be (in line with) their own, and would these norms affect their experience of basic needs satisfaction (i.e., affect their experience of value) in exercise involvement (by affecting their experience of efficacy in exercise involvement). In determining their autonomous motivation for exercise involvement, the perceptions that older adults have of the social older adult identity norms for exercise involvement were assumed to determine their (intention for) exercise involvement.

In **Chapter 2**, the findings of a survey among older adults (age ≥ 55; n = 409) are reported to examine whether older adults' perceptions of the existent social older adult identity norms for exercise involvement in society predict their (autonomous motivation for) involvement in exercise by explaining their experience of basic needs satisfaction in involvement in exercise. In **Chapter 3**, we conducted a

social-psychological experiment. In this experiment, older adults (age 65-70; n = 120) were invited to evaluate a new (fictitious) exercise activity, named 'Pattern Stepping'. Depending on the experimental condition, (1) the salience of the social older adult identity, (2) the salience of social older adult identity norms for Pattern Stepping, and/or (3) the valence of these salient social older adult identity norms for Pattern Stepping, was manipulated during the evaluation session. It was studied whether these factors affect older adults' autonomous motivation for involvement in exercise (i.e., their experiences of basic needs satisfaction and of self-regulation in exercise involvement), their exercise intention (i.e., their intention for involving in a Pattern Stepping group class), and their involvement in exercise (i.e., their Pattern Stepping performance).

Combined, the findings of **Chapter 2 and Chapter 3** underscore that identification as an older adult (i.e., feeling to belong in the social age *group* older adults) determines whether or not the norms for exercise involvement that older adults perceive to be socially associated with the social identity of 'older adult' (i.e., with the social age *group* of older adults) influence their autonomous motivation for exercise involvement. *When older adults identify themselves as an older adult*, they are autonomously motivated for involving in exercise in line with their perception of the social older adult identity norms for exercise involvement (Chapter 2). In contrast, *when older age adults do not identify themselves as an older adult*, they do *not* become autonomously motivated to exercise in line with their perception of these norms. However when the norms for exercise involvement that are socially associated with the social identity of 'younger (than older) adult' – i.e., with the social age *group* of younger (than older) adults – are salient, they do become autonomously motivated to involve in exercise in line with their perception of these norms, because this exercise involvement is more in line with who they feel they are: 'Not an older adult' (or a younger than older adult). The findings even suggest that when their social environment imposes the social norms that are associated with the social identity of 'older adult' on them by identifying them as an older adult, these older adults even experience these norms for exercise involvement as a social pressure to exercise accordingly (Chapter 3). It is concluded that only older adults' perceptions of the social norms for involvement in exercise that are associated with their subjective age group determine their autonomous exercise motivation.

In **Chapters 4 and 5**, we evaluated the value of using the social capital of social organizations for older adults as a setting for the promotion of exercise involvement. Such *groups* represent valuable

social capital to older adults: The social organization and the fellow members of the social organization can provide older adults with (social) support for dealing with the demands of life, such as involvement in exercise. In **Chapter 4**, we examined the value of social organizations for older adults providing its members with (social) support for exercise involvement by evaluating the effectiveness of Every Step Counts! (ESC)' – a social walking program offered by a social organization for older adults, named OKRA – in promoting physical activity, fitness, and well-being among older adults. In **Chapter 5**, we evaluated whether the experience of (social) support provided by fellow OKRA organization members – i.e., by the ESC program leader and by the fellow ESC program participants – for effective walking program participation, and the experience of (social) connectedness to the OKRA social organization, strengthened the autonomous motivation of ESC participants to involve in the walking program, and – resultantly – lead to a stronger intention to participate in a similar exercise program of the OKRA social organization in the future.

In **Chapter 4**, we studied the effectiveness of the ESC walking program in promoting physical activity, fitness, subjective health, and physical and mental well-being. We evaluated whether the ESC participants (n = 432) of randomly assigned ESC-participating OKRA meeting points (n = 29) – i.e., the intervention condition – progressed more on measures of physical activity, fitness (i.e., the six-minute walking test), subjective health, and physical and mental well-being, compared to a waiting-list control condition. This waiting-list control condition consisted of OKRA members (n = 148) who had confirmed to participate in the ESC-walking program in OKRA meeting points that had registered to provide ESC to its members during the next OKRA activity season (n = 11). Over the ten-week duration of the ESC walking program, the ESC participants progressed more on the measures of physical activity, fitness and subjective health, and regressed more on the measure of anxiety. With regard to physical activity, ESC participants' involvement in moderate-intensity physical activity did not change over the course of the intervention, whereas involvement in moderate-intensity physical activity diminished over the same period among the study participants in the waiting-list control condition. Furthermore, ESC participants' involvement in low-intensity physical activity also tended to increase more over the ten-week duration of the ESC walking program. Based on these findings, we concluded that the ESC walking program is an effective stepping-stone intervention for promoting physical activity, (and as a result) fitness, health, and (aspects of mental) well-being, among older adults.

In **Chapter 5**, we examined whether the experience of the provided (social) support by fellow OKRA members during ESC participation, and of (social) connectedness to OKRA, contributed to ESC participants' autonomous motivation to participate in the ESC walking program and (therein) increased their intention to involve in a similar OKRA exercise program in the future. At the end of the walking program, ESC participants (n = 300) completed measures on their experience of basic needs support by their fellow ESC participants in their ESC group (i.e., the motivational climate in their ESC group) and by their ESC group leader, and of their experienced social connectedness to OKRA. Experiencing a mastery climate (i.e., self-valued-competence support) in their ESC group and receiving autonomy-competence basic needs support from their ESC group leader increased the participants' autonomous motivation for ESC walking program participation, and (therein) strengthened their intention to involve in a similar OKRA exercise program in the future. By contrast, experiencing a performance climate in their ESC group (i.e., socially-valued-competence support) increased their controlled motivation for ESC walking program involvement, but this did not diminish their intention to involve in a similar OKRA exercise program in the future.

Feeling positively connected to the ESC group leader did not strengthen the ESC participants' autonomous motivation for participating in the ESC walking program, but did promote their intention to involve in a similar OKRA exercise program in the future. The experience of (social) connectedness to OKRA did strengthen ESC participants' autonomous motivation for ESC walking program participation, but strengthened their controlled motivation for involving in the ESC walking program even more. As a result, experienced (social) connectedness to OKRA neither increased, nor diminished their intention for participating in a similar OKRA exercise program in the future.

The findings of **Chapter 5** indicate that social (group) support that facilitates older adults to experience being effective in exercise involvement by enabling them to achieve self-valued outcomes in exercise involvement (i.e., that facilitates older adult's satisfaction of the basic needs for autonomy and competence in exercise involvement), promotes their volition to exercise (i.e., contributes to their autonomous motivation to involve in exercise). However, (social support for) feeling positively socially connected in exercise involvement (i.e., for the satisfaction of basic need for (social) belongingness) does not (consistently) contribute to their volition to exercise. The combined findings of **Chapters 4 and 5** confirm that addressing the social capital of social organizations for older adults is an effective

approach to the promotion of exercise involvement among older adults, *provided* that the supplied support for exercise involvement facilitates older adults to experience being effective in their exercise involvement by enabling them to achieve self-valued outcomes.

In conclusion, the findings in this Ph.D. thesis confirm that social group support – particularly the support that is available or received through the social capital of being/feeling connected with (1) society and the community, (2) with the age group 'older adults', and (3) with (the members of) a social organization for older adults – contributes to the (autonomous motivation for) exercise involvement of older adults, under the condition that it strengthens their personal valuation of exercise involvement. This condition is fulfilled when that support facilitates them to feel effective – i.e., achieve personally valued outcomes – in exercise involvement. The theoretical and practical implications of the findings are elaborated in the general discussion. There it is argued that promoting older adults to have social capital that essentially facilitates them to feel effective in their exercise involvement by enabling them to achieve self-valued outcomes in their exercise involvement should be considered a priority in public health policy.

Dutch Summary

Samenvatting

In het licht van de vergrijzing van de wereldbevolking, is het bevorderen van 'succesvol ouder worden' een prioriteit geworden in het volksgezondheid- en welzijnbeleid. 'Succesvol ouder worden' houdt in dat ouderen een goede lichamelijke en geestelijke gezondheid behouden, in staat blijven om zelfstandig uitdagingen in het leven het hoofd te bieden, en een actief leven blijven leiden. Regelmatig bewegen is een gezondheidsgedrag dat essentieel is om succesvol ouder te worden. De meerderheid van de ouderen beweegt echter onvoldoende om een verouderingsgerelateerde verzwakking van hun lichamelijke en geestelijke gezondheid, functioneren, en welzijn, te voorkomen. Bijgevolg vormt het stimuleren van ouderen om regelmatig te bewegen een waardevolle strategie om 'succesvol ouder worden' te bevorderen. Aangezien werd vastgesteld dat sociale steun in belangrijke mate bijdraagt tot de regelmatige bewegingsdeelname van ouderen, is het van belang om te begrijpen wanneer en hoe sociale steun van invloed is op dit cruciale gezondheidsgedrag.

Het doel van dit doctoraatsproefschrift was tweeledig: 1) het bevestigen en uitbreiden van de empirische evidentie over de bepalende rol van sociale groepssteun – nl., de steun die beschikbaar is als het gevolg van het behoren tot groepen – in de (motivatie voor) bewegingsdeelname bij ouderen; en 2) het uitbreiden van de voornaamste theorieën over de motivationele processen die dit effect van sociale groepssteun onderliggen (nl. Zelfdeterminatietheorie en de Sociale Identiteitsbenadering). Er werden drie studies uitgevoerd, elk vanuit het perspectief van een specifiek wetenschappelijk domein: 1) een sociologisch georiënteerde survey, 2) een laboratoriumexperiment in de traditie van de sociale psychologie, en 3) een interventie in het veld die kenmerkend is voor de bewegingspsychologie. In elk van deze studies werden voorspellingen die gevormd werden op basis van de voornaamste theorieën uit deze domeinen over het effect van sociale groepssteun op de (motivatie) om te bewegen, en/of op gezondheid en welzijn, getest. De studiebevindingen werden beschreven in vijf onderzoeksartikels, welke de empirische hoofdstukken van dit doctoraatsproefschrift vormen.

In **Hoofdstuk 1** onderzochten we de veronderstelling dat het sociaal kapitaal van ouderen van verbonden te zijn met de (*groepen* van de) samenleving en hun leefgemeenschap bijdraagt tot hun gezondheid en welzijn, en dit *ten dele* door hun bewegingsdeelname te bevorderen. Een grotendeels populatie-representatieve steekproef van Vlaamse ouderen (n = 1,298; leeftijd ≥ 55) werd bevraagd in een basisbevraging (n = 949) en in een opvolgingsbevraging drie jaar later (n = 409). De bevindingen tonen aan dat het beschikken over (specifieke aspecten) van (dit) sociaal kapitaal bij ouderen bijdraagt

aan een goede fysieke gezondheid en een goed fysiek welzijn in het heden, alsook, zij het in mindere mate, drie jaar later. Echter, ondanks dat de bewegingsdeelname van ouderen sterk bijdroeg aan het ervaren van goede fysiek(e) gezondheid en welzijn, kwam het gezondheid- en welzijnbevorderende effect van het bezitten van dit sociaal kapitaal voornamelijk niet tot stand door het bevorderen van hun bewegingsdeelname. Uit de bevindingen blijkt dat enkel het ervaren van veiligheid in de samenleving – het enige geëvalueerde aspect van dit sociaal kapitaal dat effectieve bewegingsdeelname essentieel vergemakkelijkt (bijvoorbeeld, veilig kunnen wandelen op straat/naar het fitnesscentrum) – de fysieke gezondheid en het fysieke welzijn van ouderen ten dele voorspelt door hun deelname aan beweging te verklaren. Ten dele door hun deelname aan beweging te verklaren, is de ervaring van veiligheid in de samenleving een van de weinige geëvalueerde aspecten van dit sociaal kapitaal dat de fysieke gezondheid van ouderen drie jaar in de toekomst verklaart. Deze bevindingen bevestigen dat sociaal kapitaal en bewegingsdeelname bij ouderen de fysieke gezondheid en het fysieke welzijn grotendeels onafhankelijk bevorderden. Om de regelmatige bewegingsdeelname van ouderen te verhogen, is het noodzakelijk dat sociaal kapitaal hen van middelen voorziet die hun (ervaring van effectief zijn in hun) bewegingsdeelname vergemakkelijken. We besluiten dat het bezitten van dergelijk sociaal kapitaal, de fysieke gezondheid en het fysiek welzijn van ouderen kan bevorderen door de gunstige gevolgen van zowel sociale verbondenheid, als van regelmatige beweging.

In **Hoofdstukken 2 en 3** evalueerden we of, en onder welke omstandigheden, de perceptie die ouderen hebben van sociale leeftijds*groep* normatieve steun voor bewegingsdeelname op ‘oudere’ leeftijd, hun autonome motivatie (nl. de motivatie die voortkomt uit henzelf) voor bewegingsdeelname bepaalt. Op basis van een voorgestelde, uitgewerkte integratie van de Zelfdeterminatietheorie (Ryan & Deci, 2000) en de Sociale Identiteitsbenadering (Haslam, 2004), verwachtten we dat de percepties die ouderen hebben van de normen voor bewegingsdeelname die verbonden zijn met de sociale identiteit ‘oudere’ (i.e., met de sociale leeftijdsgroep ‘ouderen’) hun autonome motivatie om aan beweging te doen zouden bepalen, maar dit enkel en alleen wanneer zij zichzelf als een oudere identificeren (i.e., zij zich positief verbonden voelden met de sociale leeftijdsgroep ‘ouderen’). Alleen wanneer zij zichzelf als een oudere identificeren, zouden zij ervaren dat de sociale identiteitsnormen voor ouderen (in lijn met) hun eigen normen zijn, en zouden deze normen de vervulling van de psychologisch basisnoden (i.e., hun ervaring van persoonlijke waarde) in deelname bepalen (door hun ervaring van effectief zijn

in hun deelname te bepalen). In het bepalen van hun autonome motivatie voor bewegingsdeelname, zouden de percepties die ouderen hebben van de sociale oudere identiteitsnormen om aan beweging deel te nemen hun intenties voor bewegingsdeelname beïnvloeden.

In **Hoofdstuk 2** worden de bevindingen van een bevraging van ouderen (leeftijd ≥ 55; n = 409) beschreven. Hierin werd getest of de perceptie die ouderen hebben van in de samenleving bestaande sociale leeftijds*groep* normen voor bewegingsdeelname voor ouderen, hun (autonome) motivatie voor bewegingsdeelname beïnvloedt, en dit door hun ervaren basisnoodvervulling in bewegingsdeelname te verklaren. In **Hoofdstuk 3** voerden we een sociaalpsychologisch experiment uit. In dit experiment werden ouderen (leeftijd 65-70; n = 120) uitgenodigd om een nieuwe (fictieve) bewegingsactiviteit, nl. 'Patroonstappen', te evalueren. Afhankelijk van de experimentele conditie, werden tijdens de evaluatie drie variabelen gemanipuleerd: (1) de saillantie van de sociale 'oudere' identiteit; (2) de saillantie van sociale 'oudere' identiteitsnormen voor 'Patroonstappen', en/of (3) de valentie van de sociale 'oudere' identiteitsnormen voor 'Patroonstappen'. Er werd geëvalueerd of deze gemanipuleerde factoren de autonome motivatie voor bewegingsdeelname (i.e., de ervaren basisnoodvervulling en zelfregulatie in bewegingsdeelname), de bewegingsintenties, en de bewegingsdeelname (i.e., Patroonstapprestatie), van ouderen beïnvloedden.

Gezamenlijk bevestigden de bevindingen van **Hoofdstukken 2 en 3** dat de mate waarin men zich als oudere identificeert (i.e., zich op zijn plaats voelt in de sociale leeftijdsgroep ouderen) bepaalt of de autonome motivatie voor bewegingsdeelname wel of niet door de sociale normen die verbonden zijn met de sociale 'oudere' identiteit (i.e., met de sociale leeftijdsgroep ouderen) beïnvloed wordt. Er werd gevonden dat *wanneer ouderen zichzelf als 'oudere' identificeren,* zij autonoom gemotiveerd zijn om in overeenstemming met die normen aan beweging deel te nemen (Hoofdstuk 2). Daartegenover staat dat *wanneer zij zichzelf niet als een 'oudere' identificeren*, zij niet autonoom gemotiveerd zijn om in overeenstemming met die normen aan beweging deel te nemen. Echter, wanneer de normen die sociaal verbonden zijn met de sociale identiteit 'jong(ere dan oudere) volwassenen' – i.e., met de sociale 'jongere (dan oudere) volwassenen' – saillant zijn, dan worden zij autonoom gemotiveerd om in lijn met deze normen aan beweging deel te nemen omdat die bewegingsdeelname meer in lijn is met 'wie' zij naar hun gevoel zijn, namelijk 'geen oudere' (of een 'jong(ere dan oudere) volwassene'). De bevindingen suggereren zelfs dat ouderen een externe druk ervaren om in overeenstemming met

de normen die geassocieerd zijn met de sociale 'oudere' identiteit aan beweging te doen wanneer zij voelen dat hun sociale omgeving de normen die verbonden zijn met de sociale 'oudere' identiteit aan hen oplegt door hen te identificeren als een oudere (Hoofdstuk 3). Er wordt geconcludeerd dat vooral de perceptie die ouderen hebben van de sociale normen voor bewegingsdeelname die geassocieerd zijn met hun subjectieve leeftijdsgroep, de autonome motivatie van ouderen voor bewegingsdeelname bepalen.

In **Hoofdstukken 4 en 5** taxeerden we de waarde van het gebruiken van het sociaal kapitaal van sociale organisaties voor ouderen als omgeving voor het bevorderen van bewegingsdeelname bij ouderen. Zulke *groepen* vormen waardevol sociaal kapitaal voor ouderen: De sociale organisatie en de medeleden van de sociale organisatie kunnen ouderen met steun voorzien om de uitdagingen van het leven het hoofd te bieden, waaronder deelnemen aan beweging. In **Hoofdstuk 4** evalueerden we de waarde van het aanbieden van (sociale) steun voor bewegingsdeelname door dergelijke sociale organisaties door de effectiviteit van 'Elke Stap Telt!' (EST), een sociaal wandelprogramma dat werd aangeboden door een sociale organisatie voor ouderen, nl. OKRA, in het promoten van deelname aan fysieke activiteit, fitheid, en welzijn bij ouderen te onderzoeken. In **Hoofdstuk 5** evalueerden we of de (sociale) steun die door medeleden van OKRA – i.e., door de EST-leider en de EST-mededeelnemers – geboden werd voor een effectieve bewegingsdeelname, en de ervaren sociale verbondenheid met OKRA, de autnomome motivatie van EST deelnemers om aan EST deel te nemen versterkte, en – als gevolg – tot een sterkere intentie leidde om in de toekomst aan een soortgelijk bewegingsprogramma van OKRA deel te nemen.

In **Hoofdstuk 4** evalueerden we de effectiviteit van het EST wandelprogramma met betrekking tot het bevorderen van de fysieke activiteit, de wandelfitheid, de subjectieve gezondheid, en het fysiek en mentaal welzijn van ouderen die deelnamen aan het EST wandelprogramma. We testten of de EST deelnemers (n = 432) van OKRA trefpunten die aan EST deelnamen (n = 29) – nl., de interventie-conditie – meer vooruitgingen op de afgenomen maten dan ouderen in een wachtlijst-controleconditie. Deze wachtlijst-controleconditie bestond uit OKRA-leden (n = 148) die bevestigd hadden dat ze tijdens volgende OKRA-activiteitenseizoen zouden deelnemen aan het EST wandelprogramma in een van de OKRA trefpunten (n = 11) die het wandelprogramma dan zouden aanbieden. De resultaten toonden aan dat over de tien weken dat het EST wandelprogramma duurde, de deelnemers uit de interventie-

conditie meer vooruitgang boekten op de maten van algehele fysieke activiteit, fitheid, en subjectieve gezondheid in vergelijking met de ouderen in de wachtlijst-controleconditie. Hun ervaren angstigheid nam eveneens meer af. Met betrekking tot fysieke activiteit, bleek dat het niveau van matig intense fysieke activiteit in de wachtlijst-controleconditie afnam, terwijl dit niveau stabiel bleef in de interventie-conditie. Bovendien nam de fysieke activiteit van lage intensiteit meer toe in de interventieconditie dan in de wachtlijst-controleconditie. Op basis van deze bevindingen kunnen we besluiten dat het EST wandelprogramma een effectieve instap-interventie vormt voor het bevorderen van fysieke activiteit bij ouderen, en als een gevolg daarvan, voor het bevorderen van hun fitheid, gezondheid en (aspecten van mentaal) welzijn.

In **Hoofdstuk 5** onderzochten we of de ervaring van (sociale) steun voorzien door medeleden van OKRA tijdens EST deelname, en de ervaring van sociale verbondenheid met OKRA, bijdroegen aan de autonome motivatie van EST deelnemers om aan het EST wandelprogramma deel te nemen, en (als gevolg) bijdroeg aan hun intentie om aan een gelijkaardig OKRA bewegingsprogramma in de toekomst deel te nemen. Op het einde van het wandelprogramma vulden EST deelnemers (n = 300) een vragenlijst in die peilde naar hun ervaring van steun door de mededeelnemers in hun EST groep (i.e., het motivationele klimaat in hun EST groep) en door de EST groepsleider voor de vervulling van hun basisnoden in deelname aan EST, en naar hun ervaren verbondenheid met OKRA. Het ervaren van een taakklimaat (nl. steun voor het ervaren van zelfgewaardeerde competentie) in de EST groep, en steun door de EST groepsleider voor de vervulling van de basisnoden autonomie en competentie, verhoogde de autonome motivatie van deelnemers om deel te nemen aan het wandelprogramma, en versterkte (als een gevolg) de intentie om in de toekomst aan een gelijkaardig bewegingsprogramma van OKRA deel te nemen. Daartegenover staat dat het ervaren van een prestatieklimaat (nl. steun voor het ervaren van sociaalgewaardeerde competentie) in de EST groep, de gecontroleerde motivatie voor deelname aan het EST wandelprogramma verhoogde. Dit leidde evenwel niet tot een zwakkere intentie om aan een gelijkaardig OKRA bewegingsprogramma deel te nemen in de toekomst.

Zichzelf positief verbonden voelen met de EST groepsleider versterkte de autonome motivatie van EST deelnemers om aan het EST deel te nemen niet, maar bevorderde wel de intentie om in de toekomst aan een gelijkaardig OKRA bewegingsprogramma deel te nemen. De ervaring van (sociale) verbondenheid met OKRA versterkte de autonome motivatie van de EST deelnemers om aan het EST

wandelprogramma deel te nemen, maar versterkte verrassend genoeg hun gecontroleerde motivatie voor EST deelname nog meer. Bijgevolg droeg de ervaren (sociale) verbondenheid met OKRA niet bij tot de intentie om aan een gelijkaardig bewegingsprogramma deel te nemen in de toekomst.

De bevindingen in **Hoofdstuk 5** geven aan dat sociale steun die de ervaring van effectiviteit in bewegingsdeelname bij ouderen ondersteunt door hen in staat te stellen om zelfgewaardeerde doelen te bereiken in bewegingsdeelname (nl. die de ervaren vervulling van de basisnoden aan autonomie en competentie bij ouderen vergemakkelijkt) bijdraagt aan hun wil (nl., hun autonome motivatie) om deel te nemen aan beweging. Echter, (sociale steun voor) zichzelf positief sociaal verbonden te voelen in bewegingsdeelname (nl. (voor) de vervulling van de basisnood aan (sociale) verbondenheid) draagt niet consistent bij aan hun wil om aan beweging deel te nemen. De bevindingen van **Hoofdstukken 4 en 5** bevestigen dat het aanspreken van het sociaal kapitaal van sociale organisaties voor ouderen een effectieve aanpak is voor de promotie van de bewegingsdeelname bij ouderen, op voorwaarde dat de voorziene steun het voor hen vergemakkelijk om zich effectief te voelen in bewegingsdeelname, meerbepaald door hen in staat te stellen zelfgewaardeerde doelen te bereiken.

De bevindingen in dit doctoraat bevestigen dat sociale groepssteun – meerbepaald de steun die voortkomt uit het sociaal kapitaal verbonden te zijn met (1) de samenleving en gemeenschap, (2) de leeftijdsgroep ‘ouderen’, en (3) (de leden van) een sociale organisatie voor ouderen – essentieel bijdraagt aan de (autonome motivatie voor) bewegingsdeelname van ouderen, op voorwaarde dat het hun persoonlijke waardering van bewegingsdeelname versterkt. Die voorwaarde kan vervuld worden wanneer die steun het voor hen vergemakkelijkt om zich effectief te voelen – nl. om zelfgewaardeerde uitkomsten te bereiken – in hun bewegingsdeelname. De theoretische en praktische implicaties van de bevindingen worden verder uitgewerkt in de algemene discussie van dit proefschrift. Meerbepaald wordt er daar gepleit dat het een prioriteit zou moeten zijn in het volkgezondheid- en welzijnbeleid om het bezitten van sociaal kapitaal dat bewegingsdeelname stimuleert bij ouderen te stimuleren.

General Introduction

“When I was younger, so much younger than today,
I never needed anybody's help in any way.
But now these days are gone, I'm not so self-assured.
Now I find I've changed my mind and opened up the doors.

Help me if you can, I'm feeling down!
And I do appreciate you being 'round!
Help me get my feet back on the ground!
Won't you please, please help me?

And now my life has changed in oh so many ways,
My independence seems to vanish in the haze.
But every now and then I feel so insecure,
I know that I just need you like I've never done before.”

“Help!” by The Beatles (1965).

The world population is expected to become grayer toned over the upcoming decades. In an expanding world population, the segment of adults who are over the age of sixty is projected to grow from 12% in 2013 to 21% in 2050. The number of older adults is estimated to rise from 841 million to over two billion (United Nations, 2013). This ongoing graying of society is presently most noticeable in the more developed regions of the world. For example, in Flanders (i.e., the Dutch-speaking region of Belgium), the segment of older adults is forecasted to grow from 25% in 2013 to 30% by 2030. The number of Flemish older adults would increase from fewer than 1.6 million to over 2 million (Pelfrene & Van Peer, 2011). In the first half of the 21st century, more and more individuals can be expected to live at an older age.

Our quality of life at older age depends on our success to remain in good health (i.e., to avoid chronic disease and disability, and to maintain a sense of complete physical, mental and social well-being), retain our independent functioning, and maintain an active, effective involvement in life. Having a good quality of life at an older age by achieving to meet these preconditions has been referred to as 'Successful Aging' (Rowe & Kahn, 1997). In the prospect of the graying of society, the promotion of Successful Aging has become a priority in public policy (World Health Organization, 2002; European Commission, 2012).

Social Support Promotes Successful Aging

The Beatles already knew fifty years ago that (social) help in dealing with the demands of our life essentially benefits our quality of life. Social capital indicates the availability of this help. It refers to the extent of social connectedness of an individual (or a group) (Esser, 2008; Kawachi, Subramanian, & Kim, 2010). This is defined by the number of relationships that an individual (or a group) maintains with other individuals or groups, and by the quality of these social relationships (i.e., the level of safety, trust, and reciprocity). The more social capital an individual (or a group) has (i.e., the more/better they are socially connected to other individuals or groups) the more likely they are to receive social support for (i.e., physical and psychological resources that enable) dealing effectively with the demands of life. In confirmation of the observation by The Beatles, it has consistently been found that this availability of social support profoundly benefits our quality of life: Social capital essentially contributes to our health, functioning, and well-being.

Individual social capital (Lin, 2001) refers to our personal social connectedness (Figure 1) and is indicated by our personal social network. Our own social network consists of our relationships with other persons and with groups, such as our family, community, or society. The number and the quality (i.e., the level of safety, trust, and reciprocity) of these social relationships indicate the extent that we ourselves are socially connected. This is further indicated by the extent of our social engagement (i.e., our active involvement in social relationships). The extent of our social connectedness indicates the availability of support (i.e., resources) to us through our personal social network for coping with the demands of our life. Being rich in individual social capital – i.e., being extensively socially connected – has been found to diminish the risks for morbidity and for mortality (for an overview or a review of the evidence, consult: Berkman & Glass, 2000; Holt-Lunstad, Smith, & Layton, 2010; Ikeda & Kawachi, 2010; Uchino, 2004) among older adults (for an overview or a review of the evidence, consult: Morrow-Howell & Gehlert, 2012; Seeman, 2000), and to reduce older adults' risks for physical and mental decline, disability and ill-being (e.g., Avlund, Lund, Holstein, & Due, 2004; Forsman, Nyqvist, & Wahlbeck, 2011; Glass, Mendes de Leon, Bassuk, & Berkman, 2006; Nyqvist, Forsman, Giuntoli, & Cattan, 2012; Zunzunegui, Alvarado, Del Ser, & Otero, 2003).

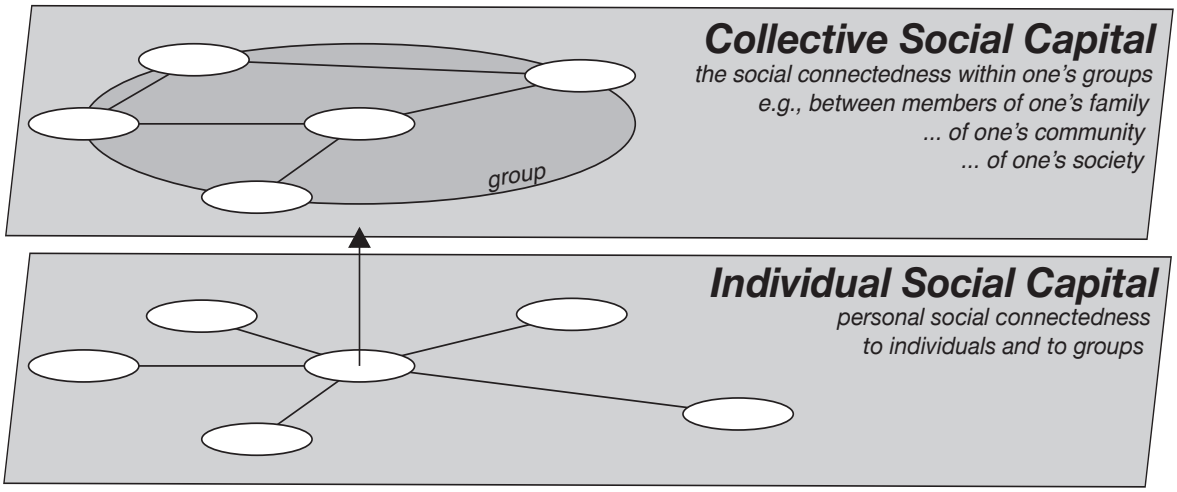

Figure 1. Social Capital: The Extent of Social Connectedness

Collective social capital (Kawachi & Berkman, 2000) is the extent of social connectedness that exists within the groups to which we belong, such as our family, community, or society (Figure 1). This is indicated by the social networks that exist within these groups - i.e., by the number and quality (i.e., level of safety, trust, and reciprocity) of the social relationships that exist between the group members

– and the level of social engagement (i.e., the active involvement in social relationships) of the group members. Such social connectedness is proposed to promote reciprocal social support (i.e., providing and receiving resources) between the group members with regard to meeting the demands of life, and to promote collaboration to provide the group members with access to resources to deal with (shared) demands of life. Collective social capital therefore signals the social support that is available to us as the result of the social connectedness that exists within our group. Being a member of a group – which is a part of our individual social capital – that is rich in collective social capital (i.e., that is extensively socially connected within) has been found to reduce our risks for morbidity, mortality, and for physical and mental disability and ill-being (for an overview or a review of the evidence, consult: Almedom & Glandon, 2010; Gilbert, Quinn, Goodman, Butler, & Wallace, 2013; Kawachi & Berkman, 2000; Kim, Subramanian, & Kawachi, 2010) These wholesome effects of social capital have been attributed to the psychological, physiological and behavioral outcomes of social support – i.e., which are the (physical and psychological) resources that are available to us through our social connectedness – enabling us to deal more effectively with the demands of life (Berkman & Glass, 2000; Uchino, 2004) (Figure 2).

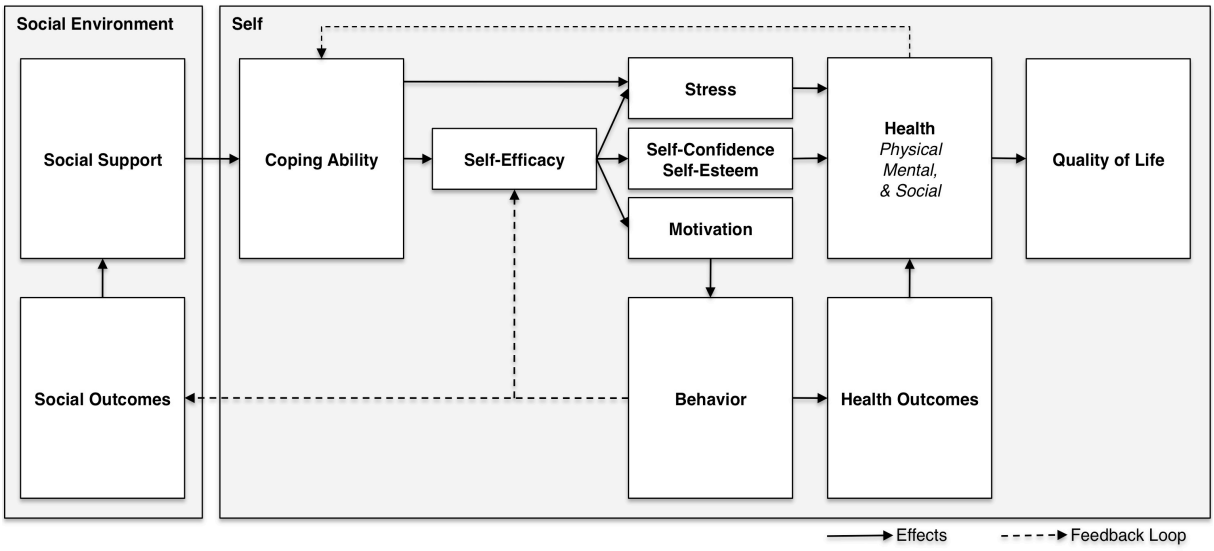

Figure 2. The Effects of Available Social Support on Health and Quality of Life

(Adapted from the described/presented pathways by Berkman & Glass (2000) and Uchino (2004)).

Psychologically, social support has been argued to bolster our perception that we are able to deal effectively with the demands of our life. This bolstered perception of our self-efficacy in coping would boost our self-confidence and our self-esteem. *Physiologically*, by strengthening our (perceived) ability to cope with the demands of our life, social support has been proposed to prevent the harmful physiological effects of physical and mental stress that arises from (needing to meet) these demands of life. *Behaviorally*, social support has been theorized to promote engagement in healthy behavior. It would motivate us to engage in healthy behavior by strengthening our (perception of) self-efficacy in our engagement in it. Engagement in the socially supported health behavior would prevent the harmful stresses of the unhealthy behavior upon our physical and mental health.

Physical Activity for Successful Aging

Developing social support for regular involvement in physical activity is a potentially valuable approach to the promotion of successful aging. Regular involvement in physical activity is key to our successful aging (Galloway & Jokl, 2000). It profoundly benefits our quality of life by essentially enhancing our health in diminishing our risks for morbidity and mortality, by enhancing our effective functioning and functional independence in reducing our risks for physical and mental decline and disability, and by enhancing our well-being (Garber et al., 2011), also at an older age (Chodzko-Zajko et al., 2009; Nelson et al., 2007). Moreover, the process of decline in physical and mental health and functioning that is (stereo)typically associated with growing into older age is for a part the result of being insufficiently physically active over the course of our life (Fiatarone Singh, 2002). It is possible to prevent or to attenuate this maladaptive effect of aging, and to enhance our quality of life by regularly involving in physical activity, even at an older age (Chodzko-Zajko et al., 2009).

According to the guidelines for health-enhancing physical activity involvement for older adults (Nelson et al., 2007), older adults meaningfully enhance their health, functioning, and well-being, when engaging in at least 30 minutes of moderate intensity aerobic physical activity on at least five days of the week, in at least 20 minutes of vigorous intensity aerobic physical activity on at least three days of the week, or in an equivalent combination of moderate and vigorous intensity aerobic physical activity. These minutes need to be accumulated in bouts of at least ten minutes of continuous aerobic physical

activity. In addition, older adults should perform muscle-strengthening physical activity for all the major muscle groups two times per week.

Despite these beneficial effects of regular involvement in physical activity, the majority of older adults in the more developed regions of the world are insufficiently physically active to meet guidelines for health-enhancing physical activity (Kruger, Carlson, & Buchner, 2007; Sjöström, Oja, Hagströmer, Smith, & Bauman, 2006). For example, over eighty percent of the older adults in Flanders have been found to be insufficiently physically active to benefit their health, functioning, and well-being (Wijndaele et al., 2006). The promotion of physical exercise – i.e., physical activity that is solely engaged in for the benefits of being physically active, including for maintaining or enhancing health, functioning, and well-being, or for the enjoyment of being physically active – is therefore considered to be a key strategy in promoting successful aging among older adults.

Social Support Promotes Physical Activity and Exercise

There is empirical evidence that social support promotes involvement in physical activity and exercise. Social capital and social support for involvement in physical activity and exercise have been reported to be positively associated with physical activity and exercise involvement (Lindström, 2010; Wendel-Vos, Droomers, Kremers, Brug, & van Lenthe, 2007) among older adults (van Stralen, De Vries, Mudde, Bolman, & Lechner, 2009). In accounts of their motives for involving in physical activity and exercise, older adults even recognize that social support motivates them to involve (e.g., Bidonde, Goodwin, & Drinkwater, 2009; Dunlop & Beauchamp, 2013; Mathews et al., 2010; Stathi et al., 2012). This motivational effect of social support on physical activity and exercise involvement is supported by the assumptions of validated motivation theories.

Motivational Effects of Social Support

Empirically validated theories on motivation explain the determining effect of social support on our motivation for involvement in physical activity and exercise. According to Social-Cognitive Theory (SCT; Bandura, 1986, 1989, 2004), we are motivated for behavior when we feel that we are effective – i.e., feel able to achieve valued outcomes – in this behavior. Social support is proposed to strengthen this feeling of self-efficacy by facilitating achieving valued outcomes. In confirmation, several studies

have confirmed the assumptions of SCT by demonstrating that social support for physical activity and exercise promotes older adults to involve by strengthening their perceived self-efficacy in engagement (e.g., Anderson, Wojcik, Winett, & Williams, 2006; Ayotte, Margrett, & Hicks-Patrick, 2010; McAuley, Jerome, Elavsky, Marquez, & Ramsey, 2003; Resnick, Orwig, Magaziner, & Wynne, 2002).

Self-Determination Theory (SDT; Deci & Ryan, 1985, 2008; Ryan & Deci, 2000) extends this reasoning on how social support determines our behavior. In line with SCT, SDT proposes that we are motivated to engage in behavior when this behavior is valued. However, the quality of this motivation is argued to depend on the extent that this valuation is intrinsic to our self. We would have a better quality of motivation the more we self-intrinsically value the behavior. We are more probable to engage in a behavior and maintain involvement in a behavior, the more we intrinsically appreciate involving in it. SDT distinguishes between two forms of motivation that differ in quality depending on whether the valuation of the behavior originates from within our self or not (Figure 3).

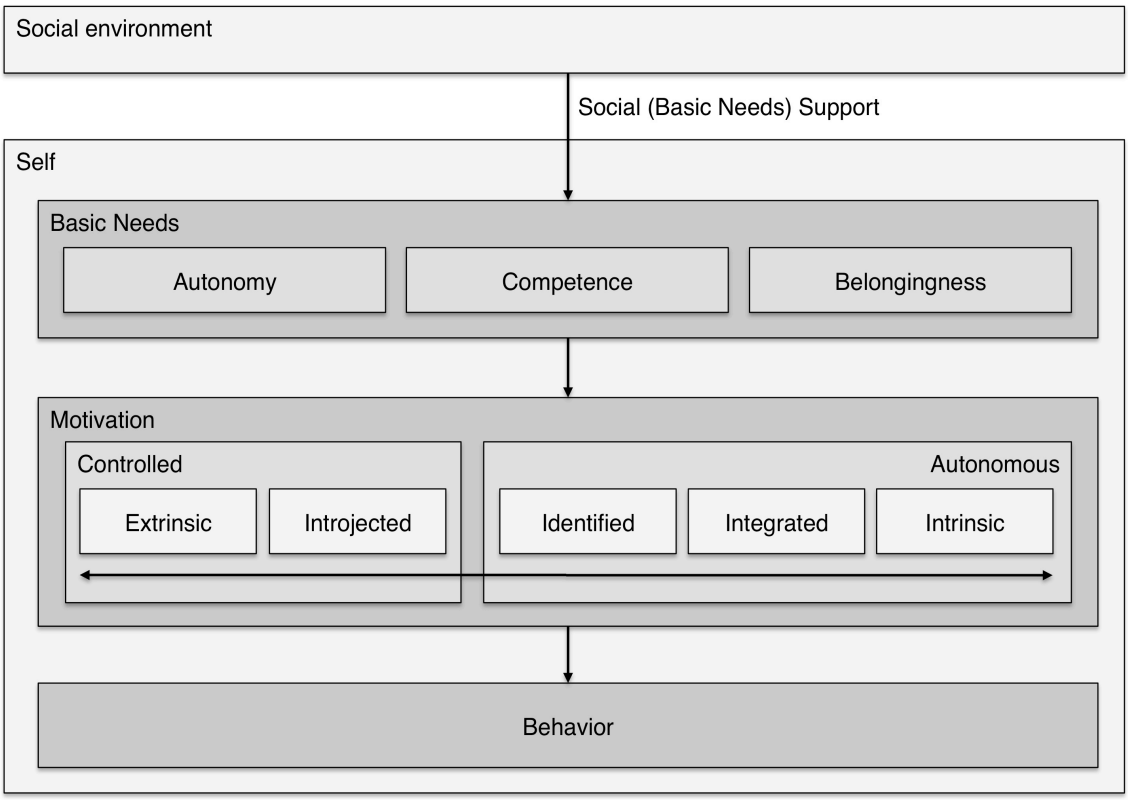

Figure 3. Self-Determination Theory (Adapted from Ryan & Deci (2007)).

Autonomous motivation is considered high quality motivation. Autonomous motives arise when we personally value engaging in the behavior. When we personally value the behavior, we 'want to' engage in the behavior out of our own volition. Autonomous motives include engaging in behavior because it leads to feelings of intrinsic appreciation, such as enjoyment (i.e., intrinsic regulation), because it is inherent to our self or identity (i.e., integrated regulation), or because we consider it to be important (i.e., identified regulation). These reasons for engaging in the behavior originate from within our self. When we are autonomously motivated, we thus experience to self-regulate our behavior. We feel that we instigate and regulate our behavior.

In contrast, controlled motivation is considered motivation of low(er) quality. Controlled motivation arises when (we perceive that) our social environment values the behavior, while we do not (completely) value engaging in the behavior ourselves. In such conditions, we feel that we 'have to' engage in the behavior because the behavior is socially appreciated. Controlled motives include engaging in behavior because it leads to feelings of (perceived) social appreciation, such as engaging in behavior in order to feel proud, or in order to avoid feeling guilty or ashamed (i.e., introjected regulation). Controlled motives further include engaging in behavior because it is socially appreciated, such as engaging in behavior in order to obtain social rewards or in order to avoid social punishment (i.e., extrinsic regulation). These reasons for engagement in the behavior (predominantly) originate external to our self (i.e., in social contingencies). When we subscribe to such controlled motives for behavior, we experience that our behavior is instigated and regulated by social contingencies.

Both autonomous and controlled motivation can lead to engagement in behavior, but only autonomous motivation is proposed to lead to a sustained involvement in behavior. A review of the evidence indicates that we are more likely to maintain a regular involvement in physical activity and exercise when our motives for engaging are more self-intrinsic (Teixeira, Carraca, Markland, Silva, & Ryan, 2012). Consequently it is essential that social support enhances the autonomous motivation of older adults for physical activity and exercise participation in order to effectively promote their *regular* involvement. Whether social support promotes the autonomous motivation of older adults for involvement in physical activity and exercise however depends on the extent that it succeeds in enhancing older adults' personal valuation of involvement in physical activity and exercise.

According to SDT, our personal valuation of behavioral involvement is determined by the satisfaction of three universal psychological basic needs, namely the basic needs for autonomy, competence, and belongingness, when we engage in this behavior. SDT more specifically claims that we more intrinsically value behavior, and thus are more autonomously motivated, the more that those basic needs are satisfied. We would want to engage in behavior out of our own volition when the behavior is in line with our personal preference (i.e., the satisfaction of the basic need for autonomy) because we feel the behavior is effective (i.e., the satisfaction of the basic need for competence) in leading to personally value outcomes, including feeling positively connected with meaningful others (i.e., the satisfaction of the basic need for belongingness). Social support that facilitates satisfaction of these basic needs would enhance autonomous motivation and promote a maintained involvement. In confirmation of these assumptions by SDT, need supportive social environments have been found to promote maintained physical activity and exercise involvement by enhancing autonomous motivation (for an overview of the evidence, consult: Teixeira et al., 2012; Wilson, Mack, & Grattan, 2008).

Social age norms represent one form of social support that potentially determines older adults' perception of the value of engaging in physical activity and exercise, and consequently may influence their motivation for involvement. Social norms refer to what people commonly do, and to what people commonly consider appropriate behavior. They signal to us what socially is considered 'effective', and thus valuable, behavior (Cialdini, 2007). Therefore, when such social norms come to our attention, we tend to behave accordingly (e.g., Goldstein, Cialdini, & Griskevicius, 2008; Kallgren, Reno, & Cialdini, 2000) because we are motivated to be effective (i.e., to achieve valued outcomes) in our behavior.

In the Social Identity Approach (SIA; Haslam, 2004) it is suggested that the extent that we tend to adhere to such social norms depends on the extent that they (are perceived to) correspond with our own. It is proposed that we form a social identity when a personal characteristic, such as older age, is salient. This social identity (e.g., older adult) is defined by the characteristics – such as behavior – that we socially perceive as normatively defining for the (group of) individuals who share this characteristic with us (i.e., older adults) in comparison to the (group of) individuals who do not (i.e., younger adults). The more we identify ourselves in terms of a social identity – i.e., the more we belong to the *group* of individuals who share the salient personal characteristic – the more the social identity (group) norms are perceived to be our own, and the more we would personally value behaving accordingly (and vice

versa). This suggests that we would be more autonomously motivated to behave in line with our social identity (e.g., to involve in exercise as an older adult), the more strongly we identify ourselves in terms of this social identity. This would lead to a maintained engagement in behavior (e.g. an involvement in exercise) that is normative for the social identity.

In confirmation, social identity norms have been found to influence our health behavior (for an overview, consult: Haslam, Jetten, Postmes, & Haslam, 2009). Therefore the use of the SIA approach in promoting health behavior has been advocated (Haslam et al., 2009; Jetten, Haslam, & Haslam, 2012). For example, presenting older adults with an exercise intervention that frames participation in exercise as being in line with the normative definition of one of their social identities has been found to be effective in promoting their engagement in physical activity (Van Hoecke, 2013). Nevertheless, the assumptions on the motivational processes that underlie this adaptation to social identity norms have rarely been studied.

Aims

The aims of this PhD project were (1) to extend the empirical evidence of the determining role of social support on older adults' motivation for exercise involvement by examining the effects of social group support – i.e., the support derived from one's social capital of belonging to groups – on exercise involvement among older adults, and (2) to elaborate the existent theory on the motivational processes that underlie this determining role of social (group) support. The PhD project consists of three studies (Figure 4), including a survey study (study 1), a social-psychological experimental study (study 2), and an exercise intervention study (study 3) (Figure 4). Each study was designed to evaluate the effect of (a specified form of) social group support on older adults' (motivation for) involvement in exercise. This resulted in five research papers. The papers form the empirical chapters of this PhD. In each chapter, the effect of a form of social group support was examined in evaluation of the integrated assumptions of theories that explain the determining role of social support in (the motivation for) physical exercise involvement, including the assumptions of SCT, SDT, and SIA. By doing so, this PhD aimed to provide a unique multi-method evaluation and a theory integrating perspective of the determining role of social support in older adults' (motivation for) physical exercise involvement.

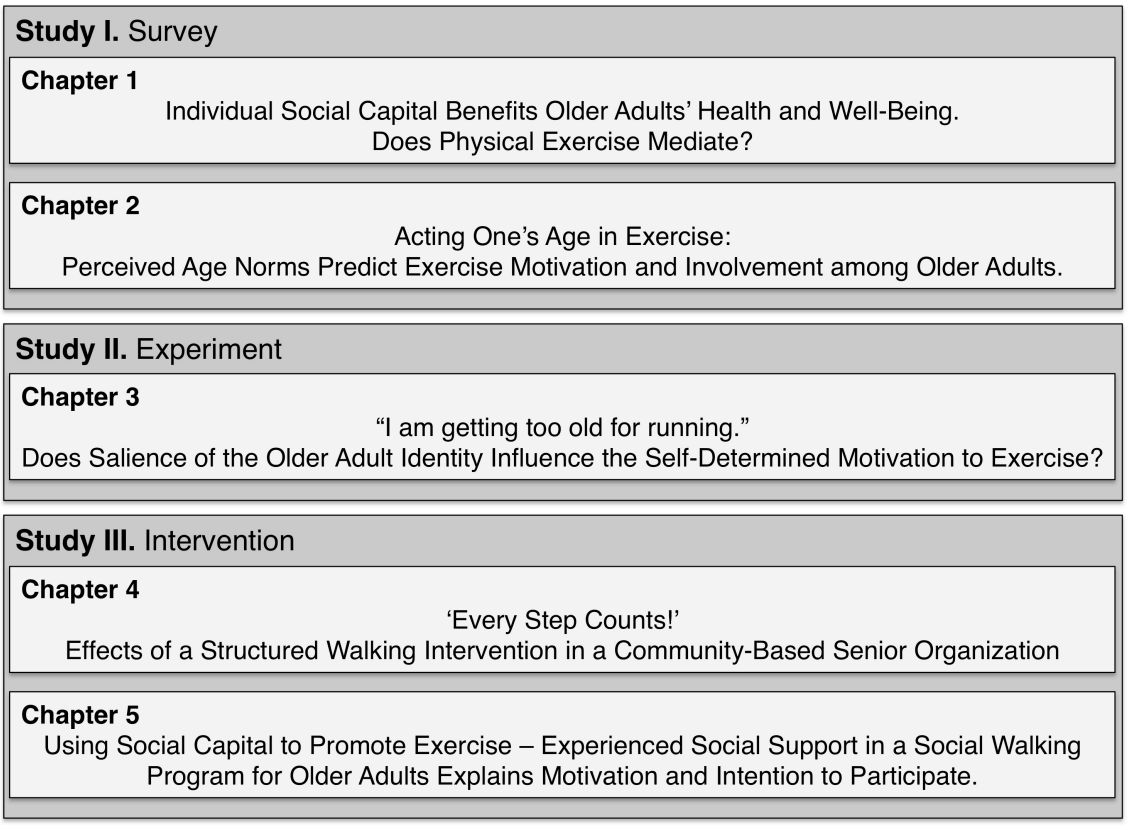

Figure 4. PhD Outline.

Survey

The first study of this PhD project consisted of a survey among a representative sample of the older adult population of the Flanders region in Belgium. Older adults were surveyed on their individual social capital of connectedness to (the *groups* of) society and the community, their exercise motivation and participation, and their physical health and well-being, in a baseline survey. Three years later they were surveyed on their experience of social support for exercise participation, their exercise motivation and participation, and their physical health and well-being, in a follow-up survey.

In **the first chapter** of this PhD it is evaluated whether the individual social capital of being connected to (the groups of) society and the community benefits the physical health and well-being of older adults, and whether this is in part the result of this social capital promoting their involvement in exercise. Although it is theorized that social capital benefits health and well-being in part by promoting health behavior, this mediation by health behavior has rarely been studied. Using the cross-sectional data of the baseline survey, it is evaluated whether, within the population of older adults, participation

in exercise mediates the association between the individual social capital of being connected to (the groups of) society and the community one the one hand, and physical health and well-being on the other hand. Furthermore, using the longitudinal data of the follow-up survey, it is determined whether exercise participation mediates the wholesome effect of this individual social capital on three-year future health and well-being.

The **second chapter** of this PhD addresses the effect of social age *group* normative support for involving in exercise at older adult age on the exercise motivation and participation of older adults. It is examined whether older adults' autonomous motivation to involve in exercise is explained by the perceptions they have of the norms for exercise involvement that are associated with (the) older adults (age group). These associations are examined in evaluation of a proposed integration of SIA in SDT. It is proposed that only when older adults identify themselves as an older adult (i.e., they feel to belong to the age group 'older adults'), the norms for exercise involvement that they perceive to be socially associated with the social identity (i.e., age group) 'older adults' determine their autonomous to involve in exercise, and resultantly, influence their exercise involvement. This is the first study to evaluate the assumptions of this theoretical integration of SIA in SDT – with regard to the effect of social older adult age (group) norms for exercise on the exercise motivation and participation of older adults.

Social-Psychological Experiment

The second study of this PhD project was a social-psychological experiment. This experiment was designed to study the effect of social age *group* normative support for exercise involvement for older adults on the autonomous motivation and the intention of older adults for involving in exercise. In the **third chapter** of this PhD, it is examined whether the autonomous motivation and the intention of older adults to involve in exercise are influenced by the situational salience of their social 'older adult' identity (i.e., their belongingness to the age group 'older adults') and the socially associated older adult identity (i.e., age group) norms for 'older adults' for exercise involvement, and by the valence of these salient older adult identity (i.e., age group) norms. These effects have not yet been studied from the perspective of SDT. This is the first study in social psychology to address these effects in evaluation of a proposed theoretical integration of the assumptions of SIA in SDT.

Intervention

The final study of this PhD project consists of an exercise intervention in the field. In this study, the value of using social organizations for older adults as an intervention setting for the promotion of physical activity among older adults is evaluated. Such social organizations for older adults represent valuable social capital to older adults. These organizations offer social activities to their members, and their members gather in the meeting points to engage in these activities together. To older adults who are member of such social organization – i.e., such a group for older adults – the organization and the other members of the organization within their meeting point are potential (social) sources of support for dealing with demands of their life, including with exercise involvement. The social organization can provide its members with (physical or psychological) resources that facilitate their effective exercise involvement, including exercise programs and gear (i.e., physical resources), exercise education, and positive social identity (i.e., social group) norms for their members (i.e., psychological resources). The members of such organization can provide each other with (physical and psychological) resources that facilitate exercise involvement, for example, sharing exercise gear, by providing transportation to the exercise activity (i.e., physical resources), and by providing exercise information and encouragement (i.e., psychological resources).

In the fourth and fifth chapter of this PhD, the effects of social support for exercise involvement that is available as a result of belonging to such a social organization for older adults on the exercise motivation and participation of older adults are studied. In **the fourth chapter** of this PhD, the value of social organizations for older adults providing its members with support for involvement in exercise is evaluated by examining the effectiveness of a social walking program (which was designed to facilitate older adults' experience of efficacy – i.e., achieving personally valued outcomes – in walking program involvement) offered by a community-based senior organization in promoting physical activity, fitness, health and well-being among older adults. In **the fifth chapter** of this PhD, it is evaluated whether the experience of social support provided by the program leader and fellow program participants – i.e., by fellow members of the social organization – during involvement in the social walking program, and of experienced connectedness to the social organization, strengthened the autonomous motivation of the participants to involve in the program, and – resultantly – lead to a stronger intention to participate in a similar exercise program of the organization in the future.

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Chapter 1

Individual Social Capital Benefits Older Adults' Health and Well-Being. Does Physical Exercise Mediate?

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Abstract

The aim of this study was to examine the assumption that older adults' individual social capital of being connected to society and the community benefits their physical health and well-being *in part* by promoting their exercise involvement. A survey was conducted among a population-representative sample (n = 1,298) of older adults (age ≥ 55), including a baseline (n = 949) and a three-year follow-up (n = 409) survey. The results indicate that specified aspects of this social capital benefited the present and, in a diminished extent, the three-year future physical health and well-being of older adults. Even though exercise involvement potently enhanced physical health and well-being, this wholesome effect of older adults' social capital did predominantly *not* emerge as the result of a promoted involvement in exercise. The experience of safety in society was the only (evaluated) aspect of this social capital that predicted their physical health and well-being at the present and three-year into the future in part by explaining their involvement in exercise. In conclusion, the social capital of being connected to society and the community, and exercise involvement, predominantly benefit older adults' physical health and well-being *independently*. The implications for the promotion of successful aging among older adults are discussed.

Key Words: Seniors, Social Support, Physical Activity, Successful Aging.

Introduction

The world population is aging rapidly. In the upcoming decades an increasing number of individuals will pass the age of sixty and will live a substantial part of their life as an older adult. The presence of older adults in the world population is projected to grow from 12% in 2013 to 21% in 2050 (United Nations, 2013). It is essential for their quality of life that these older adults remain free from disease and disability, retain an effective physical and cognitive functioning, and keep leading an active life, while growing older. Therefore, the promotion of this 'Successful Aging' (Rowe & Kahn, 1997) has become a priority in public (health) policy. The World Health Organization (2002) advocates and stimulates optimizing the opportunities for older adults to achieve this successful aging.

Social capital should be considered as one of the key factors in the successful aging of older adults. It refers to (the extent of) their own social connectedness (i.e., individual social capital; Lin, 2001) and to (the extent of) the social connectedness that exists within groups to which they belong, such as their family, community, or society (i.e., collective social capital; Kawachi & Berkman, 2000) (Esser, 2008; Kawachi, Subramanian, & Kim, 2010) (Figure 1). This (extent of) social connectedness is reflected by the number and quality (i.e., safety, trust, norms of reciprocity) of their relationships with other persons and with groups, such as their family, community, or society (i.e., individual social capital), and of the relationships existent between the members of these groups, such as between the members of their family/between the persons and/or the groups within their community/society (i.e., collective social capital).

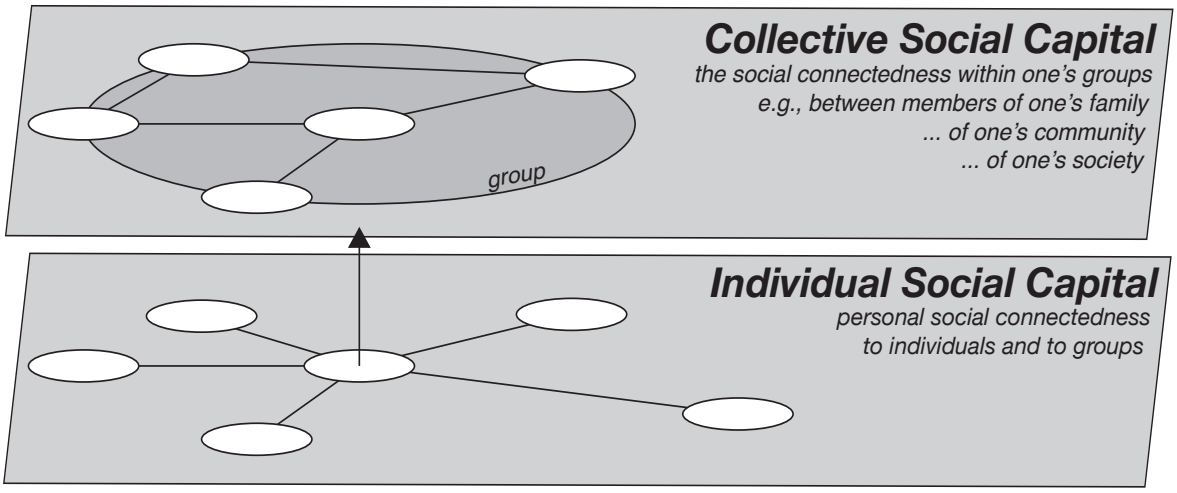

Figure 1. Social Capital – The Extent of Social Connectedness

Social connectedness instigates reciprocal social support and collaboration in dealing with the (shared) demands of life. Therein social capital reflects the availability of (reciprocal) social support to older adults for dealing with the demands of their life, either as the result of having (reciprocally) supportive and collaborative relationships with other people and/or with groups (i.e., individual social capital), or as the result of belonging to groups wherein group members support each other and collaborate to deal collectively with the (shared) demands of their life (i.e., collective social capital). This availability of social support essentially contributes to the successful aging of older adults.

Social Capital Promotes Health and Well-being

Social capital contributes to the successful aging of older adults by benefiting their health and well-being. It reduces their risks for morbidities and all-cause mortality (Berkman & Glass, 2000; Gilbert, Quinn, Goodman, Butler, & Wallace, 2013; Holt-Lunstad, Smith, & Layton, 2010; Kim, Subramanian, & Kawachi, 2010; Uchino, 2004), and it ameliorates their (self-reported) health (e.g., Nummela, Sulander, Karisto, & Uutela, 2009; Nyqvist & Nygård, 2013; Nyqvist, Nygård, & Steenbeek, 2014; Pollack & von dem Knesebeck, 2004; Sirven & Debrand, 2008, 2012). It enhances their physical (e.g., Avlund, Lund, Holstein, & Due, 2004; Mendes de Leon, Glass, & Berkman, 2003) and cognitive functioning (e.g., Holtzman et al., 2004; Seeman, Lusignolo, Albert, & Berkman, 2001; Zunzunegui, Alvarado, Del Ser, & Otero, 2003), and promotes their (mental) well-being (Glass, Mendes de Leon, Bassuk, & Berkman, 2006; Nyqvist, Forsman, Giuntoli, & Cattan, 2012).

Social capital benefits the health and well-being of older adults because social support enables them to deal more effectively with the demands of their life. Therein (the availability of) social support is proposed to have beneficial psychological, physiological, and behavioral effects on their health and well-being (Berkman, Glass, Brissette, & Seeman, 2000; Berkman & Glass, 2000; Uchino, 2004). *Psychologically*, social support is argued to bolster their self-perceived ability to cope with the demands of their life. This bolstered perception of having the ability to deal effectively with the demands of their life (i.e., self-efficacy) would benefit their well-being by boosting their self-confidence and their self-esteem. *Physiologically*, the social reinforcement of their (perceived) ability to deal effectively with the demands of their life would attenuate, and even eliminate, the stress that arises from (having to deal with) these demands of life. Therein social support prevents the harmful

physiological influences of this stress on their physical and mental health. These psychological and physiological effects are considered the direct effects of social support on health and well-being. *Behaviorally*, social support is presumed to benefit their health and well-being by promoting their involvement in health behavior. Adopting and maintaining a healthy lifestyle is one of the essential demands of life. The (availability of) social support for engagement in health behavior would motivate involvement. In promoting older adults' involvement in health behavior, social capital would benefit their health and well-being through the beneficial psychological and physiological outcomes of this socially supported health behavior. These outcomes of the health behavior are considered the indirect effects of social capital on their health and well-being: They arise from the socially supported health behavior.

Mediation by Health Behavior

Social capital has been reported to be positively associated with involvement in health behavior (Lindström, 2010; Umberson, Crosnoe, & Reczek, 2010). However, the assumption that social capital indirectly affects health and well-being by promoting involvement in health behavior has insufficiently been evaluated. Instead of a systematic evaluation of each of the assumptions of this proposed mediation by health behavior, this mediation has predominantly been studied by comparing the effects of social capital and health behavior on health and well-being. This comparison has indicated that the beneficial effect of social capital on health (and well-being) is equal to, and even surpasses, the effects of health behavior (e.g., Holt-Lunstad et al., 2010), and that the effect of social capital on health (and on well-being) is merely slightly attenuated when controlling for the effects of health behavior (Berkman et al., 2000). This suggests that only a limited part of the effect of social capital on health (and on well-being) is mediated by health behavior.

Few studies have been carried out with the aim to evaluate the proposed mediation by health behavior in the effect of social capital on health and well-being. We are aware of only three studies that have been carried out specifically with this aim. In the first study, Poortinga (2006) found (limited) evidence for the mediation by health behavior. His study revealed that social capital is positively associated with health behaviors (i.e., a healthy fruit and vegetable consumption; not smoking), and that, in turn, these health behaviors are positively related to self-rated health. Nevertheless, Poortinga

considered this finding to be (too) limited evidence for the theoretically assumed mediation by health behavior in the association of social capital with self-rated health: When controlling for the effects of these health behaviors on self-rated health, the effect of social capital on self-rated health only slightly diminished. Based on this finding, he concluded that health behaviors do not (i.e., for a non-meaningful part) mediate the effect of social capital on health. In the second study and the third study of this mediation by health behavior, Mohnen (2012) and Nieminen (2013) and their colleagues found that, of multiple health behaviors, only physical activity mediated a meaningful part of the effect of social capital on (self-rated) health. In conclusion, the mediating role of health behavior has not convincingly been confirmed, except for physical activity.

Social Capital Promotes Physical Activity

Physical activity is a health behavior that is essential for the successful aging of older adults. Regular physical activity reduces their risk for morbidities and for all-cause mortality, strengthens their physical and cognitive functioning, and enhances their physical and mental well-being (Chodzko-Zajko et al., 2009; Fiatarone Singh, 2002; Nelson et al., 2007). Regular engagement in physical exercise is one way to achieve this health- and well-being-enhancing physical activity. As a consequence, social capital potentially benefits older adults' health and well-being by promoting their regular involvement in physical exercise.

In confirmation, there is evidence that social capital promotes regular involvement in physical activity and physical exercise (Legh-Jones & Moore, 2012; Lindström, Hanson, & Ostergren, 2001) among older adults (Fisher, Li, Michael, & Cleveland, 2004; Reed, Crespo, Harvey, & Andersen, 2011). Furthermore, it has been consistently found that their experience of social support for physical activity and physical exercise engagement promotes their actual involvement (Ayotte, Margrett, & Hicks-Patrick, 2010; McAuley, Jerome, Elavsky, Marquez, & Ramsey, 2003; Orsega-Smith, Payne, Mowen, Ho, & Godbey, 2007; Resnick, Orwig, Magaziner, & Wynne, 2002). Therefore social capital is considered to be a determining factor in (older adults') participation in physical activity and physical exercise (McNeill, Kreuter, & Subramanian, 2006). It underscores that social capital potentially benefits the health and well-being of older adults by promoting their physical activity and physical exercise involvement.

Does Physical Exercise Mediate?

To our knowledge, the mediating role of involvement in physical exercise has not yet been studied as a (partial) explanation of the effect of social capital on health and well-being among older adults. With the present study we aimed to determine if older adults' individual social capital, and more specifically their social connectedness to their community and their society, enhances their health and physical well-being by promoting their physical exercise involvement. Unique in this study is the fact that we evaluated this mediation not only with a cross-sectional study design, but also with a longitudinal study design.

We hypothesized that in a cross-section of the older adult population, individual social capital would be positively related to (self-rated) health and physical well-being, and that this positive relationship would be mediated, at least partly, by involvement in physical exercise. More specifically, we expected that older adults' individual social capital would be related to their involvement in physical exercise: The more individual social capital older adults (report to) have (i.e., the more they are/experience to be connected to their community and society), the more they would (report to) involve in physical exercise. We further hypothesized that their involvement in physical exercise in turn would be associated with their self-rated health and physical well-being: Older adults would (report to) be in a better health and to feel better physically, the more they would (report to) involve in physical exercise. In correspondence with the theoretically assumed mediation by health behavior, we expected that these physical exercise-indirect associations of their individual social capital with their self-rated health and physical well-being, would, at least partially, account for the positive association of their individual social capital with their self-rated health and physical well-being (Hypothesis 1).

From a longitudinal perspective, we evaluated if this individual social capital of older adults predicted their future self-rated health and physical well-being, and whether this effect would be, at least partially, mediated by their involvement in physical exercise in this future. Specifically, we expected that older adults' individual social capital would predict their future involvement in physical exercise: The more individual social capital older adults (reported to) have (i.e., the more they are/experience to be connected to their community and society), the more they would (report to) involve in physical exercise in the future. We further expected that this physical exercise involvement in turn would be related to their self-rated health and physical well-being in that future: Older adults

would (report to) be in a better health and to feel better physically, the more they (report to) involve in physical exercise. Considering the theoretically assumed mediation by health behavior, we expected that these physical exercise-indirect associations of their individual social capital with their (future) self-rated health and physical well-being would, at least partially, account for the positive effect of older adults' individual social capital on their future self-rated health and physical well-being (Hypothesis 2).

Method

Design

We conducted a survey study among older adults (55 years old or older) in Flanders, i.e., the Dutch-speaking region of Belgium (Scheerder et al., 2011). This study was organized in collaboration with OKRA. OKRA is a region-wide social organization for older adults (age 55 years old or older). With more than 211,000 card-carrying members, it represents 12% of the older adult population in Flanders. We contacted a random sample of OKRA members – selected to be representative for the Flemish older adult population in age, gender, and region of residence – to survey them on their individual social capital (i.e., their (experienced) social connectedness to their community and society), on their physical exercise involvement, and on their health and physical well-being.

In a baseline survey (Time 1), the survey respondents reported their individual social connectedness to their community and society by indicating: their experience of (1) safety in society, their involvement in (2) social activity and (3) volunteer activity, their experience of connectedness to (4) their community, (5) OKRA and (6) age peers, and their experience of (7) ageism in society (ageism – i.e., being negatively treated based on one's (older) age – is a negative indicator of social capital). They also indicated their physical exercise involvement, their health, and their physical well-being. We expected that their (reported) individual social capital would be positively related to their self-rated health and physical well-being, and that this positive association would be, at least partially, mediated by their (reported) involvement in physical exercise (Hypothesis 1).

Three years later, we asked the participants of this baseline survey to participate in a follow-up survey (Time 2). We questioned the respondents on their involvement in physical exercise, their health, and their physical well-being. We expected that their individual social capital (at Time 1) would

predict their three-year future self-rated health and physical well-being (at Time 2): The more individual social capital older adults would (report to) have (i.e., the more they are/experience to be connected to their community and society), the better their self-rated health and physical well-being would be three years later. We further expected that this positive association would, at least partially, be mediated by their (reported) physical exercise involvement in this future (at Time 2) (Hypothesis 2).

Participants

We aimed to select a participant sample that was representative of the Flemish older adult population in age, gender and region of residence, among the registered members of OKRA. In order to achieve this, we stratified the Flemish older adult population according to age (55-59; 60-64; 65-69; 70-74; 75-79; >80), gender, and region of residence (14 regions). This stratification resulted in 168 profiles. Each profile represented a unique combination of age, gender and region of residence. Respecting the representation of each of the stratification profiles within the Flemish older adult population, we randomly selected a sample of 1,298 OKRA members for study participation. We further selected two profile-stratified back-up samples of 1,298 registered OKRA-members. When a selected participant refused to participate in the study, we contacted the profile-equivalent replacement participant from the first or – if required – the second back-up sample, for study participation.

A total of 959 selected respondents (73.9%) participated in the survey (Table 1). This participant sample was representative for the Flemish older adult population in gender ($\chi^2(1) = 0.27$, $p = .60$), but not in age ($\chi^2(5) = 22.65$, $p < .001$). The older adults between the ages of 55 and 59 years old were underrepresented (*standardized residual* = -3.59) in the participant sample, while older adults between the ages of 65 and 69 years old (*standardized residual* = 2.07) and over 80 years old (*standardized residual* = 2.06) were (slightly) overrepresented.

The reasons for non-participation among the non-responders in the initial sample of selected participants (n = 531; 40.9%) included: lack of interest (29.2%); unreachable on registered postal address/telephone number (12.2%); health problems (4.3%), communication problems (e.g., hearing/speaking disability, insufficient knowledge of the survey language) (4.9%), or private problems (1.7%). Almost half of the selected participants who refused to participate did not (want to) provide a reason for non-participation (45.2%). Less than three percent were reported to have deceased (2.5%).

Three years later we invited the 959 older adults who responded to the baseline survey to participate in the follow-up survey study. In total 445 (46.4%) of these invited participants responded to the follow-up survey (Time 2). Thirty-six of these respondents to the follow-up survey were excluded from the participant sample because they had insufficiently completed major parts of the survey. The 409 remaining respondents to the survey (42.7%) formed the participant sample for the follow-up survey study (Table 1).

This participant sample was not representative for the Flemish older adult population, neither in gender ($\chi^2(1) = 7.69$, $p < .01$) or age ($\chi^2(5) = 59.53$, $p < .001$). Men were slightly overrepresented (*standardized residual* = 2.02). Due to their higher non-participation rate, older adults over the age of 75 were underrepresented (75-79: *standardized residual* = -4.07; >80: *standardized residual* = -4.27). Consequently, older adults between the ages of sixty and seventy years old were overrepresented (60-64: *standardized residual* = 3.07; 65-69: *standardized residual* = 3.91) in the participant sample.

The reasons for non-participation (n = 514; 53.6%) included: lack of interest (29.8%); unreachable on registered postal address/telephone number (7.0%); health problems (10.1%); private problems (2.5%). Over 46% of the non-participants did not provide a reason for non-participation (46.5%). Four percent (4.1%) were reported to have deceased.

Table 1. Participants: Selected Sample and Survey Participation.

	Participants					
	Selected Sample		Baseline Survey		Follow-up Survey	
Total	*n*	%	*n*	%	*n*	%
50-59	295	22.7	165	17.2	92	22.5
60-64	265	20.4	201	21.0	111	27.1
65-69	214	16.5	184	19.2	99	24.2
70-74	214	16.5	168	17.5	67	16.4
75-79	183	14.1	127	13.2	27	6.6
≥80	127	9.8	114	11.9	13	3.2
Total	1298	100	959	100	409	100

Procedure

In the baseline survey study (at Time 1) we used the peer-to-peer survey method. This is considered an effective method to administer surveys among difficult-to-reach, socially vulnerable populations (Benoit, Jansson, Millar, & Phillips, 2005; Elliott, Watson, & Harries, 2002). The similarity of the survey interviewer installs a feeling of safety and trust in survey participation among respondents. Moreover, it facilitates a mutual understanding between the interviewer and respondent, which is argued to promote participation and unbiased response to the survey.

Volunteering OKRA members were trained to administer the survey. They were peers of the selected participants in being an older adult OKRA member within the same region of residence. In total 186 peer interviewers administered surveys for this study.

We invited the selected respondents to participate in the study in a post-mailed letter. Three weeks later, the peer interviewers contacted the respondents that were assigned to them to make an appointment for assessment of the survey at the home of the respondent. At this appointment, the peer interviewer administered the survey questionnaire from the respondent in a guided interview.

Three years later we invited all participants of the baseline survey to participate in the follow-up survey study (Time 2) in a post-mailed letter. We asked them to complete a survey questionnaire on the Internet or on a paper copy. In case of refusal or inability to participate in the study, we asked them to complete a non-participation form. Either the questionnaire or the non-participation form needed to be returned within 45 days. Halfway this time period, we contacted the non-responders by phone once to remind them about the study. When they refused to participate, we recorded their reason for non-participation.

Measures

Individual Social Capital. In the baseline survey (Time 1), we asked the participants to complete measures on seven indicators of their (experienced) social connectedness to their community and society: (1) experienced safety in society; involvement in (2) social activity and (3) volunteer activity; experienced connectedness to (4) their community, (5) OKRA, and (6) age peers; and (7) experienced ageism. The mean scores for these measures are presented in Table 2.

Safety. The participants reported their experience of safety in society by rating their agreement with eight statements (e.g., “Nowadays it is unsafe to go out in the evening”). For each of the statements, they indicated their agreement on a five-point Likert-scale that ranged from (1) ‘do not agree at all’ to (5) ‘agree completely’. In order to facilitate the interpretation of the results, the scores were inversed: A higher score reflects a higher level of experienced safety in society. Exploratory factor analysis indicated that the items formed one measure that accounted for 47% of the variance. This measure had high internal reliability (Cronbach’s α = .84).

Social Engagement. The participants were asked to indicate their active involvement (yes/no) in social activity in twenty domains (i.e., politics; vocation; religion; culture; social; leisure; restaurant/bar/club; fandom; gender; family; youth; older adult; community; councils; support/care; rescue/medical aid; self-help; NGO/charity; ecology; and ‘other’) of society. The number of domains in which they actively involved in social activity indicated the extent of their social engagement. The segment of the survey participants who actively involved in social activity in at least one of these domains was 81% among baseline survey participants, and 86% among follow-up survey participants.

Volunteer Engagement. In order to measure the extent of older adults’ engagement in volunteer activity, the participants were asked to indicate their active involvement (yes/no) in volunteer activity in 16 domains (politics; vocation; religion; culture; leisure; youth; student; school; gender; community; support/care; rescue/medical; support/consultancy; NGO/charity; ecology; and ‘other’) of society. The number of domains in which they actively involved in volunteer activity indicated the extent of their volunteer engagement. The segment of survey participants who actively volunteered in at least one domain was 37% among baseline survey participants, and 49% among follow-up survey participants.

Community Connectedness. We asked the participants to indicate the degree in which they experienced to be (socially) connected to their community: “To what degree do you feel connected to (what happens in) your community?” We asked them to respond on a five-point Likert-scale that ranged from (1) ‘not connected’ to (5) ‘very connected’.

OKRA Connectedness. We asked the participants to report their experience of (social) connectedness to OKRA by marking their agreement with three statements (“I feel strongly connected to other OKRA members”; “I feel at home at OKRA”; “Being an OKRA member is important in my life”)

on a five-point Likert-scale that ranged from (1) 'do not agree at all' to (5) 'agree completely'. Exploratory factor analysis indicated that these three items formed one measure of (social) connectedness to OKRA that accounted for 88% of the variance. This measure had high internal reliability (Cronbach's α = .93).

Age Peer Connectedness. The participants' experience of their (social) connectedness to age peers was measured by asking participants to report their agreement with the statement "I feel strongly connected the people of my age" on five-point Likert-scale that ranged from (1) 'do not agree at all' to (5) 'agree completely'.

Ageism. The participants reported their experience of ageism in society by marking the degree they agreed with the statement "In general people have a negative view on people of my age" on a five-point Likert-scale that ranged from (1) 'do not agree at all' to (5) 'agree completely'.

Table 2. Means and Standard Deviations

	Participant Sample			
	Baseline Survey		Follow-up Survey	
	M	SD	M	SD
Individual Social Capital				
Safety	2.60	.85	2.74	.84
Social engagement	2.23	1.90	2.58	2.00
Volunteer engagement	.92	1.57	1.27	1.82
Community connectedness	3.59	1.15	3.65	1.10
OKRA connectedness	3.89	1.14	3.79	1.16
Age Peer connectedness	4.12	1.04	4.10	1.01
Ageism	2.56	1.20	2.38	1.18
Physical Exercise				
Time 1	8.64	12.48	11.80	13.40
Time 2			10.11	12.27
Self-Rated Health				
Time 1	3.74	.79	3.86	.70
Time 2			4.25	.66
Physical Well-Being				
Time 1	4.16	.77	4.23	.67
Time 2			5.03	1.14

Physical Exercise. In both the baseline survey and the follow-up survey, participants indicated their involvement in physical exercise on an adapted version of the Godin Leisure-Time Exercise Questionnaire (GLTEQ; Godin & Shephard, 1997). They reported the number of times they had engaged in low-, moderate- and high-intensity physical exercise for at least twenty continuous minutes, in a normal week (i.e., undisturbed by exceptional events) of the last month (i.e., 4 weeks). The GLTEQ assigns a mean metabolic expenditure value (MET-value) to each intensity level. Using the MET-values, the GLTEQ total score was calculated: GLTEQ-total score = (low-intensity * 3 MET) + (moderate-intensity * 5 MET) + (high-intensity * 9 MET). The segment of survey participants who actively involved in physical exercise at Time 1 was 55% among the baseline survey participants, and 72% among the follow-up survey participants. At Time 2, 67% of the follow-up survey participants were involved in physical exercise. The mean scores are presented in Table 2.

Self-Rated Health. In the baseline survey, participants rated their health on a five-point Likert-scale that ranged from (1) 'very bad' to (5) 'very good'. In the follow-up survey, participants indicated their health by marking the degree they felt hindered by their health to engage in four types of activity: moderate-intensity physical activity; high-intensity physical activity; functional/self-care activity; social activity. For each type of activity, they indicated their experienced level of hindrance on a five-point Likert-scale ranging from (1) 'very much hindered' to (5) 'not at all hindered'. Exploratory factor analysis showed that the four items formed one measure of self-rated health that accounted for 68% of the variance. This measure had good internal reliability (Cronbach's α = .82). The mean score is presented in Table 2.

Physical Well-being. In both the baseline and follow-up survey, the participants rated their physical well-being by responding to four statements (e.g., 'I feel well in my body') of the Marcoen scale of (physical) well-being in older adults (Marcoen, Van Cotthem, Billiet, & Beyers, 2002). For each statement, they indicated how often they felt in accordance with the statement on a Likert-scale that ranged from (1) 'never' to (5) 'always' in the baseline survey (Time 1), and from (1) 'never' to (7) 'always' in the follow-up survey (Time 2). These items formed an internally reliable measure of physical well-being in the baseline (Cronbach's α = .85) and the follow-up (Cronbach's α = .92) survey. The mean score is presented in Table 2.

Analyses

We evaluated the hypothesized mediation by physical exercise in the association of individual social capital with self-rated health and physical well-being by means of Preacher and Hayes' (2004, 2008) method for the analysis of mediation. In contrary to the commonly used method of Baron and Kenny (1986), this method enables detecting a physical exercise-indirect effect when individual social capital does not have a direct effect on self-rated health and well-being, but merely has an indirect effect on self-rated health and physical well-being in influencing physical exercise involvement (Hayes, 2009). We used model four of Hayes' (2013) Process syntax in order to perform these analyses. The indicators of individual social capital and participant demographics (age and gender) were used as factors. Physical exercise was entered as the mediator. Self-rated health and physical well-being served as the outcome variables. Using 5,000 bootstrap samples, we performed the analyses with the unstandardized (B) and standardized measures (B(*z*)). Missing data were imputed with the Expectation-Maximization Algorithm. All analyses were performed with IBM-SPSS 19.0.

Interpretation of Results

Prior to presenting and discussing the results, it is important to note that the study design (i.e., cross-sectional and longitudinal survey) enables to identify the relationships that exist between the measured constructs (e.g., construct A is positively associated with construct B), but does not prove the causality that is theorized to exist in these relationships (e.g., construct A determines construct B). However, for the purpose of clarity, the results are discussed in terms of effects. This causality in the observed relationships is inferred from the theory that is under evaluation in the study.

Results

Cross-Sectional

Physical Exercise. Safety and social engagement were the indicators of individual social capital that explained involvement in physical exercise at Time 1 (Table 3). They were both positively associated with involvement in physical exercise at Time 1. Age and gender further described

Table 3. Associations of Individual Social Capital and Demographics with Physical Exercise

	Physical Exercise									
	Time 1					Time 2				
	B	B*(z)*	*t*	*F*(9,949)	R^2	B	B*(z)*	*t*	*F*(9,399)	R^2
Individual Social Capital				8.45***	.07				4.08***	.08
Safety	1.34	.09	2.48*			2.64	.18	3.63***		
Social engagement	.64	.10	2.55*			.23	.04	.70		
Volunteer engagement	.23	.03	.67			-.12	-.02	-.34		
Community connectedness	.08	.01	.21			-.59	-.05	-.95		
OKRA connectedness	.27	.03	.60			-.25	-.02	-.36		
Age Peer connectedness	.19	.02	.39			.92	.08	1.29		
Ageism	.39	.04	1.08			.92	.09	1.75		
Demographics										
Age	-.22	-.14	-4.36***			-.26	-.14	-2.93**		
Gender	2.72	.22	3.31**			2.43	.20	2.03*		

* p < .05; ** p < .01; *** p < .001

involvement in exercise at Time 1: Having a younger age and being male were positively associated with involvement in physical exercise (Table 3). Altogether, the indicators of individual social capital and the demographics explained 7% of involvement in physical exercise at Time 1 (Table 3).

Self-Rated Health. Four of the (selected) indicators of individual social capital (i.e., safety; volunteer engagement; community connectedness; age peer connectedness) explained self-rated health at Time 1 (Table 4 – Total). Each of these indicators was directly related to self-rated health (Table 4 – Direct). The respondents reported to have better health, the more they reported to feel safe in society, to involve in volunteer activity, and to feel connected to their community and to their age peers. The hypothesized mediation by physical exercise (Hypothesis 1) was only confirmed for safety. Involvement in physical exercise at Time 1 explained self-rated health at Time 1: The respondents reported to have a better health, the more they reported to engage in physical exercise (B = .01, B(z) = .21, t = 6.07, $p < .001$). Partly by explaining this physical exercise involvement, safety described self-rated health (Table 4 – Physical Exercise-Indirect). This physical exercise-indirect association accounted for 14% of safety's relationship of with self-rated health. Social engagement was also positively related to self-rated health at Time 1 in explaining physical exercise involvement at Time 1 (Table 4 – Physical Exercise-Indirect), but the strength of this indirect association was insufficient for social engagement to explain a significant part of self-rated health (Table 4 – Total). Age and gender were associated with self-rated health in explaining physical exercise involvement at Time 1 (Table 4 – Physical Exercise-Indirect), but did not explain a meaningful part of self-rated health (Table 4 – Total) because this physical-indirect association explained a (too) marginal part of self-rated health.

The identified associations of the (selected) indicators of individual social capital, of the (selected) demographical characteristics, and of physical exercise involvement, with self-rated health, were small. Physical exercise involvement explained self-rated health the most. Altogether, the indicators of individual social capital, the demographical characteristics, and physical exercise involvement, explained 12% of self-rated health (F(10,948) = 11.45, $p < .001$).

Table 4. Associations of Individual Social Capital and Demographics with Self-Rated Health and Physical Well-being at Time 1.

	Direct			Physical Exercise-Indirect				Total				
Self-Rated Health	B	B*(z)*	*t*	B	B CI 95	B*(z)*	B*(z)* CI 95	B	B*(z)*	*t*	*F(9,949)*	R^2
Individual Social Capital											8.44***	.08
Safety	.11	.11	3.36**	.02	[.00, .04]*	.02	[.00, .04]*	.12	.13	3.85***		
Social engagement	-.02	-.04	-1.23	.01	[.00, .02]*	.02	[.01, .04]*	-.01	-.02	-.67		
Volunteer engagement	.05	.09	2.70**	.00	[-.01, .01]	.01	[-.01, .03]	.05	.10	2.76**		
Community connectedness	.05	.07	2.01*	.00	[-.01, .01]	.00	[-.01, .02]	.05	.07	2.05*		
OKRA connectedness	-.03	-.04	-1.11	.00	[-.01, .02]	.01	[-.01, .02]	-.03	-.04	-.95		
Age Peers connectedness	.12	.16	4.34***	.00	[-.01, .01]	.00	[-.02, .02]	.13	.17	4.26***		
Ageism	-.01	-.01	-.22	.01	[-.00, .02]	.01	[-.01, .02]	.00	.00	.01		
Demographics												
Age	.00	-.04	-1.10	-.00	[-.01, -.00]*	-.03	[-.05, -.01]*	-.01	-.07	-1.95°		
Gender	.02	.02	.33	.04	[.02, .06]*	.05	[.02, .08]*	.05	.07	1.00		
Physical Well-being	B	B*(z)*	*t*	B	B CI 95	B*(z)*	B*(z)* CI 95	B	B*(z)*	*t*	*F(9,949)*	R^2
Individual Social Capital											7.88***	.09
Safety	.05	.05	1.51	.02	[.00, .03]*	.02	[.00, .04]*	.06	.07	2.01*		
Social engagement	-.00	-.01	-.18	.01	[.00, .02]*	.02	[.01, .04]*	.01	.01	.40		
Volunteer engagement	.02	.05	1.53	.00	[-.01, .01]	.01	[-.01, .03]	.03	.05	1.63		
Community connectedness	.05	.07	1.94°	.00	[-.01, .01]	.00	[-.01, .02]	.05	.07	1.98*		
OKRA connectedness	-.02	-.03	-.87	.00	[-.01, .02]	.01	[-.01, .02]	-.02	-.03	-.74		
Age Peers connectedness	.15	.21	4.66***	.00	[-.01, .01]	.00	[-.01, .02]	.15	.21	4.61***		
Ageism	-.05	-.08	-2.33*	.01	[-.01, .02]	.01	[-.01, .02]	-.05	-.07	-2.07*		
Demographics												
Age	.01	.09	2.62**	-.00	[-.00, -.00]*	-.03	[-.05, -.02]*	.01	.06	1.80		
Gender	.13	.18	2.74**	.03	[.01, .06]*	.05	[.02, .08]*	.17	.22	3.41**		

° p = .05; * p < .05; ** p < .01; *** p < .001

Physical Well-being. Four of the selected indicators of individual social capital (i.e., safety; community connectedness; age peer connectedness; ageism) explained physical well-being at Time 1 (Table 4 – Total Effect). Almost each of these indicators described physical well-being directly (Table 4 – Direct Effect). The respondents reported a better physical well-being, the more they reported to feel connected to their community and to their age peers, and the less they reported to experience ageism in society. Only safety did not explain physical well-being directly (Table 4 – Direct Effect).

In correspondence with the hypothesis of mediation by physical exercise involvement (Hypothesis 1), safety explained physical well-being indirectly by explaining involvement in physical exercise. Physical exercise involvement at Time 1 explained physical well-being at Time 1: The respondents reported to have better physical well-being, the more they reported involvement in physical exercise (B = .01, B(z) = .21, t = 7.14, $p < .001$). Safety explained physical well-being in describing this involvement in physical exercise (Table 4 – Physical Exercise-Indirect). This physical exercise-indirect association accounted for 27% of safety's relationship with physical well-being, and it essentially contributed to safety's description of physical well-being: Safety only described physical well-being through the sum of its direct association (Table 4 – Direct) and physical exercise-indirect association (Table 4 – Physical Exercise-indirect) with physical well-being. Also social engagement was positively related to physical well-being at Time 1 in explaining physical exercise involvement at Time 1 (Table 4 – Physical Exercise-Indirect), but the strength of this association was insufficient for social engagement to describe a meaningful part of physical well-being at Time 1 (Table 4 – Total).

Having an older age was directly associated with reporting more physical well-being at Time 1 (Table 4 – Direct). This positive association was attenuated as a result of a negative physical exercise-indirect association with physical well-being: Age was negatively related to physical well-being at Time 1 in being associated with reduced physical exercise involvement at Time 1 (Table 4 – Physical Exercise-Indirect). In overall, age did not explain well-being at Time 1 (Table 4 – Total) as a consequence of these conflicting direct and physical exercise-indirect associations. Gender did describe physical well-being at Time 1 (Table 4 – Total). Being male was associated with more reported physical well-being, both directly (Table 4 – Direct) and in being positively associated with

involvement in physical exercise (Table 4 – Physical Exercise-Indirect). The physical exercise-indirect association accounted for 20% of gender's association of with physical well-being.

The identified associations of the (selected) individual social capital indicators, of the (selected) demographical characteristics, and of physical exercise involvement, with physical well-being, were small. Age peer connectedness and physical exercise involvement had the strongest associations with physical well-being. Altogether, the indicators of individual social capital, the demographical characteristics, and physical exercise involvement, explained 13% of physical well-being ($F(10,948) = 12.10$, $p < .001$) at Time 1.

Longitudinal

Physical Exercise. Safety was the only (selected) indicator of individual social capital at Time 1 that predicted physical exercise involvement at Time 2: The respondents reported to involve in physical exercise more (at Time 2), the more they felt safe in society (at Time 1) (Table 3). Age and gender further predicted physical exercise involvement at Time 2: Again, having a younger age and being male were positively associated with involvement in physical exercise (Table 3). The indicators of individual social capital and the demographics explained 8% of involvement in physical exercise at Time 2.

Self-Rated Health. Two of the (selected) indicators of individual social capital (i.e., safety and age peer connectedness) at Time 1 predicted self-rated health at Time 2 (Table 5 – Total). These indicators were directly associated with self-rated health at Time 2 (Table 5 – Direct). The respondents reported to be in better health, the more they felt safe in society and felt connected to age peers.

The expected mediation by physical exercise involvement at Time 2 in the association of the (selected) indicators of individual social capital (Time 1) with self-rated health at Time 2 (Hypothesis 2) was only confirmed for safety. Involvement in physical exercise at Time 2 explained self-rated health at Time 2: The respondents reported to be in a better health, the more they reported to involve in physical exercise (B = .01, B(z) = .20, $t = 4.56$, $p < .001$). As a consequence, safety partly described self-rated health at Time 2 by predicting involvement in physical exercise at Time 2 (Table 5 – Physical Exercise-Indirect). This physical exercise-mediated association explained 25% of safety's association with self-rated health at Time 2.

Table 5. Associations of Individual Social Capital and Demographics with Self-Rated Health and Physical Well-being at Time 2.

	Direct			Physical Exercise-Indirect				Total				
Self-Rated Health	B	B*(z)*	*t*	B	B CI 95	B*(z)*	B*(z)* CI 95	B	B*(z)*	*t*	*F(9,399)*	R^2
Individual Social Capital											2.42*	.08
Safety	.09	.11	2.02*	.03	[.02, .05]*	.04	[.02, .07]*	.11	.15	2.65**		
Social engagement	-.01	-.02	-.25	.00	[-.00, .01]	.01	[-.01, .03]	-.00	-.01	-.12		
Volunteer engagement	.02	.05	.94	-.00	[-.01, .01]	-.00	[-.03, .02]	.02	.05	.87		
Community connectedness	.04	.07	1.30	-.01	[-.02, .01]	-.01	[-.04, .01]	.04	.06	1.08		
OKRA connectedness	-.04	-.07	-1.14	-.00	[-.02, .01]	-.01	[-.04, .02]	-.04	-.07	-1.19		
Age Peers connectedness	.12	.18	2.37*	.01	[-.01, .03]	.02	[-.01, .04]	.13	.20	2.50*		
Ageism	-.03	-.06	-1.21	.01	[.00, .03]*	.02	[-.00, .05]	-.02	-.04	-.82		
Demographics												
Age	-.01	-.09	-1.53	-.00	[-.01, -.00]*	-.03	[-.05, -.01]*	-.01	-.12	-1.98*		
Gender	-.02	-.03	-.30	.03	[.00, .06]*	.04	[.00, .09]*	.01	.01	.12		
Physical Well-being	B	B*(z)*	*t*	B	B CI 95	B*(z)*	B*(z)* CI 95	B	B*(z)*	*t*	*F(9,399)*	R^2
Individual Social Capital											3.00**	.08
Safety	.04	.03	.50	.05	[.02, .10]*	.04	[.02, .07]*	.09	.06	1.20		
Social engagement	-.07	-.11	-1.83	.01	[-.01, .02]	.01	[-.01, .04]	-.06	-.11	-1.67		
Volunteer engagement	.05	.08	1.17	-.00	[-.02, .01]	-.00	[-.03, .02]	.05	.07	1.11		
Community connectedness	-.01	-.01	-.18	-.01	[-.04, .01]	-.01	[-.04, .01]	-.02	-.02	-.38		
OKRA connectedness	-.01	-.01	-.14	-.01	[-.04, .02]	-.01	[-.04, .02]	-.01	-.01	-.21		
Age Peers connectedness	.24	.22	3.47**	.02	[-.01, .05]	.02	[-.01, .05]	.26	.23	3.67***		
Ageism	-.07	-.07	-1.37	.02	[.00, .05]*	.02	[.00, .05]*	-.05	-.05	-.99		
Demographics												
Age	.01	.07	1.44	-.01	[-.01, -.00]*	-.03	[-.06, -.01]*	.01	.04	.88		
Gender	.10	.09	.84	.05	[.01, .11]*	.04	[.01, .10]*	.15	.13	1.23		

* p < .05; ** p < .01; *** p < .001

Age explained self-rated health at Time 2: Older age was associated with lower self-rated health (Table 5 – Total). This association of age with self-rated health was mediated by physical exercise involvement at Time 2. Age partly explained self-rated health by explaining physical exercise involvement at Time 2 (Table 5 – Physical Exercise-Indirect). This physical exercise-indirect association explained 25% of the association of age with self-rated health at Time 2. Even though gender was indirectly associated with self-rated health at Time 2 in its association with involvement in physical exercise at Time 2 (Table 5 – Physical Exercise Indirect), this physical exercise-indirect association was insufficiently strong for gender to explain self-rated health at Time 2 (Table 5 – Total). The identified associations of the (selected) individual social capital indicators (Time 1), of the (selected) demographical characteristics, and of involvement in physical exercise (Time 2), with self-rated health (Time 2), were small. Age peer connectedness and physical exercise involvement (Time 2) had the strongest associations with self-rated health (Time 2). The indicators of individual social capital (Time 1), the demographical characteristics, and physical exercise involvement (Time 2), altogether, explained 12% of self-rated health at Time 2 ($F(10,398) = 4.22$, $p < .001$)

Physical Well-being. Age peer connectedness was the only indicator of individual social capital that predicted physical well-being at Time 2: The respondents reported to be in a better physical well-being, the more they felt connected to their age peers (Table 5 – Total). Nor age, nor gender, explained physical well-being at Time 2 (Table 5 – Total).

Safety and ageism were the (selected) indicators of individual social capital that were indirectly associated with physical well-being at Time 2 in predicting involvement in physical exercise at Time 2 (Table 5 – Physical Exercise-Indirect). Involvement in physical exercise at Time 2 explained physical well-being at Time 2: The respondents reported to be in a better physical well-being, the more they reported to involve in physical exercise (B = .02, B(z) = .21, $t = 4.02$, $p < .001$). Safety predicted this physical exercise involvement at Time 2, and there was a trend towards significance for a predicting role of ageism in involvement physical exercise at Time 2 ($p = .08$). Both safety and ageism were positively related to physical well-being at Time 2 in predicting physical exercise involvement at Time 2. Nevertheless, these associations were too limited in strength for safety and ageism to predict physical well-being at Time 2 (Table 5 – Total). Age and gender were indirectly related to physical well-being at Time 2 in explaining physical exercise involvement at Time 2 (Table 5 – Physical

Exercise-Indirect), but these associations were insufficient in strength to describe physical well-being at Time 1 (Table 5 – Total).

The identified associations of the (selected) individual social capital indicators (Time 1), of the (selected) demographical characteristics, and of involvement in physical exercise at Time 2, with physical well-being at Time 2, were small. Age peer connectedness had the strongest association with physical well-being at Time 2. The indicators of individual social capital (Time 1), the demographical characteristics, and physical exercise involvement (Time 2), altogether explained 12% of physical well-being at Time 2 ($F(10,398) = 4.25$, $p < .001$.

Discussion

Health behavior is theorized to have a mediating role in the beneficial effect of social capital on health and well-being: Social capital would benefit health and well-being, at least partially, by promoting health behavior (Berkman et al., 2000). In evaluation of this proposed mediating role of health behavior in the beneficial effect of social capital on health and well-being, we evaluated the hypothesis that individual social capital is positively associated with self-rated health and physical well-being, at least partially, through a positive association with physical exercise involvement, in (a cross-section of) the older adult population of Flanders, Belgium (Hypothesis 1). Furthermore, adopting a longitudinal perspective, we evaluated the hypothesis that this individual social capital of older adults predicts their (three-year) future self-rated health and physical well-being, at least in part, through a positive association with physical exercise involvement in this future (Hypothesis 2).

The results of the present study confirm the findings of earlier studies that (individual) social capital explains self-rated health and well-being (in the older adult population). More specifically, the results show that older adults feel healthier and physically better when they experience more safety in society, and feel more strongly connected to their community and to their age peers. Furthermore, older adults who are more involved in volunteer activity, feel healthier, while older adults who feel more negatively treated in society because of their older age, feel physically worse. These findings confirm that (aspects of) older adults' individual social capital – i.e., (aspects of) their social connectedness to their community and society – explains their self-reported health and their physical well-being: The more social capital (of a specific kind) older adults have – i.e., the more they are/feel

connected (in specific ways) to their community and society, the better their experience of health and physical well-being.

The results of this study furthermore indicate that (aspects of) individual social capital predict the future experience of health and physical well-being: Older adults who feel more connected to their age peers experience a better health and a better physical well-being three years later, while older adults who feel safer in society experience a better health three years later. These findings further confirm that (aspects of) older adults' individual social capital – i.e., (aspects of) their social connectedness to their community and society – explain the future health and well-being of older adults: The more social capital (of a specific kind) older adults have – i.e., the more they are/feel connected (in specific ways) to their community and society, the better their experience of health and physical well-being will be three years later.

In disconfirmation of our hypotheses, the identified positive associations of individual social capital with self-rated health and with physical well-being were predominantly direct (i.e., unmediated by physical exercise involvement). The proposed mediating role of physical exercise involvement in the associations of individual social capital with self-rated health and with physical well-being was only confirmed for safety. Older adults who felt safer in society exercised more at the same time and three years later. In turn, physical exercise involvement explained their experience of health and physical well-being at the same time. Consequently, safety explained current and future experienced health and physical well-being, partially, by explaining involvement in physical exercise. Even though the findings confirm the proposed mediating role of physical exercise involvement, the mediation explains only a small part of the association of this (aspect of) individual social capital to present and future experienced health and physical well-being among older adults.

Except for this limited mediation by physical exercise involvement in the association of safety in society with current and future experienced health and physical well-being, it can be concluded that older adults' individual social capital and involvement in physical exercise (predominantly) independently explain their experience of health and physical well-being. In consideration of the findings of this study and previous studies, it is valid to argue that health behaviors only play a minor role in explaining the positive effects of (this kind of) individual social capital on the experience of health and physical well-being of older adults. However, the observed mediating role of physical

exercise involvement in the association of safety with experienced health and physical well-being, as well as the observation that social engagement is indirectly associated with better experienced health and physical well-being in explaining physical exercise involvement at the same time, underscore the value of the health behavior pathway in the associations of social capital with health and well-being. Social capital – and especially social connectedness to the community and society – is an abstract indicator of the availability of general social support, not an indicator of available social support specifically for involvement in physical exercise. Therefore it is logical that it only explains a limited part of physical exercise involvement, and subsequently, only explains a limited part of the effect of physical exercise involvement on experienced health and physical well-being. Because the association of physical exercise involvement with experienced health and physical well-being was small, social capital consequently could only explain a limited part of experienced health and physical-well-being in explaining a (limited) part of physical exercise involvement. This notwithstanding, aspects of older adults' social connectedness to their community and society (i.e., safety and social engagement) were found to be associated with their experienced health and physical well-being in explaining their involvement in physical exercise. These findings indicate that addressing these aspects of older adults' individual social capital for developing social support for physical exercise involvement is a potentially valuable strategy to promote the health and physical well-being of older adults.

With respect to the promotion of successful aging among older adults, the findings of the study highlight the value of the combined promotion of older adults' social connectedness to their community and society, and of older adults' involvement in physical exercise. Older adults' individual social capital – i.e., their personal social connectedness to their community and society – and involvement in physical exercise predominantly benefit their (experience of) health and physical well-being independently. The promotion of social physical exercise activities within a safe environment – e.g., a social walking program in a social organization for older adults (e.g., Pelssers et al., 2013) – could prove to be a valuable strategy to promote the successful aging of older adults. It potentially enhances older adults' experience of health and physical well-being through both the beneficial outcomes of being physically active, and of being/feeling connected to their community and society (e.g., of being/feeling connected to their age peers). Furthermore, considering the (proposed) mediation by

health behavior in the association of social capital with health and well-being, addressing social capital to promote involvement physical in exercise would provide older adults with social support specific for physical exercise involvement. In line with the findings that older adults' experienced social support for physical exercise affects their active involvement, individual social capital could have more potent effects on the physical health and well-being of older adults in promoting their physical exercise involvement.

Alternatively, promoting a feeling of safety in society among older adults potentially contributes to their successful aging in a meaningful way. This would benefit their health and physical well-being directly by reducing the stress of feeling of unsafe in their community or society, and by promoting their physical activity involvement. Therefore creating safe living and physical exercise environments for older adults could contribute to the successful aging of older adults.

Limitations

Some limitations of the study limit the generalization of these conclusions. First, the participant sample was not completely representative for the Flemish older adult population. All respondents to the survey were members of OKRA. It implies that each of the study participants is socially engaged in society and the community: They are members of a social organization for older adults. Considering that in this study the social capital of being connected to society and the community – which *includes* older adults' social engagement in social organizations – is hypothesized to benefit the physical health and well-being of older adults in part by promoting their exercise involvement, it could be that the study participants are more prone to exercise (or experience better physical and mental health) than older adults who are not socially engaged (in such a social organization for older adults). This entails that the observed associations between this individual social capital of being connected to society and the community, physical exercise involvement, and physical health and well-being, could be different for older adults who are not socially engaged (in such a social organization for older adults). Moreover, in the baseline survey, the youngest category of older adults (55 to 59 years old) was underrepresented among the participants. It is arguable that they had less time or were less prone to participate in the study because they were (still) professionally active. In contrast, in the follow-up survey, the oldest category of older adults (75 years old or older) and women were underrepresented. It could be that

they were less motivated to participate in a survey on physical exercise: Physical exercise involvement declines with age and is lower among women. Alternatively, for some respondents over 75 years old, responding to the survey on the Internet or on a paper copy (instead of to a guided interview) could have been too difficult.

The second limitation of this study consists of the inconsistent scales and time frames of the measures. For example, the survey respondents indicated the degree to which they felt (un)safe in society *today*, on a *five-point Likert-scale*, while they indicated their engagement in social activity by indicating if they *had or had not* actively engaged in social activity in a specified domain of society over the *last year*. They reported their (degree of) involvement in physical exercise by indicating their *weekly involvement during the last month*. The different scales (e.g., dichotomous (No/Yes); Likert (1-5); Continuous) and time-frames (i.e., today; last month; last year) may influence the identified relations between the concepts.

Finally, individual social capital reflects the availability of social support, but does not reflect the nature of this social support. It is possible that an older adult feels connected to his community or society (i.e., availability of social support), but does not feel socially supported to engage in physical exercise because their involvement in physical exercise derogates from what is (perceived to be) exercise behavior that is valued by their community or society (e.g., negative age norms for physical exercise participation). We did not measure the nature of the social support that was available to older adults as the result of their social connectedness to their community or society. The nature of the available social support determines the size and the direction of the influence of individual social capital on physical exercise. Accounting for the nature of the available social support would potentially increase the amount of variance in physical exercise engagement, and indirectly in experienced health and (physical) well-being, that is explained by individual social capital.

Strengths

The present study also had several strengths. First of all, to our knowledge, this is the first study (1) to evaluate the mediating role of physical exercise in the relation of individual social capital to self-rated health and physical well-being within the older adult population (2) from both a cross-sectional and longitudinal perspective (3) using the method of Preacher and Hayes for mediation

analysis. Second, the peer-to-peer survey method in the baseline survey promoted survey participation. This is indicated by a high survey participation rate. It further promoted unbiased response to the survey. This is reflected by the high participation rate of older adults that did not actively involve in physical exercise (in a study on physical exercise involvement). Finally, collaboration with a social organization for older adults in conducting the survey reflected the use of social capital in the study. Older adults were actively involved in conducting the study, promoting their social engagement.

Conclusion

The present study confirmed that individual social capital contributes to the successful aging of older adults by benefiting their present and future experienced health and physical well-being. The mediating role of physical exercise seems to be limited. The only indicator of individual social capital that positively affects older adults' experience of health and physical well-being by promoting physical exercise involvement is experienced safety in society. The combined promotion of individual social capital and involvement in physical exercise – e.g., providing social exercise activities for older adults within social organizations for older adults – is a potentially valuable strategy to enhance the successful aging of older adults because of the independent beneficial effects of their personal social connectedness (to their community and society: e.g., social connectedness to age peers) and their physical exercise involvement on their health and well-being.

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Chapter 2

Acting One's Age in Exercise:
Perceived Age Norms Predict Exercise Motivation and Involvement Among Older Adults

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Abstract

The present study aimed to determine the associations between perceived older age norms for exercise on one hand, and exercise motivation and involvement on the other hand, within the older adult population. The hypothesized associations were derived from an integration of the Social Identity Approach (SIA) and Self-Determination Theory (SDT). Older adults (n = 409; age = 68.65) completed a survey including measures on older adult identification, older adult exercise norms (i.e., descriptive; injunctive; prototype), autonomous exercise motivation (i.e., basic needs satisfaction; self-regulation), and exercise participation. Linear Regression-based analyses indicated that older adults who perceived more positive older adult exercise norms experienced more basic needs satisfaction and more self-regulation in exercise involvement. In explaining autonomous exercise motivation, older adults' perceptions of older adult norms for exercise indirectly explained their exercise involvement, albeit weakly. In contradiction to the proposed integration of SIA and SDT, the strength of the associations between perceived older adult norms for exercise on one hand, and autonomous exercise motivation and exercise involvement on the other hand, did not differ depending on the extent older adults identified themselves as an older adult. The findings of this study underscore the potential influence of perceived (older) age norms on the exercise motivation and participation of older adults. The implications for the promotion of physical exercise among older adults are discussed.

Keywords: Seniors, Physical Activity, Social Identity Approach, Self-Determination Theory.

Introduction

When we witness young adults attempt to pole vault at the community athletics track, we presume that they are preparing for a competition and do not give it a second of thought. However, when we witness adults of sixty years old or older attempt the same, the thought of 'not acting their age' might quickly come to our mind. The sight would leave many among us amazed, amused, impressed, endeared, or even somewhat (too) concerned about their health. Nevertheless, the pole vault is one of the many Olympic disciplines that older adults compete in during the World Masters Games. The difference in our reaction clearly illustrates that age comes with expectations of exercise behavior. These expectations reflect what we perceive to be 'normal' exercise behavior for individuals with a certain age. In indicating what is normal exercise behavior for our age, such perceived age norms may guide our exercise involvement. But do we act our age by exercising accordingly? And if so, why?

In the Social Identity Approach (SIA; Haslam, 2004), it is explained how we form our perception of age norms and under what circumstances these perceived age norms guide our behavior. SIA proposes that we form a social identity when a personal characteristic, such as older age, is salient to us. The mold of this social identity (e.g., older adult) is shaped by the features (e.g., exercise behavior) that we perceive to be normatively descriptive of persons who share the salient personal characteristic (i.e., older adults) compared to those who do not (i.e., younger adults). For example, the 'older adult' social identity mold would include 'older adults do not pole vault' because *not* involving in pole vaulting is age normatively descriptive for older adults: Predominantly younger adults (and adolescents) practice this discipline.

According to SIA, we will behave in line with social identity norms when we perceive ourselves in terms of a social identity. When we see ourselves in the light of a social identity, we apply its mold to our self. For example, the more we identify ourselves as an older adult, the more we will (be inclined to) exercise in line with what we perceive to be the normatively descriptive exercise behavior for older adults: We would be less likely to (want to) pole vault when we perceive ourselves as an older adult. There is evidence that perceived social identity norms indeed influence our health behavior when a social identity is salient to us (Tarrant & Butler, 2011), even when this is unhealthy (Oyserman, Fryberg, & Yoder, 2007).

The motivational processes that underlie this influence of social identity norms have barely been studied from the perspective of Self-Determination Theory (SDT; Deci & Ryan, 1985; Ryan & Deci, 2000). SDT is a validated theory on motivation (Deci & Ryan, 2008) for exercise involvement (Teixeira, Carraca, Markland, Silva, & Ryan, 2012; Wilson, Mack, & Grattan, 2008). At present, it is the dominant theory on motivation in the domain of exercise promotion. Consequently, in order to deal effectively with the determining influence of social identity norms in exercise promotion, it is essential to understand how social identity norms affect exercise motivation and involvement from the perspective of SDT.

In the present study, we propose an integration of the theoretical assumptions of SIA and SDT that explains how social identity norms affect our exercise motivation. We aim to evaluate this integration by determining to what extent the perceived exercise norms for older adults (i.e., older adult social identity norms) affect older adults' motivation to exercise. We further evaluate to what extent the perceived exercise norms guide the exercise involvement of older adults as a consequence of affecting their exercise motivation.

Self-Regulation of Behavior

According to SDT, we are motivated to involve in exercise when we experience that exercise involvement is valued. However, the quality of our motivation would depend on the extent to which this appreciation of exercise involvement is intrinsic to our self. We would have a better quality of motivation, the more this appreciation of exercise involvement is self-intrinsic, and we experience that our motivation to involve in exercise originates within our self. SDT distinguishes between two types of motivation that differ in quality depending on whether the appreciation of exercise involvement is predominantly intrinsic to our self or not.

Autonomous motivation refers to the motivation that arises when we (predominantly) self-intrinsically appreciate involving in exercise. Autonomous motives include involving in exercise because we experience feelings of self-intrinsic appreciation, such as enjoyment, in it (i.e., intrinsic regulation), because it is a valued, intrinsic part of our self (i.e., integrated regulation), or because it is important to us (i.e., identified regulation). Because these motives arise from a predominantly self-intrinsic appreciation of exercise involvement, we experience that our reasons for involving in exercise

emanate from our self. As a consequence, when we are autonomously motivated to exercise, we experience to self-regulate our involvement: We (want to) involve in exercise out of our own volition.

By contrast, controlled motivation refers to the motivation that originates when (we experience that) our exercise involvement is (predominantly) socially (i.e., self-extrinsically) appreciated. Such controlled motives include involving in exercise out of feelings that arise from (the perception of) being socially appreciated, such as involving in exercise in order to feel proud, or to feel less guilty or ashamed (i.e., introjected regulation). They further include involving in exercise because it is socially appreciated, such as involving in exercise in order to obtain social rewards or to avoid social punishment (i.e., extrinsic regulation). Because these motives (are experienced to) arise from a predominantly social appreciation of exercise involvement, we experience that our reasons for involving emanate outside our self (i.e., in our social environment). Therefore, when we have controlled motives, we experience that our involvement in exercise is regulated (i.e., controlled) by (perceived) social contingencies: We feel (socially) pressured to involve in exercise.

According to SDT, autonomous motivation is motivation of a superior quality. When compared to controlled motives, autonomous motives would be more probable to result in (a maintained) exercise involvement because they arise from a personal appreciation of exercise involvement. A review of the evidence confirmed that we indeed are more likely to exercise, and to maintain our exercise involvement, when we are autonomously motivated to exercise, and we experience that our exercise involvement is self-regulated (Teixeira et al., 2012).

SDT assumes that the degree to which we self-intrinsically appreciate involvement in exercise is reflected by the experienced satisfaction of three universal basic psychological needs in exercise involvement: the basic needs for autonomy, competence and belongingness. We would be more autonomously motivated to exercise when exercise involvement is in line with our personal preference (i.e., autonomy) because we experience to be effective in it (i.e., competence) as our exercise involvement leads to outcomes that we personally value, such as feeling positively connected to meaningful others (i.e., belongingness). In confirmation, it has consistently been found that (social support for) the satisfaction of these basic needs (BNS) in exercise involvement is positively related to (sustained) exercise involvement because it leads to the experience of self-regulation in exercise involvement, i.e., to autonomous motivation for exercise (Teixeira et al., 2012).

Social Identity Norms as Basic Needs Support

Social (identity) norms can be viewed as a form of social support for our autonomous (exercise) motivation. Social norms represent social information on what constitutes effective and valued (i.e., appreciated) behavior (Cialdini, 2007). Therefore, when such norms come to our attention, we tend to behave accordingly (e.g., Goldstein, Cialdini, & Griskevicius, 2008; Kallgren, Reno, & Cialdini, 2000; Mollen, Rimal, Ruiter, & Kok, 2013) because we perceive that the behavior is appreciated (or valued). Consequently, when a social identity is salient to us, social identity norms similarly come to our attention and we tend to behave in line with (the norms of) this social identity because we perceive that this behavior is positively valued. Although it has been established that we behave in line with salient social (identity) norms, it is unclear when we do so out of autonomous or controlled motives.

In SIA it is argued that the more we identify ourselves in terms of a social identity, the more we are likely to behave in line with social identity norms. Adopting the perspective of SDT, we propose that this occurs because we are more autonomously motivated to behave in line with social identity norms when we see ourselves in terms of a social identity. When we identify ourselves in terms of a social identity, we accept the social identity norms as our own: The social identity norms become our personal norms. Therein the social identity norms affect our personal perception of what is effective and 'valuable' behavior. Consequently, the more we identify ourselves in terms of a social identity, the more we would self-intrinsically appreciate (i.e., perceive basic needs satisfaction in) behaving in accordance with the social identity norms, and the more we would be autonomously motivated to behave accordingly. In other words, the more that we identify ourselves in terms of a social identity, the more that behaving in accordance with the social identity would be in line with our perceived personal identity, and the more we would feel to self-regulate our involvement in this behavior.

There is evidence for the assumptions that underlie our proposed integration of SIA in SDT. Sassenberg, Matschke and Scholl (2011) demonstrated that when we identify ourselves in terms of a social identity, we persist in behavior until we match the social identity norms for this behavior. Based on our proposed integration of the assumptions of SIA and SDT, we argue that this persistence in trying to adhere to the social identity norms for behavior reflects autonomous motivation. We persist longer because we have a more self-intrinsic appreciation of the social identity normative behavior,

and therefore are more autonomously motivated to adhere to the social identity normative behavior, when we perceive ourselves in terms of the social identity. This assumption is in line with the conclusion that was drawn by Sassenberg and his colleagues that social identity norms "serve as internally motivated standards for self-regulation" when we identify ourselves in terms of a social identity. The findings of a study by Amiot, Sansfaçon, and Louis (2014) even further confirm our proposed integration of SIA and SDT. They found that we internalize social identity normative behavior as our own when we identify ourselves in terms of a social identity: We are more autonomously motivated to behave in a social identity congruent manner when we identify ourselves in terms of a social identity.

Older Adult Norms in Exercise Motivation

In this study we evaluate the proposed integration of SIA and SDT by determining the relationships that exist between perceived older adult (social identity) norms for exercise on one hand, and autonomous exercise motivation and exercise involvement on the other hand, among older adults. In line with our proposed integration of SIA and SDT, we hypothesize that older adults' perceptions of older adult norms for exercise explain their experience of Basic Needs Satisfaction (BNS) in exercise, their autonomous exercise motivation, and their exercise involvement. More specifically, we expect that older adults experience more BNS in exercise the more that they perceive that older adults exercise (i.e., descriptive norm), that older adults are expected to (or should) exercise (i.e., injunctive norm), and that involvement in exercise is age normatively descriptive for older adults compared to younger adults (i.e., prototype norm) (Hypothesis 1a). We further expect that older adult identification moderates these relationships: We expect that the hypothesized relationships of the perceived older adult norms for exercise with exercise BNS will be stronger (i.e., more positive) when older adults identify themselves more as an older adult (Hypothesis 1b) because the older adult norms are then more experienced to be their own.

Furthermore, we expect that older adults' perceptions of these older adult norms for exercise involvement explain their experience of self-regulation in exercise involvement (i.e., autonomous exercise motivation). Specifically, we hypothesize that older adults experience more self-regulation in their exercise involvement (i.e., are more autonomously motivated to involve in exercise), the more

that they perceive that older adults exercise (i.e., descriptive norm), that older adults are expected to (or should) exercise (i.e., injunctive norm), and that involvement in exercise is age normatively descriptive for older adults compared to younger adults (i.e., prototype norm) (Hypothesis 2a). According to SDT, experienced self-regulation in exercise involvement (i.e., autonomous exercise motivation) arises from the experience of BNS in exercise involvement. Consequently, we hypothesize that these perceived older adult norms for exercise are indirectly associated with the experience of self-regulation in exercise involvement (i.e., autonomous exercise motivation) through their (expected) association with the experience of BNS in exercise involvement (Hypothesis 2b). In line with the assumptions of our proposed integration of SIA and SDT, we expect that these hypothesized associations are moderated by identification as an older adult. More specifically, we expect that the more that older adults identify themselves as an older adult, the stronger (i.e., the more positive) that their perceptions of the older adult norms for exercise are (indirectly) related to their experienced self-regulation in exercise, i.e., autonomous exercise motivation (in explaining experienced BNS in exercise) (Hypothesis 2c).

Finally, we expect that older adults' perceptions of older adult exercise norms explain their exercise involvement. More Specifically, we expect that older adults involve in exercise more, the more that they perceive that older adults involve in exercise (i.e., descriptive norm), that older adults are expected to (or should) exercise (i.e., injunctive norm), and that exercise involvement is age normatively descriptive for older adults (i.e., prototype norm) (Hypothesis 3a).

Based on the assumptions of SDT, we even further hypothesize that this association is indirect – in sequence – through the experience of BNS and self-regulation (i.e., autonomous motivation) exercise involvement: Older adults norms would explain exercise involvement in explaining BNS, BNS subsequently explaining experienced self-regulation (i.e., autonomous motivation), and self-regulation (i.e., autonomous motivation) in turn explaining involvement in exercise (Hypothesis 3b). We expected that this BNS–self-regulation–mediated relation to exercise involvement would be stronger the more they perceived themselves as an older adult (Hypothesis 3c). A schematic representation of the hypotheses is presented in Figure 1.

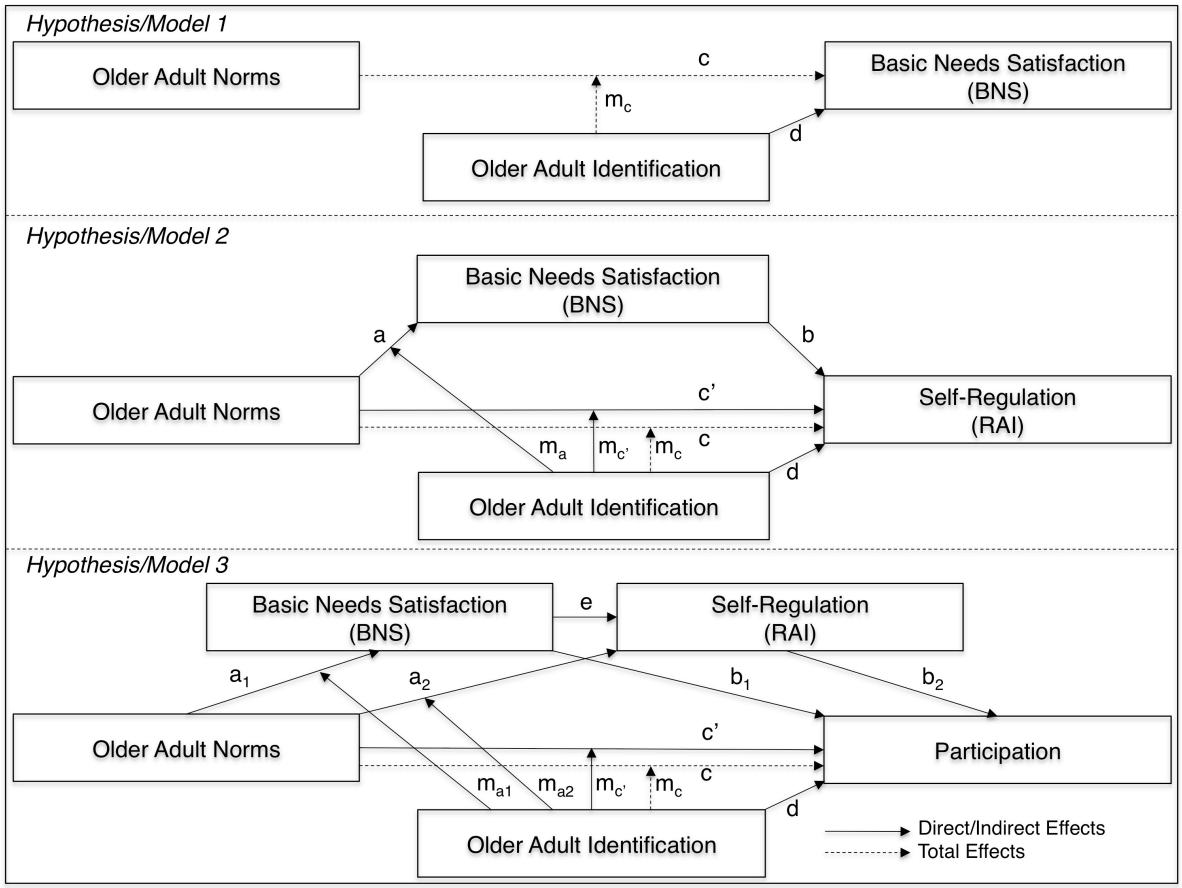

Figure 1. Hypothesized Associations of Older Adults Exercise Norms with Exercise Basic Needs Satisfaction (BNS) (Hypothesis/Model 1), Self-Regulation (RAI) (Hypothesis/Model 2), and Participation (Hypothesis/Model 3), Controlled for the Moderation by Older Adult Identification.

Method

Design

The present study was part of a survey study on social capital, social support, exercise motivation, and exercise participation, among older adults in Flanders, the Dutch-speaking region of Belgium (Scheerder et al., 2011). The survey study was organized in collaboration with OKRA. OKRA is a social organization for older adults (i.e., 55 years old or older). The organization has a region-wide network of meeting points. With more than 211,000 members, OKRA represents 12% of the Flemish older adult population. A sample of OKRA members – selected to be representative for the Flemish older adult population in age, gender and region of residence – was contacted for participation in the survey study.

In the present study, the OKRA members who had enrolled in this survey study were invited to complete a survey on older adult identification, older adult exercise norms, exercise motivation and exercise participation. The participants completed this survey at one moment in time. Based on this survey data, the present study was aimed to determine the associations that exist between older adult identification, older adult exercise norms, exercise motivation, and exercise participation, within the older adult population. Therein this study had a cross-sectional design.

Participants

In total, 959 OKRA members enrolled in the survey study on social capital, social support, exercise motivation, and exercise participation (i.e., Scheerder et al., 2011). These older adults – aged 55 years old or older – were invited to respond to a survey on older adult identification, older adult exercise norms, exercise motivation, and exercise participation. In total 445 of the 959 invitees (46.4%) responded to this survey. However, 36 respondents were excluded from the participant sample because they did not adequately complete major parts of the survey. The remaining 409 respondents formed the participant sample. Their mean age was 68.65 (SD = 6.60) years. Males accounted for 54.0% of the participants.

The reasons for non-participation (n = 514; 53.6%) included: lack of interest (29.8%); unreachable on registered postal address/telephone number (7.0%); health problems (10.1%); private problems (2.5%). Four percent of the non-participants (4.1%) had deceased. Over 46% of the non-participants did not provide a reason for not participating (46.5%).

Procedure

The 959 OKRA members who were enrolled in the survey study were sent a letter that invited them to partake in a survey on older adult identification, older adult exercise norms, exercise motivation and exercise participation. They could complete the survey questionnaire on the Internet or on a paper copy. In case of non-participation, they were asked to return a non-participation form. They were asked to return the questionnaire or the non-participation form within six weeks. Three weeks after the invitation letter, non-responders were contacted by phone once to remind them about study participation. When they refused study participation, their reason for non-participation was noted.

Measures

Older Adult Identification. Identification as an older adult was measured with three items (i.e., "I feel … (1) I am a 55-years-old-or-older adult; (2) I belong among 55-years-old-or-older adults; (3) a bond with 55-years-old-or-older adults."). The participants were asked to indicate their agreement on a five-point Likert-scale from (1) 'completely disagree' to (5) 'completely agree'. Exploratory factor analysis showed that the items formed one measure of older adult identification that explained 77.5% of the variance. The measure had high internal reliability (Cronbach's α = .85). The mean was 4.18 (SD = .86). The majority of participants (85.8%) identified themselves as a '55-years-old-or-older adult' (score > 3), while only 6.6% rejected identification as a '55-years-old-or-older adult' (score < 3).

Older Adult Norms. Three types of (perceived) older adult norms for exercise were measured: Descriptive, Injunctive and Prototype.

Descriptive. The participants were asked to report their perception of how many of the older adults in society exercise. They reported this perception on an eleven-point Likert-scale from (0) '0% - None of the 55-years-old-and-plus adults in society exercise' to (10) '100% - All of the 55-years-old-and-plus adults in society exercise'. The mean was 4.57 (SD = 1.62). Half of the study participants (50.9%) perceived that a minority of the '55-years-old-and-plus adults' in society (score < 5) exercise. Almost thirty percent of the study participants (28.1%) perceived that the majority of '55-years-old-and-plus adults' in society (score > 5) exercise.

Injunctive. The participants indicated their perception of their normative expectations of older adults in regard to exercise by marking their agreement with the item "55-years-old-or-older adults should exercise" on a five-point Likert-scale from (1) 'completely disagree' to (5) 'completely agree'. The mean was 4.36 (SD = .82). The majority of the study participants (85.6%) reported that '55-years-old-and-plus adults' should exercise (score > 3), while only 3.4% of the study participants reported that '55-years-old-or-older adults' should not exercise (score < 3).

Prototype. The participants were asked to report the degree they perceived exercise as prototypical (i.e., age normatively descriptive) for '55-years-old-or-older adults' compared to individuals who are younger than 55-years old. They reported this perception by completing the item "Exercisers are …" with an answer on a seven-point Likert-scale that ranged from (1) 'all younger than 55 years old' to (7) 'all 55-years-old-and-plus adults'. The mean was 3.14 (SD = 1.46). The majority of the study

participants (64.8%) perceived that exercise is prototypical for adults who are younger than 55 years old (score < 4). Thirteen percent of the study participants perceived exercise as prototypical for '55-years-old-or-older adults' (score > 4).

Motivation. Two dimensions of self-determined exercise motivation were measured: Basic Needs Satisfaction and Self-Regulation in exercise involvement.

Basic Needs Satisfaction (BNS). Experienced satisfaction of SDT's three basic needs (i.e., autonomy, competence, and belongingness) in exercise involvement was measured with nine items. The nine items consisted of three items for each of the basic needs, i.e., autonomy ("I … (1) want to exercise; (2) willingly choose to exercise; (3) prefer to spend my spare time exercising."), competence ("I … (1) am good in exercise; (2) am able to exercise; (3) have sufficient ability to exercise."), and belongingness ("I … (1) have a bond with exercisers; (2) feel to belong among exercisers; (3) am a genuine exerciser."). The study participants marked their agreement on a five-point Likert-scale that ranged from (1) 'completely disagree' to (5) 'completely agree'. Exploratory factor analysis showed that the items formed one measure of BNS that explained 72.2% of variance. The measure had high internal reliability (Cronbach's α = .95). The mean was 3.26 (SD = 1.04). More than half of the study participants (58.4%) experienced BNS in exercise (score > 3), while almost forty percent of the study participants (36.7%) did not (score < 3).

Self-Regulation. The experience of Self-Regulation in exercise was measured with 15 items. Each of the five levels of self-regulation that are distinguished by SDT (i.e., intrinsic, integrated, identified, introjected and external regulation) was measured with three items. The items ("I exercise…) on intrinsic (e.g., … because I enjoy it"), identified (e.g., "… because I value the benefits of exercise"), introjected (e.g., "… because I would feel guilty if I did not exercise") and external (e.g., "… because others pressure me to exercise.") regulation were selected from the revised version of the Behavioral Regulation in Exercise Questionnaire (BREQ-2; Markland & Tobin, 2004). We added three items on integrated regulation (i.e., "I exercise because … (1) it is an important part of who I am; (2) I feel I am my true self when I exercise; (3) I just would not be myself without exercising."). The study participants reported their agreement on a five-point Likert-scale that ranged from (1) 'completely disagree' to (5) 'completely agree'.

An adapted version of the Relative Autonomy Index (RAI) was calculated. This index contrasts autonomous motives with controlled motives in order to determine the experienced level of self-regulation. It attributes a weight to each subscale according to the level of self-regulation in the motives in each subscale. The RAI is calculated by taking the sum of these weighted subscales. In the present study the RAI was adapted in order to include the subscale of integrated regulation. It was calculated with the formula: RAI = (3 * intrinsic regulation) + (2 * integrated regulation) + (1 * identified regulation) + (-1 * introjected regulation) + (-2 * external regulation). The mean RAI score was 14.66 (SD = 6.08).

Participation. Participation in exercise was measured with the Godin Leisure-Time Exercise Questionnaire (GLTEQ; Godin & Shephard, 1997). Study participants were asked to report the number of times per week they participated in exercise activities of low, moderate, and high intensity of at least ten continuous minutes during a normal week (i.e., undisturbed by unusual life circumstances) of the last month (i.e., four weeks). For each level of intensity, the number of activities was multiplied with the assigned metabolic equivalent value (MET) for this activity level. The total score is obtained by calculating the sum of the MET-weighed values: GLTEQ total score = (low intensity * 3 MET) + (moderate intensity * 5 MET) + (high intensity * 9 MET). This total score reflects the MET of the weekly exercise activity. The mean GLTEQ total score was 9.99 (SD = 12.33). Over 65% of the study participants (65.5%) reported to participate in exercise (GLTEQ > 0).

Analysis

Correlation, Hierarchical Multiple Linear Regression, and Hayes' Mediation Process (Hayes, 2009, 2013) analyses were performed. Pearson correlations were calculated in order to observe the associations that exist between older adult identification, the older adult norms (i.e., Descriptive; Injunctive; Prototype), motivation (i.e., BNS; RAI) and participation. Hierarchical Multiple Linear Regression of Older Adult identification, Older Adult Norms, and the product-interactions of Older Adult Identification and Older Adult Norms on BNS was performed to evaluate the hypothesized moderation by Older Adult Identification in the associations of Older Adult Norms with BNS (Hypothesis 1: Figure 1 – Model 1).

Hayes' Mediation Process analyses (Hayes, 2013) were performed to test the validity of the hypothesis that Older Adult Norms are indirectly associated with Self-Regulation (i.e., RAI) through BNS, and that these associations are moderated by Older Adult Identification (Hypothesis 2: Figure 1 – Model 2). Finally, the same method of analysis was used to test the validity of the hypothesis that Older Adult Norms are indirectly associated with Participation through BNS and Self-Regulation (i.e., RAI), and that Older Adult Identification moderates these associations (Hypothesis 3: Figure 1 – Model 3).

The Older Adult Identification and Older Adult Norms variables were mean-centred prior to the regression-based analyses (i.e., Hierarchical Multiple Linear Regression; Hayes' Mediation Process Model) in order to reduce and avoid multicollinearity that results from the correlation between the main effects of the factors/moderator and the product-interactions of the factors and the moderator. All Hayes' Mediation Process analyses were performed with 5,000 Bootstraps. Total effect models were requested to obtain the total effects of the factors, moderator(s) and their product-interactions.

These analyses were performed with IBM-SPSS 19.0. Hayes' PROCESS syntax for IBM-SPSS was used to perform Hayes' Mediation Process Analyses (Hayes, 2013). PROCESS model 4 was used for simple mediation analysis (Figure 1 – Model 2). PROCESS model 6 was used for multiple mediation analysis (Figure 1 – Model 3). Missing Value Analysis with the Estimation-Maximization Algorithm was used to deal with missing data prior to the analyses.

Interpretation of Results

The study design (i.e., cross-sectional survey) allows for identifying the relationships that exist between the measured constructs (e.g., construct A is associated with construct B), but this does not prove the sequence of causality that is hypothesized to exist between these constructs (e.g., construct A causes construct B). However, the results are presented and/or discussed in terms of a sequence of effects. This described sequence of causality in the observed relationships is presumed to exist by the theory that is under evaluation in the study.

Results

Pearson correlations (Table 1) showed that Older Adult Identification and Older Adult Norms (i.e., Descriptive; Injunctive; Prototype) were positively associated with Basic Needs Satisfaction (BNS) and with Self-Regulation (Relative Autonomy Index, or RAI). Older Age Norms were positively related to Participation. BNS was positively related to RAI. Both BNS and Self-Regulation (RAI) were positively associated with Participation.

A Hierarchical Multiple Linear Regression of Older Adult Identification, Older Adult Norms, and the product interactions between Older Adult Identification and the Older Adult Norms, on BNS (Table 2), showed that Identification explained 4% of BNS: Participants who more strongly identified themselves as an older adult reported more BNS (Step 1). This weak association diminished when controlling for the Older Adult Norms (Step 2). Together with Older Adult Identification, Older Adult Norms explained 26% of BNS. Participants reported to experience more BNS when they identified themselves more strongly as an older adult and/or perceived more positive norms. The Injunctive Norm explained BNS the most: It was moderately strong related to BNS. The Descriptive Norm and the Prototype Norm were both weakly related to BNS. These findings confirm Hypothesis 1a. Contrary to our expectations (Hypothesis 1b), the product-interactions of Older Adult Identification and the Older Adult Norms did not explain BNS (Step 3).

Older Adult Norms explained Self-Regulation in a Hayes' Mediation Process analysis of the direct associations and the BNS-indirect associations of Older Adult Norms with RAI (Table 3). Each Older Adult Norm was positively related to RAI (Table 3 – Total Effect). The Injunctive Norm was moderately strong associated with RAI, while both the Descriptive Norm and Prototype Norm were weakly associated with RAI. These findings confirm Hypothesis 2a. BNS significantly explained RAI (Table 3 – Direct Effect). Each of the Older Adult Norms explained RAI indirectly through its positive relation to BNS (Table 3 – Indirect Effect). Only the injunctive norm also explained RAI directly after controlling for BNS (Table 3 – Direct Effect). These findings confirm Hypothesis 2b: BNS mediated the associations of the Older Adult Norms with Self-Regulation. The Older Adult Identification × Norms product-interactions did not explain RAI. This finding rejects Hypothesis 2c: Older Adult Identification did not moderate the effects of Older Adult Norms on Self-regulation. Controlling for Older Adult

Table 1. Pearson Correlations of Demographics, Older Adult Identification, Older Adult Norms, Motivation, and Participation.

	1a	1b	2	3a	3b	3c	4a	4b	5
1. Demographics									
a. Age	1	.04	.02	-.05	.07	.06	-.09	-.03	-.15**
b. Gender°		1	.00	-.02	.03	-.01	.15**	.05	.14**
2. Older Adult Identification			1	.09	.19***	.06	.21**	.15**	.09
3. Older Adult Norms									
a. Descriptive				1	.25***	.29***	.30***	.29***	.13**
b. Injunctive					1	.14**	.44***	.43***	.21***
c. Prototype						1	.25***	.20***	.11*
4. Motivation									
a. Basic Needs Satisfaction (BNS)							1	.82***	.44***
b. Self-Regulation (RAI)								1	.41***
5. Participation									1

** p <. 05, ** p < .01, *** p < .001, ° Male*

Table 2. Model 1. Multiple Linear Regression Model of Older Adult Identification and Older Adult Norms on Basic Needs Satisfaction (BNS).

	BNS								
	Model Step 1			Model Step 2			Model Step 3		
Model	β	B	*t*	β	B	*t*	β	B	*t*
Factors									
Older Adult Identification	.21	.25	4.22***	.12	.14	2.66**	.12	.14	2.54*
Older Adult Norms									
Descriptive				.16	.10	3.40**	.15	.10	3.35**
Injunctive				.36	.45	7.99***	.36	.45	7.93***
Prototype				.15	.11	3.31**	.15	.10	3.27**
Older Adult Identification × Norms									
Descriptive							.02	.01	.31
Injunctive							-.06	-.07	-1.21
Prototype							.06	.05	1.24
F			17.82***			36.11***			21.05***
R^2			.042			.263			.269
ΔR^2						.221***			.005

** p <. 05, ** p < .01, *** p < .001*

Table 3. Model 2. Mediation Process Model of Older Adult Identification and Older Adult Norms on Self-Regulation (RAI): Direct, Basic Needs Satisfaction (BNS)-Indirect, and Total Effects.

	RAI										
	Direct Effect				BNS-Indirect Effect				Total Effect			
Model 2	β	B		*t*	β	B	95% CI(B)	Sobel z	β	B		*t*
Mediator												
BNS	.77	4.53		23.29***								
Factors												
Older Adult Identification	-.05	-.36		-1.66	.09	.63	[.14, 1.14]*	2.53*	.04	.27		.84
Older Adult Norms												
Descriptive	.05	.19		1.64	.12	.45	[.18, .71]*	3.31**	.17	.64		3.63***
Injunctive	.09	.69		2.89**	.28	2.04	[1.53, 2.58]*	7.50***	.37	2.73		8.04***
Prototype	-.02	-.07		-.57	.12	.47	[.18, .77]*	3.24**	.10	.40		2.10*
Older Adult Identification × Norms												
Descriptive	-.02	-.10		-.70	.01	.05	[-.27, .38]	.31	-.01	-.05		-.22
Injunctive	-.03	-.22		-.91	-.04	-.33	[-.87, .30]	-1.20	-.07	-.55		-1.51
Prototype	-.04	-.19		-1.30	.04	.21	[-.12, .56]	1.23	.00	.02		.09
F			105.24***								18.22***	
R^2			.678								.241	

** p <. 05, ** p < .01, *** p < .001*

Identification, Older Adult Norms explained 24% of RAI. Older Adult Identification, Older Adult Norms and BNS jointly explained 68% of RAI.

Hayes' Mediation Process analysis of the direct effects, the BNS-indirect effects, the RAI-indirect effects, and the BNS→RAI-double indirect effects of the Older Adult Norms on Participation (Table 4) indicated that BNS and RAI explained Participation (Table 4 - Direct Effect). BNS had a moderately strong direct positive association, and RAI had a weak direct positive association with Participation. Based on the assumptions of SDT, BNS even further explained Participation through its positive association with RAI (β = .12, B = 1.51, 95% CI = [.17, 2.83]). When considering its direct and indirect associations with Participation, BNS was strongly associated with Participation in a positive direction (β = .43;B = 5.14 t = 8.23, p < .001). Only the Injunctive Norm of the Older Adult Norms explained Participation (Table 4 – Total effect). Its association to Participation was positive, small, and indirect through BNS, RAI, and BNS→RAI (Table 3 – Indirect Effects). This finding partially confirms Hypothesis 3a: The Injunctive Norm explains Participation. Furthermore it confirms Hypothesis 3b: The relation of the Injunctive Older Adult Norm to Participation is completely indirect through its associations with BNS and Self-Regulation. This indirect association through BNS and Self-Regulation (partly) follows the sequence proposed by SDT: The Injunctive Norm positively explains BNS; BNS positively explains RAI; RAI positively explains Participation. However, the Injunctive Norm is most strongly associated with Participation in explaining BNS, instead of in (BNS-indirectly) explaining self-regulation.

The Descriptive Norm and the Prototype Norm did not explain Participation (Table 4 – Total Effects). These findings (partly) disconfirm Hypothesis 3a. Nevertheless, these norms were indirectly related to Participation through BNS and/or RAI (Table 4 – Indirect Effects). Although these indirect associations were too weak to explain Participation significantly, this finding is again in line with Hypothesis 3b. The Older Adult Norms are indirectly associated with Participation through BNS and/or RAI (partly) in the sequence that is proposed by SDT. None of the Older Adult Identification × Older Adult Norms product-interactions explained Participation. This finding rejects Hypothesis 3c. Older Adult Identification did not moderate the direct and the motivation-indirect associations of Older Adults Norms with Participation. However, although Older Adult Identification did not positively explain

Table 4. Model 3. Multiple Mediation Process Model of Older Adult Identification and Older Adult Norms on Exercise Participation: Direct, Basic Needs Satisfaction (BNS)-Indirect, Self-Regulation (RAI)-Indirect, BNS→RAI-Indirect, and Total Effects.

	Participation						
	Direct Effect			BNS-Indirect Effect		RAI-Indirect Effect	
Model 3	β	B	*t*	B	95% CI (B)	B	95% CI (B)
Mediator							
BNS	.31	3.63	3.81***				
RAI	.16	.33	2.08*				
Factors							
Older Adult Identification	.01	.14	.20	.50	[.14, 1.09]*	-.12	[-.38, .00]
Older Adult Norms							
Descriptive	-.01	-.08	-.22	.36	[.13, .68]*	.06	[.00, .21]*
Injunctive	.01	.09	.12	1.63	[.92, 2.60]*	.23	[.03, .58]*
Prototype	.00	-.01	-.04	.38	[.15, .72]*	-.02	[-.16, .07]
Older Adult Identification × Norms							
Descriptive	-.01	-.07	-.16	.04	[-.21, .33]	-.03	[-.16, .05]
Injunctive	.00	.04	.05	-.27	[-.78, .18]	-.07	[-.32, .06]
Prototype	.04	.43	.92	.17	[-.08, .50]	-.06	[-.24, .02]
F		11.39***					
R^2		.204					

** p <. 05, ** p < .01, *** p < .001*

Table 4. (Continued). Model 3. Multiple Mediation Process Model of Older Adult Identification and Older Adult Norms on Exercise Participation: Direct, Basic Needs Satisfaction (BNS)-Indirect, Self-Regulation (RAI)-Indirect, BNS→RAI-Indirect, and Total Effects.

	Participation							
	BNS→RAI-Indirect Effect		Total Indirect Effect			Total Effect		
Model 3	B	95% CI (B)	β	B	95% CI (B)	β	B	*t*
Mediators								
BNS								
RAI								
Factors								
Older Adult Identification	.21	[.03, .59]*	.04	.59	[.05, 1.28]*	.05	.73	1.00
Older Adult Norms								
Descriptive	.15	[.03, .35]*	.07	.57	[.25, .94]*	.06	.49	1.23
Injunctive	.68	[.14, 1.35]*	.17	2.54	[1.83, 3.48]*	.18	2.63	3.43***
Prototype	.16	[.03, .39]*	.06	.51	[.17, .92]*	.06	.50	1.16
Older Adult Identification × Norms								
Descriptive	.02	[-.09, .16]	.00	.02	[-.36, .42]	-.01	-.04	-.09
Injunctive	-.11	[-.45, .05]	-.03	-.45	[-1.16, .27]	-.03	-.41	-.50
Prototype	.07	[-.02, .27]	.02	.17	[-.22, .61]	.06	.60	1.20
F							3.63***	
R^2							.060	

** p <. 05, ** p < .01, *** p < .001*

Participation, it was indirectly associated with Participation through BNS and/or RAI. Overall, the combined indirect associations of Older Adult Identification and Older Adult norms explained 6% of participation (Table 4 – Total Effect). Older Adult Identification, Older Adult Norms, BNS, and RAI, together explained 20% of Participation.

Discussion

We aimed to evaluate assumptions of a proposed integration of the assumptions of the Social Identity Approach (SIA) and of Self-Determination Theory (SDT) by determining the associations between perceived older adult exercise norms, exercise motivation (i.e., basic needs satisfaction (BNS) and self-regulation), and exercise participation, among older adults. Our findings confirm that older adults' perceptions of older adult exercise norms explain their experienced BNS in exercise involvement. The more that the surveyed older adults perceived positive older adult identity norms for exercise involvement, the more they experienced BNS in exercise involvement. They were especially more likely to experience BNS the more they perceived that older adults should exercise (i.e., injunctive norm).

In line with the assumptions of SDT, the experience of BNS in exercise involvement explains older adults' experience of self-regulation in exercise involvement (i.e., autonomous motivation to exercise). The more the surveyed older adults experienced BNS in exercise, the more that they experienced to self-regulate their exercise involvement (i.e., the more that they were autonomously motivated to exercise). Older adults' perceptions of older adult norms for exercise indirectly explain older adults' experience of self-regulation in exercise involvement (i.e., autonomous exercise motivation) by explaining their experience of BNS in involvement in exercise. The more that the surveyed older adults perceived positive older adult norms for involving in exercise, the more they felt to self-regulate their exercise involvement (i.e., the more they were autonomously motivated to exercise) as a result of experiencing more BNS in exercise involvement. Furthermore, older adults' perception that older adults should exercise (i.e., injunctive norm) is also directly related to their experience of self-regulation in exercise involvement (i.e., autonomous exercise motivation). The more that the surveyed older adults perceived that older adults should exercise, the more they self-regulated their exercise involvement (i.e., the more that they were autonomously motivated to exercise).

In further correspondence with SDT, older adults involve in exercise more when they experience more BNS in exercise involvement, and therein more experience to self-regulate their exercise involvement (i.e. are more autonomously motivated to exercise). Among the surveyed older adults, experienced BNS in exercise explained exercise involvement, partly as a result of reflecting more experienced self-regulation in involvement (i.e., more autonomous motivation to exercise). Consequently, the perception of more positive older adult norms for exercise indirectly explains exercise involvement by reflecting more experienced BNS and, subsequently, more experienced self-regulation (i.e., autonomous motivation) with regard to exercise involvement. However, although all of the surveyed older adult norms for exercise were indirectly associated with exercise involvement through exercise motivation, only the perception that older adults should exercise (i.e., the injunctive norm) sufficiently influenced the experienced BNS and self-regulation in exercise (i.e., autonomous motivation) of older adults to (be able to) affect exercise involvement significantly.

In sum, these findings confirm that perceived age norms constitute a source of social support for BNS in exercise that affects older adults' self-regulation in exercise involvement (i.e., autonomous exercise motivation). The more that older adults perceive that older adults involve in exercise (i.e., descriptive norm), that older adults should involve in exercise (i.e., injunctive norm), and that involving in exercise is age normatively defining for older adults compared to younger adults (i.e., prototype norm), the more they experience BNS and self-regulation in exercise, and were autonomously motivated to exercise. In the sequence, their perceptions of these age norms are indirectly associated with their actual involvement in exercise by being positively related to their (autonomous) motivation for exercise (i.e., BNS and self-regulation in exercise). This effect of perceived age norms is the most potent for the injunctive norm, i.e., the perception that older adults should engage in exercise.

Based on our proposed integration of the assumptions of SIA and SDT, we expected that older adults' perceptions of older adult norms for exercise would be more positively (i.e., more strongly) associated with their experienced BNS and self-regulation (i.e., autonomous motivation) in exercise, and subsequently with their exercise involvement, the more that they perceive themselves as an older adult. Contrary to expectation, the extent of identification as an older adult did not moderate the associations of perceived older adult norms for exercise with experienced BNS and self-regulation (i.e. autonomous motivation). Perceived older adult norms for exercise were not differently related to

experienced BNS and self-regulation (i.e., autonomous motivation) in exercise involvement, and with exercise involvement, based on the extent of identification as an older adult. This suggests that older adults are affected in their (autonomous) exercise motivation and their exercise involvement by their perception of older adult norms for exercise, regardless of the extent that they perceive themselves as an older adult. This finding seems to disconfirm our proposed integration of SIA and SDT.

However, the absence of moderation by older adult identification in the association of perceived older adult exercise norms to (autonomous) exercise motivation and (indirectly) to exercise involvement could be attributable to the finding that the majority of the participants in this study (85.8%) perceived themselves as an older adult. Consequently, these older adults could have experienced that the older adult exercise norms they reported applied to them, and corresponded to their own. Less than seven percent of the participants in this study rejected that they were older adults. Only those participants may have experienced that the older adult social identity norms were not their personal norms, and therein may even have experienced these norms as controlling when they felt they were perceived as an older adult by their social environment. Only these study participants may have experienced a significantly lower self-intrinsic valuation of (i.e., BNS) exercising in line with their perceived older adult norms for exercise, and less self-regulation in exercising like an older adult. Therefore they may have had a significantly lower autonomous motivation to exercise in line with their perceived older adult norms for exercise and have been less probable to exercise like an older adult.

Because the vast majority of the study participants did identify themselves as an older adult, the perceived older adult norms can be expected to have (generally) been positively associated with the participants' BNS and self-regulation in exercise involvement, and to be positively related to their autonomous exercise motivation and to their exercise involvement. However, it is possible that not the extent of identification as an older adult is the determinant for whether older adult exercise norms lead to less or more (autonomous) exercise motivation and involvement, but that this motivation and involvement rather depends on whether one perceives oneself as an older adult or not. Therefore, in order to further evaluate the validity of the proposed integration of SIA and SDT, future research should aim to evaluate whether rejecting the social identity of older adult leads to a reduced self-intrinsic valuation (i.e., BNS) of exercising in line with the perceived older adult norms for exercise, and leads to a reduced autonomous motivation or increased controlled motivation to exercise accordingly.

Implications

The findings of the present study confirm that older adults' perceptions of older adult norms for exercise involvement are positively associated with their self-intrinsic valuation (i.e., BNS) of exercise involvement, and with their experienced self-regulation in exercise involvement. This indicates that older adults are autonomously motivated to exercise in line with perceived age norms for exercise for older adults. Moreover, it suggests that perceived (social) older age norms for exercise – and specifically the injunctive age norm – need to be considered a potent source of social support for exercise involvement among older adults.

This finding represents critical knowledge with regard to the promotion of exercise among older adults. In society, there are (pervasive) negative age norms for exercise involvement for older adults. The majority of older adults in society are insufficiently involved in physically activity, including in exercise, to maintain their physical and mental health and functioning (Kruger, Carlson, & Buchner, 2007; Sjöström, Oja, Hagströmer, Smith, & Bauman, 2006; Wijndaele et al., 2006). In other words, involving in exercise is not (descriptively) normative among older adults. Moreover, older adults represent the age group that is the least involved in exercise (Hartmann-Tews, 2006; Van Tuyckom & Scheerder, 2010): Exercise involvement reduces with increasing age (Shaw, Liang, Krause, Gallant, & McGeever, 2010). This implies that involvement in exercise not age normatively descriptive of older adults. Considering the finding of the present study that such older adult norms for exercise are positively associated with the exercise motivation and (indirectly) to the exercise involvement of older adults, it is essential to develop interventions that counterweigh the potential maladaptive impact of these negative norms on involvement in exercise at an older age in order to promote exercise involvement among older adults.

One potentially valuable approach to preventing such harmful effect of negative older adult exercise norms is to advertise older adults that model a healthy involvement in exercise. This model would disconfirm the existing perception of negative older age norms for exercise involvement. For example, witnessing another older adult effectively involve in pole-vaulting sends older adults the message "older adults still (can effectively) involve in pole-vaulting". This perception might motivate older adults to involve in pole-vaulting, or to involve in other athletic exercise activities. Another potentially valuable approach is to address older adults on alternative social identities (e.g., OKRA-

member) with more positive (social identity) norms for involving in exercise. For example, Van Hoecke (2013) found that addressing older adults on a social identity with positive norms for exercise involvement is an effective approach in motivating older adults (to continue) to involve in an exercise activity. Similarly, providing older adults with opportunities to involve in exercise activities that are (designed to be) age normatively descriptive for older adults (e.g., Nordic walking, older adult gym hour) could be a valuable approach to motivate older adults to involve in exercise. For example, when older adults perceive that the majority of the people who participate in Nordic walking or in a gym class are older adults, they may perceive that engaging in this exercise activity could be (self-intrinsically) valuable to them, and might be more autonomously motivated to participate in this exercise class. Such SIA-based interventions are currently being advocated as a valuable approach to promote health behavior, and to benefit health and well-being, among members of specific social (age) groups (Jetten, Haslam, & Haslam, 2012).

Limitations

The most important limitation of this study resides in our definition of older adult as a '55-years-old-or-older adult'. Our definition of 'older adult' is a cognition-based definition in presenting a clear-cut social criterion (i.e., being 55-years old or older) of what we considered an older adult. The study participants decided whether they perceived themselves as an older adult or not by cognitively checking their age against this (socially) presented age criterion. Consequently, almost all study participants identified themselves as an older adult because they were all 55 years old or older. As a result of this high number of study participants who identified themselves as an older adult, it remains unclear whether or not older adults who do not see themselves as an 'older adult' are (more) negatively influenced in their self-intrinsic valuation of exercise involvement (i.e., BNS), in their experienced self-regulation in exercise involvement (i.e., autonomous exercise motivation), and in their exercise involvement, than older adults who do not. In the present study, we opted for this definition of 'older adult' because we worked with OKRA, a social organization that advertises itself to older adults as a social organization for '55-years-old-and plus adults'. In future studies that aim to evaluate our proposed integration of SIA and SDT, it is advisable to measure identification with the social identity with an emotion-based definition that includes a criterion that is internal to the perception of the

participants (e.g., Do you feel to be an ‘older adult’). It depends on the older adults’ perception of the concept ‘older adult’ whether they perceive themselves as an older adult and feel that the perceived norms for older adults apply to them.

A second limitation is that each of the study participants is a member of a social organization for older adults (i.e., OKRA) that provides social exercise activities to its members. As a consequence, they could significantly differ in their perceptions of social age norms for exercise involvement, and in their (autonomous motivation for) exercise involvement compared to older adults who are not socially engaged in such a social organization for older adults, or to older adults who are not socially engaged at all. Therefore the associations that exist between these older adults’ perceived social age norms for older adults and the (autonomous motivation for) exercise involvement could differ significantly from those of our participant sample. This implies that the observed associations between the perceived social age norms for older adults and (autonomous motivation for) exercise involvement cannot be generalized to the general older adult population.

The cross-sectional design of the study is a third limitation. This design enables to determine the associations between older identification, older adult (age) norms for exercise, self-intrinsic valuation (i.e., BNS) and self-regulation of exercise involvement, autonomous exercise motivation, and exercise involvement, among older adults. Based on our proposed integration of the validated assumptions of SIA and SDT, it is possible to propose causality in the identified associations. For example, it is possible to infer from our proposed integration of SIA and SDT that older adults’ perceptions of the older adult norms for exercise determine their experience of BNS in exercise. However, this theoretically proposed causality could not be determined in the associations that were identified in the present study because the data is cross-sectional: All of the concepts were measured at the same moment in time. Therefore it cannot be excluded that – contrary to the sequence that is proposed in our integration of SIA and SDT – older adults’ experience of BNS exercise involvement determined their perception of the older adult norms for exercise involvement. Our proposed integration of SIA and SDT should be evaluated in a study with a longitudinal design in order to determine this sequence of influences, or causality.

A fourth and final limitation is that no other forms of available social support were measured. The provision of support for involvement in exercise by significant persons (e.g., by a partner, family member, friend) and groups (e.g., family, community, society) has been found to determine exercise involvement significantly (Wendel-Vos, Droomers, Kremers, Brug, & van Lenthe, 2007) among older adults (van Stralen, De Vries, Mudde, Bolman, & Lechner, 2009). Controlling for the influence of these forms of social support on exercise involvement would enable us to determine the relative value of older adults' perceived older adult norms in explaining their (autonomous) exercise motivation (i.e., their experienced BNS and self-regulation in exercise involvement), and their exercise involvement.

Conclusion

Among older adults, perceived (older) age norms for exercise are positively related, in sequence, to the self-intrinsic valuation of exercise involvement (i.e., experienced basic needs satisfaction), to the experience of self-regulation in exercise involvement (i.e., autonomous exercise motivation), and to exercise involvement. This implies that older age norms for older adults directly affect both the self-intrinsic valuation of exercise involvement (i.e., BNS) and the autonomous motivation for involving in exercise (i.e., experienced self-regulation), and thereby indirectly affect the exercise involvement, of older adults. Especially the perception of older adults that older adults should exercise (i.e., injunctive norm) has a potent effect on their exercise motivation and participation. Contrary to expectations that were formed based on our proposed integration of the (validated) assumptions of the Social Identity Approach (SIA) and Self-Determination Theory (SDT), these effects of older age norms do not differ in strength depending on the extent that older adults perceive themselves as an older adult, and thus perceive that the perceived older age norms apply more or less to themselves. However, further research is needed to determine whether only older adults that identify themselves as older adult are (more) positively influenced by social identity norms. Considering the existing negative older age norms in society, the finding of this study underscore the importance of presenting positive older age norms for exercise involvement to older adults.

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Chapter 3

“I am getting too old for running.”

Does Salience of the Older Adult Identity

Influence The Self-Determined Motivation to Exercise?

Pelssers, J., Vanbeselaere, N., & Boen, F.

Abstract

When older adults are aware of their age, their perception of older age norms for involvement in exercise potentially affect their exercise motivation. Based on a proposed integration of the assumptions of the Social Identity Approach (SIA) and Self-Determination Theory (SDT), the present study was designed to evaluate the effects of the salience of older age, the salience of the older adult identity norms for exercise, and the valence of these salient older adult identity norms, on the self-based (i.e., autonomous) exercise motivation, the exercise intentions, and the exercise performance, of older adults. In total, 120 older adults between the ages of 65-70 years old were invited to evaluate a (fictional) new exercise activity, 'Pattern Stepping'. They were randomly assigned to one of four experimental conditions in which the salience of older age was manipulated together with the salience and the valence of older adult identity norms for Pattern Stepping. Before and after the manipulations, the participants completed measures of Pattern Stepping performance and indicated their self-based (i.e., autonomous) motivation (i.e., basic needs satisfaction; self-regulation) for Pattern Stepping and exercise involvement. At the end of the evaluation trial, they reported their intention to involve in Pattern Stepping in the future, and their identification as an older adult. Repeated measures ANOVAs revealed that basic needs satisfaction in Pattern Stepping decreased when older age was (manipulated to be) salient, while it increased when involvement in Pattern Stepping was presented as age normative for younger adults in the (manipulated) salience of older age. Further, experienced self-regulation in (i.e., the autonomous motivation for) exercise involvement diminished when Pattern Stepping involvement was presented as age normative for older adults, but increased when involvement in Pattern Stepping was presented as age normative for younger adults, in the (manipulated) salience of older age. Considering that the majority of the study participants did not identify themselves as an older adult, the findings suggest that age norms for exercise should match with older adults' subjective age to affect their autonomous exercise motivation.

Keywords: Seniors, Physical Activity, Social-Determination Theory, Social Identity Approach

Introduction

"I am getting too old for running." With those words my father[1] informed me that he would cede his lifelong hobby of running at the age of 64. When I tried to persuade him that being too old for anything is merely a thought, he countered: "Do you see many people of my age running? It's not for my age anymore." In his perception, people of his age did not run, indicating that, maybe, he should not be running either. He put his running shoes in the closet, quitting an activity he loved ever since running home from school when he was a young boy. His account illustrates that age comes with norms that guide our behavior. My father acted his age by adhering to what he perceived to be *normal* behavior for people of his age: He stopped running.

The Social Identity Approach (SIA; Haslam, 2004) provides an explanation for why individuals tend to adhere to age norms. According to SIA, individuals mentally form a social identity when a personal characteristic that is shared with others, such as age, becomes salient to them. For example, when my father noticed that almost all runners who were passing him on his run were in their twenties or early thirties, his older age became salient to him. Due to this salience of his older age, he is expected to have mentally formed the social identity 'older adult'. Such a social identity is defined by those personal characteristics that are perceived to be distinctively normative for the individuals who share the salient personal characteristic (in comparison to those individuals who do not). Thus, when my father noticed that the runners who passed him on his run were predominantly younger adults, he (might have) concluded: "Older adults do not run (quickly)." SIA proposes that when individuals perceive themselves in the frame of a salient social identity, they (tend to) behave accordingly. My father acted in line with his feeling of being an older adult: He quit running because he believed that it was not (*normal*) for his age anymore.

From the SIA perspective, it is unsurprising that older adults feel 'too old for running'. There are apparent negative age norms for involvement in exercise at an older age. Although regular involvement in exercise essentially promotes the health and well-being of older adults (Chodzko-Zajko et al., 2009; Fiatarone Singh, 2004; Nelson et al., 2007), the vast majority of older adults do not (sufficiently) involve in this health behavior (Kruger, Carlson, & Buchner, 2007; Sjöström, Oja,

[1] father of the lead author

Hagströmer, Smith, & Bauman, 2006). More importantly, involvement in exercise declines with increasing age (Shaw, Liang, Krause, Gallant, & McGeever, 2010): Older adults involve considerably less in exercise than their younger counterparts (Hartmann-Tews, 2006; Van Tuyckom & Scheerder, 2010). This signals that *not* involving in exercise is distinctively age normative for older adults. Based on the assumptions of SIA, these negative older adult identity norms potentially thwart older adults' involvement in this health behavior when their older age is salient to them. They might stop to engage in exercise by adhering to what is distinctively normative for their age, just like my father did.

There is ample evidence that when individuals see themselves in the frame of a salient social identity, their perception of what constitutes the normatively defining health behavior for this social identity affects their health behavior (for an overview, consult: Tarrant, Hagger, & Farrow, 2012). Consequently, the use of SIA for the promotion of health behavior has been advocated (Haslam, Jetten, Postmes, & Haslam, 2009; Jetten, Haslam, & Haslam, 2012). The underlying reasoning is that addressing individuals on social identities with positive norms for health behavior motivates them to involve in this health behavior. Confirming the efficacy of this approach to the promotion of health behavior, interventions that addressed individuals on a social identity and emphasized this social identity's positive norms for exercise involvement have been proven to be effective in promoting exercise involvement (Pearson, 2008) among older adults (Van Hoecke, 2013). This approach could be specifically valuable in promoting health behavior among individuals who have a social identity that is associated with apparent negative norms for a health behavior. Like my father, who decided to quit running because he perceived himself as an older adult, individuals also tend to behave in line with such negative social identity norms for health behavior, even while knowing that their behavior is unhealthy (Oyserman, Fryberg, & Yoder, 2007). An activation of alternative social identities with more positive norms for the health behavior attenuates, and even overturns, this maladaptive effect (Tarrant & Butler, 2011). Alternatively, emphasizing a more positive social identity norm for the health behavior – e.g., showing my father a documentary film on older adults who run at the age of eighty – could potentially counter the harmful effects of the perception of (existent) negative social identity norms for the health behavior.

It is essential to understand why individuals behave in line with social identity norms for (health) behavior in order to promote health behavior effectively with SIA. Unfortunately, the motivational processes that underlie this adherence to social identity norms have rarely been studied from the perspective of Self-Determination Theory (SDT; Deci & Ryan, 1985; Ryan & Deci, 2000), one of the dominant theories on (the) motivation (for health behavior). In this study, we propose an integration of the assumptions of SIA and SDT that explains how social identity norms (could) affect the motivation for (health) behavior. In order to evaluate this theorizing, we assessed the effects of the situational salience of older age, the situational salience of older adult identity norms for exercise, and the valence of these situational salient older adult identity norms, on the exercise motivation, intentions, and performance, of older adults.

The Self-Regulation of (Health) Behavior

The core proposition of SDT is that the motivation to involve in (health) behavior is of a better quality the more it originates from 'the self', and the more individuals want to involve in the (health) behavior out of their own volition. According to SDT, this is determined by the experienced satisfaction of three innate psychological needs in (health) behavior involvement: The basic needs for autonomy, competence, and belongingness. Why the satisfaction of these basic needs exactly leads to the sense of *wanting* to involve in a (health) behavior out of one's self has not been clearly specified in SDT, but we presume that it arises because fulfillment of these three basic psychological needs in involvement in the (health) behavior reflects that the individual self-inherently values (the outcomes of) involving in the (health) behavior.

The need for autonomy is fulfilled when involvement in the (health) behavior is in line with the preference of the individual because he/she values (the outcomes of) involving in the (health) behavior. The need for competence is satisfied when the individual experiences to be effective in the (health) behavior due to it leading to outcomes that he/she values. The need for belongingness is met when the individual experiences to be positively connected to others (i.e., to individuals or groups) whom he/she values through his/her involvement in the (health) behavior. We presume this sense of social belonging is an outcome of involvement in (health) behavior that is valued by each individual. The more that individuals expect/experience these basic psychological needs will be/are satisfied by

involving in a (health) behavior, the more they (self-inherently) value involvement in this (health) behavior, and the more they (*want* to) involve in it out of their own volition (i.e., out of their self).

In SDT it is proposed that individuals strive to satisfy these three basic psychological needs because, we presume, individuals are by nature driven to be effective – i.e., to achieve outcomes they value – in their interaction with their environment. As a consequence, the more involvement in a (health) behavior satisfies the basic psychological needs of individuals – i.e., the more that individuals value (the outcomes of) being involved in a (health) behavior – the more likely it is that they will involve in this (health) behavior. It implies that individuals are better motivated for involving in a (health) behavior the more their motivation originates from their self, and the more they (*want to*) involve in it out of their own volition.

SDT broadly distinguishes between motives that predominantly originate from within the self and motives that do not. *Autonomous motivation* refers to motives that predominantly originate from within the self (i.e., from a predominantly self-inherent appreciation of (health) behavior involvement). When individuals have autonomous motives, they *want to* involve in the (health) behavior out of their own volition (i.e., out of their self) because they value (the outcomes of) the (health) behavior, and they experience that their involvement in the (health) behavior is regulated by their self. On a continuum from most to least experienced autonomy (i.e., self-regulation) in (health) behavior involvement, autonomous motives include involving in a (health) behavior out of feelings of intrinsic appreciation (e.g., enjoyment) that arise from involving in the (health) behavior (i.e., self-intrinsic regulation), because the (health) behavior is a self-valued aspect one's identity (i.e., self-integrated regulation), or because one considers (health) behavior as valuable (i.e., self-identified regulation).

Controlled motivation refers to those motives that predominantly originate external to the self (i.e., from a predominantly self-external/social appreciation of the (health) behavior). When individuals have such controlled motives, they feel they *have to/should* involve in a (health) behavior because (they expect/experience that) their social environment appreciates (the outcomes of) their involvement in this (health) behavior. Therein individuals experience that their involvement in the (health) behavior is predominantly not regulated by their self, but instead is 'controlled' by their social environment: They feel socially pressured to involve in the (health) behavior. On the continuum from most to least experienced autonomy (i.e., self-regulation) in (health) behavior involvement, these controlled motives

include involving in a (health) behavior out of feelings of social appreciation (e.g., pride or reduced guilt/shame) in involvement in the (health) behavior (i.e., self-introjected regulation), or because involvement in the (health) behavior is socially appreciated (e.g., out of social rewards or avoided social punishment) (i.e., self-external regulation).

Both autonomous and controlled motives lead to involvement in (health) behavior, but only autonomous motives have been found to result in a maintained/persisted involvement in (health) behavior (Deci & Ryan, 2008). According to SDT, this occurs because individuals in nature strive to fulfill the basic psychological needs – i.e., to feel effective in achieving self-appreciated outcomes – in (health) behavior involvement. In contrast to social appreciation, this personal appreciation of (the outcomes of) (health) behavior involvement is ever-present in guiding the behavior of individuals (because it is inherent to their self). As a consequence, individuals are (more) continuously driven to involve in (health) behaviors for which they are autonomously motivated. Consequently, social support would be more effective in promoting (a maintained/persisted) involvement in a (health) behavior the more it succeeds in enhancing individuals' autonomous motivation by increasing their perceived/experienced satisfaction of the basic psychological needs in – i.e., by increasing individuals' self-inherent appreciation of – (health) behavior involvement. These tenets of SDT have been validated for various (health) behaviors (Deci & Ryan, 2008), including for exercise involvement (Teixeira, Carraca, Markland, Silva, & Ryan, 2012; Wilson, Mack, & Grattan, 2008).

The proposed central role of (experienced) self-regulation in motivation is emphasized by the consistent inclusion of self-regulation in alternative theories on motivation for (health) behavior. Both Theory of Planned Behavior (TPB; Ajzen, 1991) and Social-Cognitive Theory (Bandura, 1986, 1989, 1991, 2004, 2005) emphasize that individuals are (self-)motivated for involving in a (health) behavior when they feel they are effective in the (health) behavior (i.e., self-efficacy) and personally appreciate (the outcomes of) (health) behavior involvement (i.e., involvement in the (health) behavior is in correspondence with their values/attitudes). In these theories, it is presumed that the more that individuals feel effective in a (health) behavior, and the more they appreciate (the outcomes of) involving in this (health) behavior, the more they would intent (TPB), and engage in self-regulatory activity (i.e., goal setting, planning, self- monitoring and -management) (SCT) to involve in the (health) behavior. Social support that increases individuals' perceived/experienced self-efficacy in/appreciation

of (health) behavior involvement – i.e., social support that increases the perception/experience of being able (i.e., competence) to achieve self-appreciated (i.e., autonomy) outcomes through involvement in a (health) behavior – would enhance individuals' intention to involve in this (health) behavior, and (subsequently) lead to (increased) involvement in this health behavior. These assumptions have been validated for various (health) behaviors, including for exercise involvement (e.g., Anderson, Wojcik, Winett, & Williams, 2006) among older adults (e.g., Ayotte, Margrett, & Hicks-Patrick, 2010).

When using SIA for the promotion of a (health) behavior, it is essential to enhance the personal appreciation of (the outcomes of) involvement in the (health) behavior in order to promote autonomous motivation for, and subsequently, a maintained/persisted involvement in the (health) behavior. However, to our knowledge, it has not yet been determined how social identity norms influence the autonomous motivation for – i.e., the self-regulation of – (health) behavior. In order to fill this void, we propose and evaluate an integration of the tenets of SIA and SDT that explains how social identity norms (could) affect the autonomous motivation for – i.e., the experienced self-regulation of – (health) behavior.

Social Identity Norms as Basic Needs Support

Social norms are a form of social information to individuals. It is proposed that social norms inform the observer of what is effective behavior. When individuals commonly involve (i.e., descriptive social norm) and/or are commonly expected to involve (i.e., injunctive social norm) in a (health) behavior, this informs observers that involvement in this (health) behavior is (experienced/perceived by the individuals in their social environment to be) effective – i.e., leads to outcomes that are (socially) valued (Cialdini, 2007). In informing individuals of what is (socially considered to be) effective behavior, social norms are a form of social support for behavior. Consequently, when such social norms are salient, individuals tend to behave in line with these social norms (e.g., Cialdini et al., 2006; Goldstein, Cialdini, & Griskevicius, 2008; Mollen, Rimal, Ruiter, & Kok, 2013). It is noteworthy that this adherence is more likely when descriptive norms are salient than when injunctive norms are salient.

Drawing on the assumptions of SDT, we propose that the extent to which salient social norms for a (health) behavior affect involvement in this (health) behavior is dependent on the extent to which

these social norms are in correspondence with individuals' personal norms for the (health) behavior. When the social norms correspond with their personal norms, the social valuation of (health) behavior involvement is in line with their personal valuation of (health) behavior involvement, and the social norms would be (experienced/perceived) as basic needs supportive. This implies that the more that social norms correspond with individuals' personal norms for a (health) behavior, the more that individuals would be autonomously motivated to involve in the social normative (health) behavior, and the more likely they are to adhere to the social norms for the (health) behavior, when these social norms are salient.

SIA proposes that when individuals feel to *belong* to a salient social group (e.g., older adult age group) and perceive their self in the frame of this social identity (e.g., 'older adult'), the social identity norms are internalized as their own. Vice versa, when individuals perceive that their personal norms correspond with social identity norms, this individual is expected to feel to *belong* to this social group, and see their self in terms of this social identity (Figure 1). Essentially, it is presumed by SIA that *only* when individuals feel to *belong* to a social group (e.g., older adult age group) and see themselves in the frame of this social identity (e.g., older adults), they will adhere to the social identity's norms for a (health) behavior. Therefore SIA proposes that the adherence to social identity norms occurs out of a desire (or need) to *belong* to the (salient) social group.

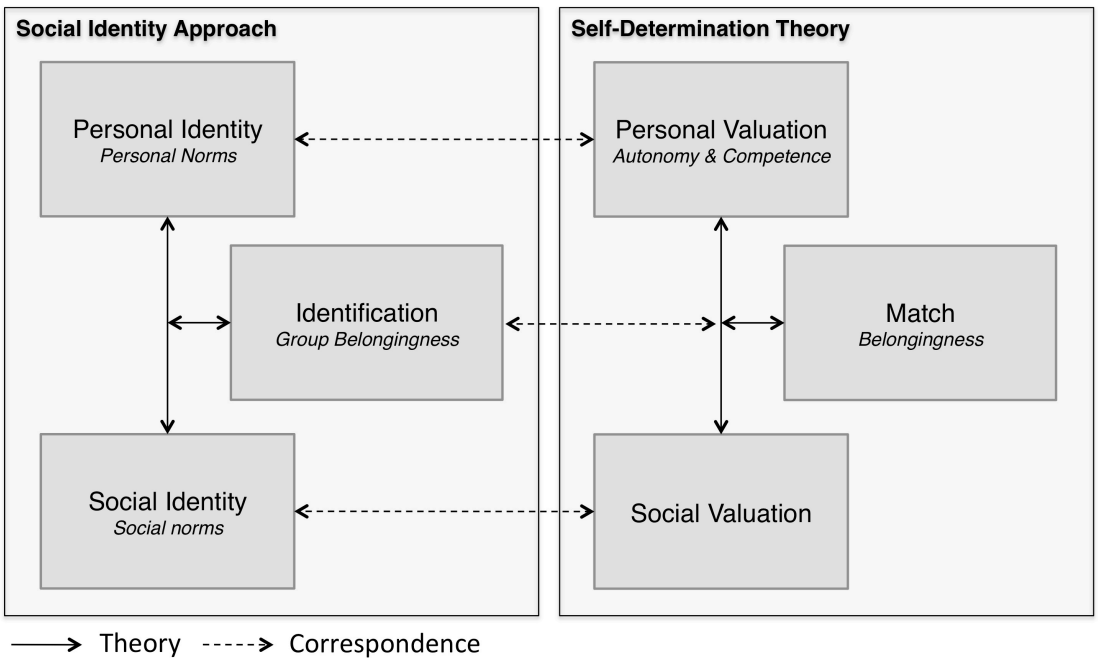

Figure 1. Integration of Social Identity Approach in Self-Determination Theory

Based on the assumption that social (identity) norms signal what is socially considered to be effective (health) behavior (for the individuals who have the social identity), we propose that when individuals feel to *belong* to a social group (e.g., older adult age group) and see their self in the frame of a social identity (i.e. older adult), this social identity's norms for a (health) behavior determine their autonomous motivation for involving in this (health) behavior by shaping their (perceived/experienced) basic needs satisfaction in (health) behavior involvement. When they identify themselves in terms of a (salient) social identity (e.g., older adult), it strengthens their perception/experience that involvement in the social identity normative (health) behavior is effective for them (i.e., leads to outcomes which they value) because the social identity norms are perceived/experienced as their own. Therein the social identity norms determine their expected/experienced basic needs satisfaction in the (health) behavior (Figure 1). This implies that the more individuals identify themselves in terms of a social identity, the more they would be(come) autonomously motivated for the social identity's normative health behavior – i.e., the more they would: expect to experience feelings of intrinsic appreciation (e.g., enjoyment) in the social identity's normative (health) behavior (i.e., self-intrinsic regulation), perceive/experience the social identity's normative (health) behavior a self-valued aspect of their identity (i.e., self-integrated regulation), and/or consider the social identity's normative (health) behavior to be important (i.e., self-identified regulation) – when this social identity is salient to them. For example, it implies that when an older adult (e.g., my father) identifies himself as an older adult, he would become less autonomously motivated to exercise (i.e., more autonomously motivated not to exercise) when his social older adult identity is salient to him because he socially perceives that 'not involving in exercise' is normative for the (social) identity of being an older adult, and considers these exercise norms to be his own.

When individuals do *not* feel to *belong* to a social group (e.g., older adult age group) and thus do not see their self in terms of this social identity (e.g., older adult), they perceive/experience that the social identity norms for (health) behavior are irrelevant to them: The social identity norms are not perceived/experienced to apply to them. The social identity norms for a (health) behavior will not affect their (autonomous) motivation for involvement in this (health) behavior because then the social identity norms do not determine their (expectation/experience of) basic needs satisfaction in (health) behavior involvement. In line with the assumptions of SIA, this implies that individuals do not adhere to social identity norms for (health) behavior (out of themselves) when they do not identify themselves in terms

of a social identity. For example, when an older adult (e.g., my father) does not identify himself as an older adult, his autonomous motivation for exercise involvement would not be affected by the social older adults identity norms for exercise involvement because they would not apply to him: He would not consider these exercise norms his own.

However, an interesting situation occurs when individuals perceive/experience that their social environment considers them to belong to a social group (e.g., feeling that one is considered an 'older adult' by one's social environment because the social environment considers one's age to be 'older adult' age), but do not feel to belong to this social group themselves (e.g., do not perceive themselves as/experience being an older adult). In such a situation, individuals would experience that their social environment assumes that the social identity norms are their personal norms, while they do not. We presume that individuals would then perceive/experience the social identity norms as a form of social control. When a social identity is socially imposed on individuals or the social environment incorrectly assumes the social identity norms for a (health) behavior to be individuals' personal norms, these individuals perceive/experience that their social environment pressures them to behave accordingly because these social identity norms signal what the social environment considers as effective (health) behavior – i.e., (health) behavior which leads to outcomes that are (socially) valued – for them. This perceived/experienced social appreciation of their engagement in the social identity normative (health) behavior will lead to controlled motives, such as engaging out of feelings of social appreciation (e.g., out of pride, or avoided guilt or shame) (i.e., self-introjected regulation) or out of social appreciation (e.g., to obtain social rewards or to avoid social punishment) (i.e., self-external regulation). As these controlled motives are less potent in promoting (persisted) behavior involvement, the salience of such a socially imposed social identity is less likely to lead to adherence to this social identity's norms for (health) behavior.

The abovementioned reasoning might explain why injunctive social norms have been found to be less potent in promoting (health) behavior. Because injunctive social norms have been defined as the *expectations of others* with regard to (health) behavior involvement, they are in definition a form of social control. They are likely to result in controlled motives for involvement in (health) behavior, which (in turn) are less likely to result in (a persisted) health behavior involvement. Only when the individual (self-inherently) appreciates being positively connected to the holders of these expectations and/or the

injunctive social norms are (brought) in line with the personal norms of the individual (i.e., are basic needs supportive), this individual could become autonomously motivated to involve in the (socially expected) health behavior.

In summary, we propose that when a social identity becomes salient to individuals, the extent to which they see themselves in terms of this salient social identity determines whether they (expect to) experience basic needs satisfaction when involving in a (health) behavior that is normative for this social identity. When individuals identify themselves in terms of a salient social identity, the social identity norms would become their personal norms, and they would experience (to want) to engage in the social identity normative (health) behavior out of their own volition, i.e., out of their self. Because only autonomous motivation is proposed by SDT to lead to (a persisted) involvement in a (health) behavior, individuals would behave (more) in line with the (health) behavior that is normative for a salient social identity when they identify themselves (more strongly) in terms of this social identity. This concurs with the assumption of SIA that individuals (would) only behave in line with a social identity's norms for (health) behavior when they identify themselves in terms of this social identity.

There is ample evidence for the assumptions that underlie our proposed integration of SIA and SDT. First of all, Christensen and his colleagues (2004) showed that individuals (i.e., university students) who (strongly) identified themselves in terms of a (salient) social identity (i.e., student of a specified university) and behaved in line with the social identity (injunctive) norm (for helping another university student in completing a task), experienced more positive emotions than those who behaved in line with these (injunctive) social identity norms, but did not (strongly) identify themselves in terms of the social identity. Furthermore, the individuals who strongly identified themselves in terms of this salient social identity and behaved in line with the norms of the social identity, reported that their self (i.e., their present behavior) was more in line with their self-standards for (i.e., their personal valuation of) involvement in this behavior than the individuals who behaved in line with the norms of the social identity, but weakly identified themselves in terms of the salient social identity. The findings of this study confirm our assumptions that only individuals who (strongly) identify themselves in terms of a salient social identity experience that the social identity norms are their own norms, and that this correspondence between social identity norms and personal norms leads to the experience of positive emotions (of belongingness to the social group).

Second, Sassenberg and his colleagues (2011) showed that individuals (i.e., university students) persisted longer in working on tasks (i.e., on tests of various academic competences) when their task performance did not match the task performance that was socially normative for the salient social identity (i.e., university student), but this occurred only when they (strongly) identified themselves in terms of this salient social identity. In line with SIA, they concluded that this persistence to adhere to the social identity norms confirms that individuals behave in line with social identity norms out of a desire (i.e., need) to belong to the salient social group. We agree with this conclusion, but add that this persistence reflects autonomous motivation: When individuals feel to belong to a salient social group and identify themselves in terms of this social identity, they will persist longer in the social identity normative (health) behavior because they consider the social identity norm for involving in this (health) behavior as their own norm. Specifically, they consider that engaging in the social identity normative (health) behavior is effective (in leading to outcomes which they value, including feeling to belong to the salient social group). Our proposition is in line with the conclusion by Sassenberg and his colleagues (2011) that when individuals identify their self in terms of a salient social identity, "*[the social identity] norms … function as part of the* self *… and serve as internally motivated standards for self-regulation*" (p. 896).

Third, the findings of a study by Amiot, Sansfaçon, and Louis (2014) provide further evidence for the validity of our proposition. Amiot and her colleagues showed that the more strongly individuals identify themselves in terms of a social identity (i.e., fan of a ice hockey team), the more their motivation to behave in accordance with this social identity's norms for a behavior (i.e., involvement in derogatory behavior towards the players/fans of the opposing ice hockey team) is self-based (i.e., autonomous), and the more they effectively behave in line with the social identity's norms for a behavior, when this social identity is salient. This result confirms that the more individuals identify themselves in terms of a social identity, the more they self-inherently appreciate behaving in accordance with the social identity norms, and the more they (want to) engage in the social identity normative behavior out of their own volition, i.e., out of their self.

Finally, studies on the integration of the tenets of SIA and TPB have provided ample evidence that the more strongly individuals perceive themselves in terms of a social identity, the more the social identity norms (i.e., social valuation) correspond to the personal norms of these individuals (i.e.,

personal valuation), and the more those individuals (*want* to) behave in line with these social identity norms. More specifically, several studies have shown that only among individuals who identify themselves in terms of a social identity, the association that exists between personal values and attitudes with regard to (health) behavior involvement on the one hand, and the (intention for) involvement in the (health) behavior on the other hand, is strengthened/weakened by social identity norms that support (i.e., correspond with)/frustrate (i.e., do not correspond with) the individual's personal norms for involvement in the (health) behavior (see Smith and Louis (2009) for an overview). These findings suggest that the more individuals identify themselves in terms of a social identity, the more that the social identity normative values and attitudes are considered personal attitudes and values, and therefore the more likely they are (to be intent) to engage in the social identity normative (health) behavior. This corresponds with our proposition that individuals are more self-motivated to behave in line with social identity norms, the more they identify themselves in terms of a social identity because the social identity norms for the (health) behavior are then experienced as their own.

Older Adult Identity Effects on Exercise Motivation

In order to evaluate our proposed integration of the assumptions of SIA and SDT, the present study aimed to determine the effects of the situational salience of older age, of the situational salience of older adult identity norms for engaging in exercise, and of the valence of the situationally salient older adult identity norms, on the (self-based) exercise motivation, the exercise intentions, and the exercise performance, of older adults. Under the cover story of a marketing study, we invited older adults – aged 65-70 years old – to evaluate a fictional new exercise activity: 'Pattern Stepping'. Under the presumption that the participants of this study identified themselves as older adults, we expected that they would internalize the existent negative social older adult identity norms for exercise involvement when their older age was salient to them. Consequently, we expected that when their older age was made situationally salient, they would experience less basic need satisfaction in Pattern Stepping/in exercise (Hypothesis 1a), would be less autonomously motivated for Pattern Stepping/for exercise (Hypothesis 2a), would be less intent to involve in Pattern Stepping in the future (Hypothesis 3a), and would perform worse on Pattern Stepping (Hypothesis 4a) compared to when their older age was not made situationally salient. We further expected that this negative effect would

be even stronger when, in the manipulated situational salience of their older age, negative older adult identity norms for Pattern Stepping were made situationally salient (Hypotheses 1-4b) to them. Finally, we expected the situational salience of positive older adult identity norms for Pattern Stepping in the situational salience of older age would counter these negative effects and (potentially) increase experienced basic needs satisfaction in Pattern Stepping/in exercise (Hypothesis 1c), increase autonomous motivation for Pattern Stepping/for exercise (Hypothesis 2c), promote the intention to involve in Pattern Stepping in the future (Hypothesis 3c), and improve Pattern Stepping performance (Hypothesis 4c).

Method

Pattern Stepping

The Pattern Stepping exercise requires participants to perform prescribed sequences of footsteps on the Pattern Stepping exercise floor (Figure 2). Pattern stepping exercise grids are presented on this floor. Each grid consists of eight numbered squares (1-8) that form a 2 × 4 squares rectangle. In total twelve grids (A-L) are presented in a six-grids away (A-F) and six-grids back (G-L) circuit.

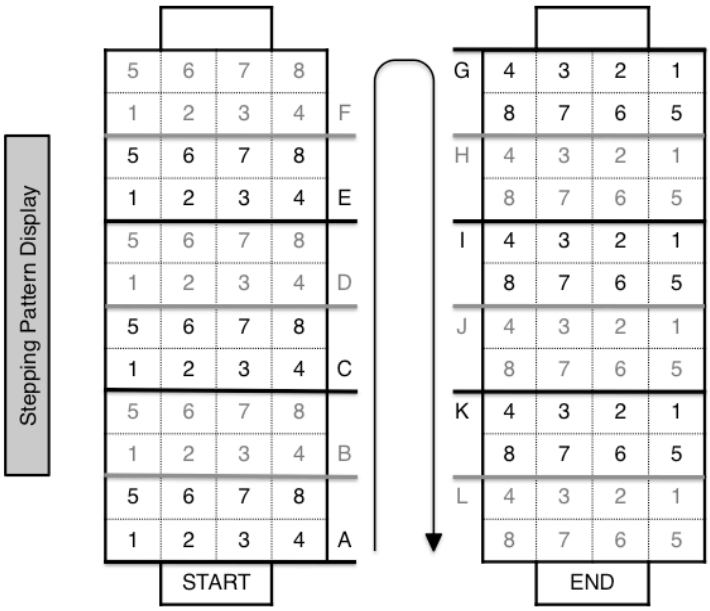

Figure 2. Pattern Stepping Exercise Floor

The sequence of footsteps (i.e., the stepping pattern) that needs to be completed within each of the twelve grids is prescribed on a display at the side of the exercise floor. Such stepping pattern consists of a number sequence of four (e.g., 2-5-6-1) to six (e.g., 1-3-5-6-1-7) numbers. Exercisers correctly perform a stepping pattern when, within one grid, they place one foot on the corresponding squares in accordance with the prescribed sequence. The prescribed stepping pattern needs to be completed within each of the grids. The objective of the exercise is to avoid errors in completing the stepping pattern as quickly as possible.

Design

The experiment had a Condition (4) × Time (2) between-within subjects design. The study participants were asked to evaluate Pattern Stepping in two evaluation trials. In the first trial (Time 1), they completed measures on their motivation for Pattern Stepping and for exercise, after their Pattern Stepping performance was measured in the absence of (the manipulation of) the situational salience of older age and of older adult identity norms for Pattern Stepping. In the second trial (Time 2), they completed the same measures of performance and motivation, and additional measures of the intention to involve in Pattern Stepping in the future, in one of four conditions. These conditions differed in (the manipulation of) the situational salience of older age and/or older adult identity norms for Pattern Stepping, and/or in the valence of these older adult identity norms (Figure 3).

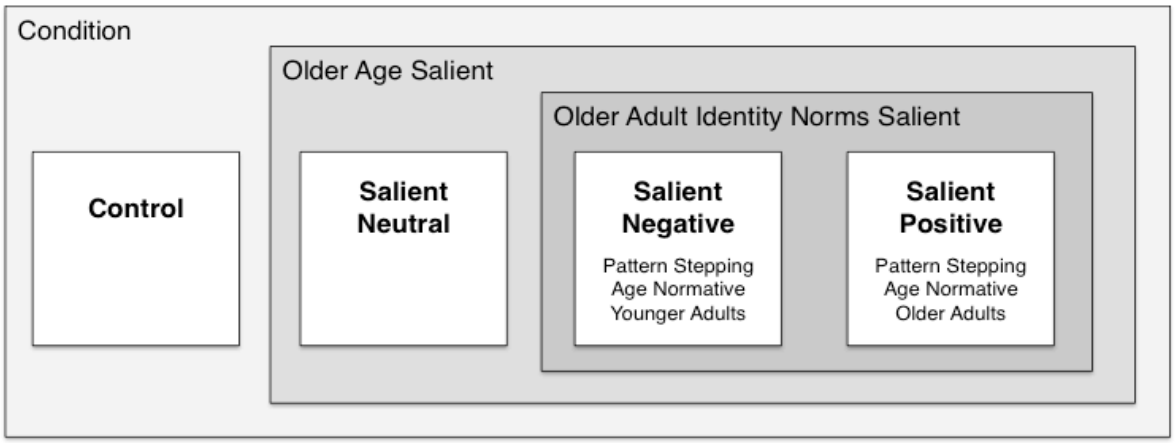

Figure 3. Conditions

In the *control condition*, the salience of both older age and older adult identity norms for Pattern Stepping was evaded. References to (older) age were deliberately avoided. Older adult identity norms for Pattern Stepping were not presented.

In the three *salient conditions*, older age was deliberately made situationally salient by means of a manipulation. These conditions differed in the manipulation of situational salience of older adult identity norms for Pattern Stepping, or in the valence of the situationally salient older adult identity norms for Pattern Stepping. In the *salient-neutral condition*, no older adult identity norms for Pattern Stepping were presented. In the *salient-negative condition*, negative older adult identity norms were presented: Pattern Stepping was described to be distinctively age-normative for younger adults. By contrast, in the *salient-positive condition*, positive older adult identity norms were presented: Pattern Stepping was described to be distinctively age-normative for older adults.

Participants

Under the cover of a marketing study on the new exercise activity 'Pattern Stepping', we recruited 120 older adults (65 to 70 years old) for study participation. Stratified for gender, the recruited participants were randomly assigned to one of the four conditions (n = 30). The mean age of the participants was 66.76 (SD = 1.62) years. The conditions did not differ in the age of their participants ($F(3,119) = .28$, $p = .84$). The number of male and female participants was equal (n = 60) in each of the conditions (n = 15).

Procedure

The recruited older adults participated individually in the study at an agreed moment of time. A university researcher welcomed them to the 'Pattern Stepping' study and informed them about the mock goal – i.e., the market evaluation of the new exercise activity 'Pattern Stepping' – and procedure of the study. After the participants provided their informed consent for study participation, the researcher screened the participants' health risks in participation with the revised Physical Activity Readiness Questionnaire (rPAR-Q; Thomas, Reading, & Shephard, 1992).

After participants were found eligible for study participation, the researcher explained Pattern Stepping according to a fixed protocol. This included a practice trial. During this trial, the researcher corrected any misinterpretations by the participant of exercise execution. When the exercise execution was clear to the participants, they completed the first evaluation trial of Pattern Stepping. In this evaluation trial, the participants performed three prescribed stepping patterns. Their performance on completing these stepping patterns was measured. Afterwards they completed an evaluation questionnaire. In this evaluation questionnaire, the participants reported their motivation to involve in Pattern Stepping and in exercise. The performance and motivation measures constituted the pre-manipulation measurement (Time 1).

The participants were offered a break after completing the first evaluation trial. During this break, the situational salience of older age, the situational salience of older adult identity norms for Pattern Stepping, and/or the valence of these situational salient older adult identity norms for Pattern Stepping, was manipulated. The manipulation depended on the condition of the participant.

After the break and the manipulation, the participants completed the second evaluation trial. In this evaluation trial, the participants executed three prescribed stepping patterns. Their performance on completing these patterns was again measured. Afterwards they completed an evaluation questionnaire. Therein they again reported their motivation for involving in Pattern Stepping and in exercise, and indicated their intention to participate in Pattern Stepping in the future. These performance, motivation, and intention measures formed the post-manipulation measurement (Time 2). In order to evaluate the efficacy of the manipulation, the participants were asked to indicate the extent to which they identified themselves as an older adult, and their perception of age norms for Pattern Stepping, at the end of the evaluation questionnaire. This concluded study participation. The participants were thanked for study participation with a gift from the university gift shop (worth: €10/$12).

Manipulation

Situational Salience of Older Age. In each of the three *salient conditions*, older age was made situational salient at the end of the first evaluation questionnaire (i.e., at the start of the break). On the last page of this questionnaire, the participants were asked to compare their present self with

their former, 'younger adult' self. They were asked to complete the sentence: "Compared to when I was a younger adult (i.e., to when I was between 20 and 25 years old), now I am/have …". They were asked to write down three differences.

Situational Salience & Valence of Older Adult Identity Norms. Both the situational salience of older adult identity norms for Pattern Stepping and the valence of these situational salient older adult identity norms for Pattern Stepping, were manipulated by means of a mock poster advertisement for a Pattern Stepping class. This poster advertisement was presented to the participants during the break between the first and the second evaluation trial. The content of this advertisement included a Pattern Stepping logo, information on Pattern Stepping, and two testimonies of Pattern Stepping exercisers. Depending on the condition, the advertisement content communicated no older adult identity norms, negative older adult identity norms (i.e., age normative for younger adults), or positive older adult identity norms (i.e., age normative for older adults) for Pattern Stepping. The researcher considered and discussed the content of the advertisement together with the participant. The researcher informed the participants that they could register for the advertised Pattern Stepping class at the end of the study.

Control Condition. The poster consisted of the Pattern Stepping logo and the text "Do you like to exercise? Or you want to start exercising? Participate in Pattern Stepping, the new popular exercise activity! Discover it for free in our class!" The testimonies of two Pattern Stepping exercisers were presented. The testimonies consisted of their written experiences of Pattern Stepping. The testimony of a female exerciser read: "Friends asked me to join them in Pattern Stepping. I had never heard of Pattern Stepping before. I liked it, and now I meet with friends every week to try new and more difficult patterns". The testimony of a male exerciser read: "I enjoy Pattern Stepping. It is relaxing". In order to convey the gender of these Pattern Stepping exercisers, each testimony was signed with a name.

Salient-Neutral Condition. The logo was adapted to include pictures of both older and younger adults to strengthen the situational salience of older age. The situational salience of older age was further strengthened by presenting information on the age of the exercisers who provided the testimonies: A headshot picture and a Pattern Stepping action picture were added to each testimony and their age was explicitly mentioned. The presented testimonies included the testimonies of a

younger adult woman and an older adult man. Therein this advertisement reinforced the situational salience of older age, without conveying age and gender norms for Pattern Stepping.

Salient-Negative Condition. In order to convey that Pattern Stepping is age normative for younger adults, the logo was adapted to include only pictures of younger adults. The text was adapted to read "… Pattern Stepping, the new popular exercise *among younger adults*! …". The testimonies by the Pattern Stepping exercisers were both from younger adults. Their younger adult age could be inferred from their headshot and Pattern Stepping action pictures, and from the explicit mentioning of their younger adult age. This advertisement reinforced the situational salience of the older age of the participant, and conveyed that Pattern Stepping is age normative for younger adults. The older adult identity norm was 'not involving in Pattern Stepping'.

Salient-Positive Condition. In order to convey that Pattern Stepping is age normative for older adults, the logo was adapted to include only pictures of older adults. The text was adapted to read "… Pattern Stepping, the new popular exercise *among older adults*! …". The testimonies by the Pattern Stepping exercisers were both from older adults. Their older adult age could be inferred from their headshot and Pattern Stepping action pictures, and from the explicit mentioning of their older adult age. This advertisement strengthened the situational salience of older age, and conveyed that Pattern Stepping is age normative for older adults. The older adult identity norm was 'involving in Pattern Stepping'.

Measures

Performance. The performance on Pattern Stepping was video-recorded. The required time to complete the stepping patterns, and the number of errors committed in completing the stepping patterns, were the measures of performance.

Time. The time between leaving the 'start' field and arriving at the 'end' field on the Pattern Stepping exercise floor was measured for the three prescribed stepping patterns in the evaluation session. The total time needed to complete the three prescribed stepping patterns of the evaluation session (in seconds) was the time performance measure.

Errors. The number of committed errors was recorded. One error corresponded to one or multiple missteps in the prescribed stepping pattern within one grid of the Pattern Stepping exercise floor. Therefore the maximum number of committed errors on each of the prescribed stepping patterns corresponded to the number of grids on the exercise floor: 12. The amount of errors committed on the three prescribed stepping patterns of the evaluation session (with a maximum of committed 36 errors) formed the error performance measure.

Motivation. The experiences of basic needs satisfaction and self-regulation in Pattern Stepping involvement and in exercise involvement were measured in order to determine the (degree of) self-based (i.e., autonomous) motivation for Pattern Stepping and for Exercise.

Basic Needs Satisfaction (BNS). The experiences of BNS in Pattern Stepping and BNS in exercise were (each) measured with nine items. For each of the basic needs (i.e., autonomy, competence, belongingness), need satisfaction was assessed with three items. The three items for the basic needs for autonomy (e.g., "I want to involve in Pattern Stepping/exercise") and competence (e.g., "I feel I am good in Pattern Stepping/exercising") were selected from the Psychological Need Satisfaction in Exercise Questionnaire (PNSE; Wilson, Rogers, Rodgers, & Wild, 2006) and the Basic Needs Satisfaction in Sports Scale (BNSSS; Ng, Lonsdale, & Hodge, 2011). The items were adapted to fit the purpose of this study. The three items for the basic need for belongingness were constructed. The items measured the expected/experienced social support for Pattern Stepping/exercise involvement (e.g., "The people who surround me in my life (would) react positively to my choice to involve in Pattern Stepping/exercise").

For each item, the participants indicated the degree to which they agreed with the item on a five-point Likert-scale that ranged from (1) 'completely do not agree' to (5) 'completely agree'. Exploratory factor analysis with Varimax rotation showed that the nine items formed one internally reliable measure of BNS in Pattern Stepping (explained variance = 64.9%) and in exercise (explained variance = 65.0%) that was internally reliable (Cronbach's α = .93 for experienced BNS in Pattern Stepping and in Exercise).

Self-Regulation. The experience of self-regulation in Pattern Stepping involvement was measured with three items. Each item described one of the differentiated levels of self-regulation, i.e., intrinsic ("e.g., I enjoy Pattern Stepping"), integrated ("e.g., Pattern Stepping is in line with who I am"),

and identified ("e.g., I recognize the benefits of Pattern Stepping") regulation. For each of the items, the participants marked their degree of agreement on a five-point Likert-scale that ranged from (1) 'completely do not agree' to (5) 'completely agree'. The three items formed one internally reliable measure of autonomous motivation for Pattern Stepping involvement (explained variance = 66.6%; Cronbach's α = .74)

The degree of experienced self-regulation in exercise was measured with fifteen items. Nine items measured autonomous exercise motivation: Each of the three differentiated levels of self-regulation, i.e., intrinsic ("I enjoy exercising"), integrated ("Exercising is a part of who I am") and identified ("I appreciate the benefits of exercising") regulation, was measured with three items. Six items measured controlled exercise motivation: Each of the two differentiated levels of social regulation, i.e., introjected ("I would feel guilty if I would not exercise") and external ("Others pressure me to exercise") regulation was measured with three items. The intrinsic, identified, introjected, and external regulation items were selected from the revised Behavioral Regulation in Exercise Questionnaire (BREQ-2; Markland & Tobin, 2004) and adapted to fit the purpose of the study. The items on integrated regulation were constructed because integrated regulation ("Exercising is part of who I am") is a central construct in the research question and the BREQ-2 does not include items on integrated regulation.

For each item, the participants marked the degree to which they agreed with the item on a five-point Likert-scale that ranged from (1) 'completely do not agree' to (5) 'completely agree'. An exploratory factor analysis with Varimax rotation, which was forced to extract two factors, was performed. The nine self-regulation items formed one internally reliable measure of autonomous motivation (Cronbach's α = .94). The six social regulation items formed one internally reliable measure of controlled motivation (Cronbach's α = .82). The two measures explained 64.6% of the variance.

The Relative Autonomy Index (RAI) of the BREQ-2 contrasts the self-regulation and the social regulation in exercise involvement in order to indicate the relative (degree of) self-regulation in exercise involvement. In analogy, we computed an adapted version of the RAI: RAI = (3 * intrinsic regulation) + (2 * integrated regulation) + (1 * identified regulation) + (-1 * introjected regulation) + (-2 * extrinsic regulation). This RAI indicates the relative (degree of) experienced self-regulation (i.e., autonomy) in exercise involvement.

Intention. The participants indicated their willingness/intention to involve in Pattern Stepping in the future in two ways. First, they reported their willingness to involve in Pattern Stepping and to involve in a Pattern Stepping class in the future on a seven-point Likert-scale that ranged from (1) 'definitively not' to (7) 'definitively' willing. Second, they showed their intention to involve in a Pattern Stepping class in the future in their choice to register for the advertised Pattern Stepping class.

Identification as an Older Adult. The participants indicated (the degree of) their self-identification as an older adult by reporting the degree to which they perceived themselves as an older adult (i.e., cognitive identification) and the degree to which they felt like an older adult (i.e., affective identification).

Cognitive Identification. The participants reported the degree to which they considered themselves as an older adult by marking the degree that they agreed with the item "I am an older adult" on a five-point Likert-scale that ranged from (1) 'completely do not agree' to (5) 'completely agree'. Participants were categorized as a 'cognitively self-identified older adult' when reporting a score higher than three, while they were considered a 'cognitively not self-identified older adult' when reporting a score of three or lower.

Affective Identification. The participants reported the degree to which they felt like an older adult by indicating their agreement with the item "I feel like an older adult" on a five-point Likert-scale that ranged from (1) 'completely do not agree' to (5) 'completely agree'. Participants were considered an 'affectively self-identified older adult' when reporting a score higher than three, and an 'affectively not self-identified older adult' when reporting a score of three or lower.

Older Adult Identity Norms. In order to measure the extent to which the participants perceived that Pattern Stepping was age normative for older adults (in comparison to younger adults), the participants were asked to indicate the degree to which they considered Pattern Stepping an exercise activity for older adults and for younger adults. For each age group, they marked this on a seven-point Likert-scale from (1) 'not at all' to (7) 'definitely' an exercise activity for older/younger adults. The difference between the scores for the older adults and the younger adults indicated the extent to which they perceived that Pattern Stepping was age-normative for older adults. This shows the participants' perceptions of the older adult identity norm for Pattern Stepping.

Exercise Engagement. The participants reported their present involvement in exercise on an adapted version of the Godin Leisure-Time Exercise Questionnaire (GLTEQ; Godin & Shephard, 1997). They reported the number of minutes that they had involved in exercise activities of low, moderate, and high intensity (of at least ten continuous minutes) in a normal week (i.e., without unexpected life events) of the last month. For each level of intensity, the number of minutes was multiplied with the metabolic equivalent value (MET-value) for this intensity. The GLTEQ total score was obtained according to the formula: GLTEQ total score = (low intensity * 3 MET) + (moderate intensity * 5 MET) + (high intensity * 9 MET). This GLTEQ total score reflects participants' intensity-corrected, weekly exercise involvement.

Analysis

In order to evaluate the validity of the hypotheses on the effects of situational salience of older age, situational salience of older adult identity norms, and the valence of situational salient older adults identity norms, on self-based motivation and performance, we conducted repeated measures analyses of variance. The motivation and performance measures were used as the dependent variables. Condition was the between-subjects factor. Time was the within-subjects factor. Exercise involvement, age (in years) and gender were used as covariates.

In order to evaluate the validity of the hypotheses on the effects on intention to involve in Pattern Stepping in the future, we performed univariate analyses of variance. The intentions to involve in Pattern Stepping/Pattern Stepping Class were used as the dependent variables. In these analyses, Condition was used as the between-subjects factor. Exercise involvement, age (in years) and gender, were used as covariates. In order to determine the effect of Condition on registration for the Pattern Stepping class, we conducted a contingency test.

Prior to these analyses, we evaluated the effectiveness of the manipulation. In order to evaluate if the manipulation was successful in making older age salient to the participants, we compared the control condition with the salient conditions on identification as an older adult by means of an independent samples t-test. Further we used a contingency test to determine if there was an association between Condition and the number of self-identified older adults. In order to evaluate if the manipulation was successful in communicating the older adult identity norm for Pattern Stepping, we

conducted a univariate analysis of variance that compared the conditions on the perceived older identity norms for Pattern Stepping. We used a contingency test to assess if Condition and the number of participants who perceived positive older adult identity norms for Pattern Stepping (i.e., age normative for older adults) were associated. All analyses were conducted with IBM-SPSS 19.0.

Results

Manipulation Check

Situational Salience of Older Age. The manipulation did not (profoundly) influence identification as an older adult (Table 1). Participants in the salient conditions did not identify themselves more strongly as an older adult, both cognitively and affectively, than participants in the control condition. The number of participants who considered themselves as an older adult (i.e., cognitive identification) also did not differ between the salient conditions and the control condition.

Table 1. Identification as an Older Adult and Social Older Adult Identity Norms for Pattern Stepping

		Cognitive Identification							
		Identification				Degree of Identification			
Condition	n	n	%	χ^2	df	M	SD	*t*	df
				1.67	1			-.82	1,118
Control	30	9	30.0			3.03	1.22		
Salient	90	39	43.3			3.23	1.14		
		Affective Identification							
		Identification				Degree of Identification			
Condition	n	n	%	Fisher's Exact *p*		M	SD	*t*	df
				.04*				-.83	1,118
Control	30	0	0.0			2.00	.83		
Salient	90	11	12.2			2.18	1.08		
		Older Adult Identity Norms							
		Normativity				Degree of Normativity			
Condition	n	n	%	χ^2	df	M	SD	*F*	df
				17.22**	3			7.76***	3,116
Control	30	15	50.0			.43	1.70		
Salient-Neutral	30	15	50.0			.67	1.67		
Salient-Negative	30	8	26.7			-.33	2.02		
Salient-Positive	30	24	80.0			1.80	1.52		

** p < .05, ** p < .01, *** p < .001*

Notwithstanding these findings, the salient conditions and the control condition did differ in the number of participants who felt like an older adult (i.e., affective identification). Although only a small number of the participants in the salient conditions felt like an older adult, in these conditions more participants felt like an older adult than in the control condition. The majority of study participants did not identify themselves as an older adult. Forty percent perceived themselves as an older adult (i.e., cognitive identification). Less than ten percent felt like an older adult (i.e., affective identification).

Situational Salience & Valence of Older Adult Identity Norms. The manipulation was effective in communicating the older adult identity norms for Pattern Stepping (Table 1). The conditions differed in the perceived older adult identity norms for Pattern Stepping. The Bonferroni-corrected pairwise comparisons of the conditions indicated that Pattern Stepping was perceived as more age normative for older adults (in comparison to younger adults) in the salient-positive condition than in the salient-negative ($p < .001$) and control ($p < .05$) conditions, while participants in the salient-positive condition had the tendency to perceive Pattern Stepping as more age normative for older adults (in comparison to younger adults) than those in the salient-neutral condition ($p = .08$).

The conditions differed in the number of participants who perceived Pattern Stepping as age normative for older adults (in comparison to younger adults). In the salient-positive condition, more participants perceived Pattern Stepping as age normative for older adults than in the control ($\chi^2(1) = 5.93$, $p < .05$), salient-neutral ($\chi^2(1) = 5.93$, $p < .05$), and salient-negative ($\chi^2(1) = 17.14$, $p < .001$) conditions. Furthermore, there was a tendency for more participants to perceive Pattern Stepping as age normative for younger adults (in comparison to older adults) in the salient-negative condition than in the control ($\chi^2(1) = 3.46$, $p = .06$) and salient-neutral ($\chi^2(1) = 3.46$, $p = .06$) conditions.

Performance

Condition did not affect Pattern Stepping performance (Table 2). The time required to complete the stepping patterns, and the errors committed in completing the stepping patterns, did not change differently over Time between the conditions. It indicates that the situational salience of older age, the situational availability of older adult identity norms, and the valence of the situational salient older adult identity norms, did not influence performance on Pattern Stepping.

Table 2. Repeated Measures ANOVA – Performance

	Condition											
	Control		Salient-Neutral		Salient-Negative		Salient-Positive		Condition × Time			
Pattern Stepping Performance	*EM*	*SE*	*EM*	*SE*	*EM*	*SE*	*EM*	*SE*	*F*	df	*(Partial)* η^2	
Time									1.06	3,113	(.027)	.026
Time 1	165.02	10.03	162.75	10.14	152.21	10.05	154.72	10.12				
Time 2	161.28	10.00	162.30	10.11	144.33	10.02	145.08	10.09				
Errors									1.13	3,113	(.029)	.029
Time 1	1.76	.37	1.71	.37	1.46	.37	1.58	.37				
Time 2	2.19	.34	2.37	.34	1.29	.34	1.39	.34				

** p < .05, ** p < .01, *** p < .001*

Performance: η^2*(Time) = .076;* η^2*(Errors) = .038*

Motivation

Pattern Stepping. Condition affected experienced Basic Needs Satisfaction (BNS) in Pattern Stepping (Table 3). The Bonferroni-corrected pairwise comparisons showed that the (manipulation of) situational salience of older age did not affect experienced BNS. Experienced BNS did diminish over Time in the salient-neutral condition ($p < .01$), but this drop in experienced BNS did not differ ($p = .34$) from the (absent) change in experienced BNS over Time in the control condition ($p = .68$). However, in the (manipulated) situational salience of older age, the (manipulated) situational salience of negative older adult identity norms for Pattern Stepping (i.e., age normative for younger adults) promoted the experience of BNS in Pattern Stepping: The salient-neutral and salient-negative conditions differed from each other in the change in experienced BNS over Time ($p < .01$). Whereas experienced BNS diminished in the salient-neutral condition ($p < .01$), there was a tendency for it to increase in the salient-negative condition ($p = .07$). The (manipulation of) situational salience of positive older adult identity norms for Pattern Stepping (i.e., age normative for older adults) in the (manipulated) situational salience of older age did not affect the experience of BNS in Pattern Stepping compared to when the situational salience of older adult identity norms for Pattern Stepping was avoided (i.e., salient-neutral condition) or negative older adult identity norms for Pattern Stepping (i.e., age normative for younger adults) were (manipulated to be) situationally salient (i.e., salient-negative condition). Experienced BNS in Pattern Stepping did not change over Time ($p = .38$) in the salient-positive condition. Therein the condition did not differ from the salient-neutral ($p = .74$) or the salient-negative ($p = .33$) condition.

The effect of Condition on experienced BNS in Pattern Stepping did not transfer to the autonomous motivation for Pattern Stepping (Table 3). Condition did not account for change in autonomous motivation for Pattern Stepping over Time. This indicates that the autonomous motivation for Pattern Stepping was unaffected by the situational salience of older age, by the situational salience of the older adult identity norms for Pattern stepping, or by the valence of these older adult identity

Exercise. Condition did not explain experienced BNS in exercise involvement (Table 3). The situational salience of older age, the situational salience of older adult identity norms for Pattern stepping, and the valence of these older adult identity norms for Pattern Stepping, did not influence the experience of BNS in exercise involvement. Nevertheless, Condition did affect the degree of self-regulation (i.e., autonomy) in exercise involvement (Table 3).

Table 3. Repeated Measures ANOVA - Motivation

	Condition											
	Control		Salient-Neutral		Salient-Negative		Salient-Positive		Condition × Time			
Motivation	*EM*	*SE*	*EM*	*SE*	*EM*	*SE*	*EM*	*SE*	*F*	df	*(Partial)* η^2	
Pattern Stepping												
Basic Need Satisfaction (BNS)									4.09**	3,113	(.098)	.089
Time 1	3.12	.15	3.51	.16	3.14	.15	3.51	.16				
Time 2	3.08	.14	3.21	.14	3.32	.14	3.43	.14				
Autonomous Motivation									.92	3,113	(.024)	.023
Time 1	3.51	.15	3.69	.15	3.64	.15	3.77	.15				
Time 2	3.13	.15	3.51	.15	3.52	.15	3.58	.15				
Exercise												
Basic Need Satisfaction (BNS)									1.23	3,113	(.032)	.031
Time 1	3.78	.15	3.75	.15	3.45	.15	3.79	.15				
Time 2	3.68	.14	3.52	.14	3.43	.14	3.71	.14				
Autonomous Motivation									2.69°	3,113	(.067)	.063
Time 1	3.94	.16	3.76	.16	3.54	.16	3.82	.16				
Time 2	3.85	.15	3.59	.15	3.63	.15	3.76	.15				
Controlled Motivation									2.35	3,113	(.059)	.055
Time 1	2.52	.16	2.30	.16	2.14	.16	2.05	.16				
Time 2	2.48	.15	2.11	.15	2.09	.15	2.26	.15				
Relative Autonomy Index (RAI)									2.98*	3,113	(.073)	.070
Time 1	16.15	.93	15.36	.94	14.46	.94	16.85	.94				
Time 2	15.68	.90	15.06	.91	15.39	.90	15.73	.91				

** p < .05, ** p < .01, *** p < .001, ° p = .05*

Pattern Stepping: η^2(BNS) = .179; η^2(Autonomous Motivation) = .053

Exercise: η^2(BNS) = .055; η^2(Autonomous Motivation) = .119; η^2(Controlled Motivation) = .123; η^2(RAI) = .116

There was a tendency for Condition to explain the autonomous motivation for exercise involvement (Table 3). Bonferroni-corrected pairwise comparisons of the conditions revealed that (the manipulation of) the situational salience of older age did not affect the autonomous motivation for exercise involvement. Although autonomous motivation diminished over Time in the salient-neutral condition ($p < .05$), this drop in autonomous motivation did not differ ($p > .99$) from the (absent) change in autonomous motivation over Time in the control condition ($p = .18$). Only the salient-neutral condition and the salient-negative condition differed in the change in autonomous motivation over Time ($p < .05$). Whereas autonomous motivation for exercise involvement diminished in the salient-neutral condition ($p < .05$), it did not change in the salient-negative ($p = .16$) condition. This finding indicates that in the circumstance where older age was (manipulated to be) situationally salient, the (manipulated) situational salience of negative older adult identity norms for Pattern Stepping involvement (i.e., age normative for younger adults) promoted the autonomous motivation for exercise involvement compared to when no older adult identity norms for Pattern Stepping were (manipulated to be) situationally salient. The (manipulated) salience of positive older adult identity norms for Pattern Stepping (i.e., age normative for older adults) in the (manipulated) situational salience of older age did not affect autonomous motivation for exercise involvement compared to when the situational salience of older adult identity norms for Pattern Stepping was avoided or compared to when negative older adult norms for Pattern Stepping (i.e., age normative for younger adults) were (manipulated to be) situational salient. The autonomous motivation for exercise involvement did not change over Time in the salient-positive condition ($p = .35$), and therein this condition did not differ from the salient-neutral condition ($p > .99$) and the salient-negative condition ($p = .57$).

Condition did not explain controlled motivation for exercise involvement. Despite that over Time controlled motivation tended to increase in the salient-positive condition ($p = .05$) and tended to diminish in the salient-neutral condition ($p = .08$), the controlled motivation for exercise involvement did not change differently over Time between the conditions (Table 3). This finding indicates that the controlled motivation for involving in exercise did not change because of the situational salience of older age, the situational salience of older adult identity norms for Pattern stepping, and/or the valence of these situational salient older adult identity norms for Pattern Stepping.

Even though Condition (merely) tended to explain the autonomous motivation for, and even did not explain controlled motivation for exercise involvement, it nevertheless explained the relative degree of (perceived/experienced) self-regulation (i.e., autonomy) in involvement in exercise: Condition affected the change on the Relative Autonomy Index (RAI) over Time (Table 3). Bonferroni-corrected pairwise comparisons revealed that the control condition and the salient-neutral condition did not differ in the change on the RAI over Time ($p > .99$). The RAI did not change over Time in the control condition ($p = .35$) or in the salient-neutral ($p = .55$) condition. This implies that (the manipulation of) the situational salience of older age did not affect the relative degree of self-regulation (i.e., autonomy) in exercise involvement. The (manipulated) situational salience of older adult norms for Pattern Stepping also did not affect the relative degree of self-regulation (i.e., autonomy) in the circumstance of the (manipulated) situational salience of older age. The salient-neutral condition did not differ from the salient-negative ($p = .53$) or the salient-positive condition ($p > .99$) in the change in RAI over Time. Only the salient-negative condition and the salient-positive condition differed in the change on the RAI over Time ($p < .05$). Whereas the RAI reduced in the salient-positive condition ($p < .05$), it tended to increase in the salient-negative condition ($p = .07$). This finding indicates that the relative degree of self-regulation (i.e., autonomy) in exercise involvement increased when negative older adult identity norms for Pattern Stepping (i.e., age normative for younger adults) were (manipulated) to be situationally salient in comparison to when positive older adult norms for Pattern Stepping (i.e., age normative for older adults) were (manipulated) to be situationally salient in the circumstance of the (manipulated) situational salience of older age.

Intentions

The conditions did not differ in the intentions to involve in Pattern Stepping/to involve in a Pattern Stepping Class in the future (Table 4). The number of participants who registered for the Pattern Stepping class ($\chi^2(3) = 3.37$, $p = .34$) did not differ between the conditions. In overall, the findings indicate that the intention to involve in Pattern Stepping in the future was not affected by the situational salience of older age, by the situational salience of older adult identity norms for Pattern stepping, or by the valence of these situational salient older adult identity norms for Pattern Stepping.

Table 4. Repeated Measures ANOVA – Intention

	Condition											
	Control		Salient-Neutral		Salient-Negative		Salient-Positive		Condition			
Pattern Stepping Intention	*EM*	*SE*	*EM*	*SE*	*EM*	*SE*	*EM*	*SE*	*F*	df	*(Partial)* η^2	
Future Involvement	4.10	.22	4.25	.22	4.44	.22	4.54	.22	.77	3,113	(.020)	.016
Group Class Involvement	3.66	.25	4.11	.25	4.01	.25	4.35	.25	1.35	3,113	(.035)	.030

** p < .05, ** p < .01, *** p < .001*

Intention: η^2(Future Involvement) =.179; η^2(Group Class Involvement) =.164.

Discussion

Within the frame of our proposed integration of the assumptions of SIA and SDT, we aimed to assess the effects of (a) the situational salience of older adult age, (b) the situational salience of the social older adult identity norms for a (fictional) new exercise activity (i.e., Pattern Stepping), and (c) the valence of these situationally salient social older adult identity norms for Pattern Stepping, on older adults' exercise motivation, intentions and performance. Specifically, the effects on their autonomous motivation for – i.e., on their experience of basic needs satisfaction (Hypothesis 1) and self-regulation (Hypothesis 2) in – Pattern Stepping and exercise, on their intention to involve in Pattern Stepping in the future (Hypothesis 3), and on their Pattern Stepping performance (Hypothesis 4) were evaluated. We consider the observed effects, and we discuss their implications for the validity of our proposed integration SIA and SDT, and for the practice of exercise promotion among older adults.

Considering that the existent social older adult identity norms for involving in exercise are that "older adults do *not* exercise", we hypothesized that older adults would be(come) less autonomously motivated for – i.e., would experience less basic needs satisfaction (Hypothesis 1a) and self-regulation (Hypothesis 2a) in – Pattern Stepping and exercise involvement when their older adult age would be(come) situationally salient to them. However, in contrary to what we expected, the (manipulated) situational salience of their older adult age did not diminish their autonomous motivation for Pattern Stepping and exercise involvement. This suggests that the autonomous motivation of older adults for involving in exercise (activities) is not thwarted by the situational salience of their older adult age.

The (manipulated) situational salience of social older adult identity norms for Pattern Stepping did affect the autonomous motivation for involvement in Pattern Stepping/exercise, but differently than we hypothesized. We hypothesized that the situational salience of negative social older adult identity norms for Pattern Stepping – i.e., "In comparison to older adults, involving in Pattern Stepping is social age normative for younger adults", which signals that "In comparison to younger adults, *not* involving in Pattern Stepping is social age normative for older adults" – would thwart the autonomous motivation for – i.e., would diminish the basic needs satisfaction (Hypothesis 1b) and self-regulation (Hypothesis 2b) in – Pattern Stepping and exercise involvement, whereas the situational salience of positive social older adult identity norms – i.e., "In comparison to younger adults, involvement in Pattern Stepping is social age normative for older adults" – would strengthen this autonomous motivation (Hypothesis 1-

2c). However, these hypotheses were not only rejected. Sometimes even the opposite pattern of what we had hypothesized occurred.

Inverse to what we hypothesized, the situational salience of negative social older adult identity norms for Pattern Stepping – i.e., "In comparison to older adults, involving in Pattern Stepping is social age normative for younger adults", which implies that "In comparison to younger adults, *not* involving in Pattern Stepping is social age normative for older adults" – strengthened older adults' experienced basic needs satisfaction in Pattern Stepping (Hypothesis 1b) and increased their autonomous exercise motivation (Hypothesis 2b). This finding suggests that the situational salience of negative social older adult identity norms for involving in (an) exercise (activity) does not diminish, but actually strengthens older adults' autonomous motivation for involving in (this) exercise (activity). Moreover, the situational salience of positive social older adult identity norms for Pattern Stepping – i.e., "Compared to younger adults, involving in Pattern Stepping is social age normative for older adults" – did not strengthen the autonomous motivation for – i.e., did not enhance experienced basic needs satisfaction (Hypothesis 1c) and self-regulation (Hypothesis 2c) – in Pattern Stepping and exercise involvement. This suggests that the situational salience of positive social older adult identity norms for involvement in (an) exercise (activity) does not enhance older adults' autonomous motivation to involve.

These findings seem to contradict our proposed integration of SIA and SDT. However, we like to point to an alternative explanation, which is in line with our proposed integration of SIA and SDT, for why the situational salience (a) of older adult age and of negative social older adult identity norms for Pattern Stepping did not diminish, (b) positive social older adult identity for Pattern Stepping did not increase, and (c) negative social older adult identity for Pattern Stepping enhanced, the autonomous motivation for Pattern Stepping and exercise involvement. We propose that these unexpected effects possibly occurred because the majority of the study participants did *not* (strongly) identify themselves as an older adult.

A key assumption of our proposed integration of SIA and SDT is that older adults' autonomous motivation for involvement in (an) exercise (activity) would only be determined by the social older adult identity's norms for involvement in (this) exercise (activity) when they identify themselves as an older adult. Only when they identify themselves as an older adult would the social older adult identity norms for involvement in (an) exercise (activity) be internalized into their self, and experience these norms as

their own. However, the majority of the study participants actually did *not* (strongly) identify themselves as an older adult. Consequently they probably did not (fully) internalize the social older adult identity norms for exercise/Pattern Stepping when older adult age and/or the social older adult identity norms for Pattern Stepping involvement were situationally salient to them, and therefore (predominantly) did not experience the social older adult identity norms for exercise/Pattern Stepping involvement as their own. These social older adult identity norms thus would not determine their *autonomous* motivation for – i.e., their experienced basic needs satisfaction and self-regulation in – Pattern Stepping or exercise. This is a potential explanation for why the situational salience of older adult age and of negative social older adult identity norms for Pattern Stepping did not diminish, and for why the situational salience of positive social older adult identity for Pattern Stepping did not enhance, the autonomous motivation for Pattern Stepping and exercise involvement (among the study participants).

Furthermore, when individuals do not (want to) identify themselves in terms of a salient social identity (i.e., older adults), their autonomous motivation is potentially determined by the norms that are associated with the contrasting social identity (i.e., younger (than older) adults) because this identity is (more) in line with 'who' they are (i.e., "I am *not* an older adult, I am a younger (than older) adult.") or want to be (i.e., "I do *not* want to be an older adult, but I want to be a younger (than older) adult."). This contrasting social identity's norms – which are the inverse of the salient social identity's norms – would become (more) internalized and be (more) experienced as their own. Considering that the majority of the study participants did *not* (strongly) identify themselves as an older adult, this potentially explains why the situational salience of negative social older adult identity norms for Pattern Stepping – i.e., "In comparison to older adults, involving in Pattern Stepping is social age normative for younger adults", which implies that "In comparison to younger adults, *not* involving in Pattern Stepping is social age normative for older adults") did not diminish, but actually enhance autonomous motivation for Pattern Stepping and exercise involvement (among the study participants).

The effect of the valence of the situationally salient social older adult identity norms for Pattern Stepping on the experienced level of self-regulation (i.e., the level of autonomy) in exercise motivation provides even more evidence for this reasoning. Contrary to our expectation, the experienced level of self-regulation did not diminish when negative social older adults identity norms – i.e., "In comparison to older adults, involving in Pattern Stepping is social age normative for younger adults", which implies

that “In comparison to younger adults, *not* involving in Pattern Stepping is social age normative for older adults” – were situationally salient, whereas it did not increase when positive social older adults identity norms – i.e., “In comparison to younger adults, Pattern Stepping is social age normative for older adults”) were situationally salient, compared to when no such social older adults identity norms were situationally salient (Hypotheses 2b-c). This indicates that the situational salience of social older adult identity norms for (an) exercise (activity) does not affect older adults’ experienced level of self-regulation in exercise motivation.

However, when social older adult identity norms were situationally salient to older adults, the valence of these norms determined the experienced level of self-regulation in exercise motivation. The opposite of what we expected occurred. The situational salience of negative social older adult identity norms for Pattern Stepping – i.e., “In comparison to older adults, involving in Pattern Stepping is social age normative for younger adults”, which implies that “In comparison to younger adults, *not* involving in Pattern Stepping is social age normative for older adults” – elevated the experienced level of self-regulation in the motivation to involve in exercise compared to when positive social older adult identity norms for Pattern Stepping – i.e., “In comparison to younger adults, involving in Pattern Stepping is social age normative for older adults” – were situationally salient, instead of reducing it. This inverse effect might again be attributable to the majority of participants not (strongly) identifying themselves as an older adult.

The study participants – who did *not* identify themselves (strongly) as an older adult (i.e., “I am *not* an older adult, but a younger (than older) adult”) or do not want to be an older adult (i.e., “I do *not* want to be an older adult, but a younger (than older) adult”) – might have internalized the norms of the contrasting social identity (i.e., younger (than older) adults) and experienced these norms – i.e., “In comparison to older adults, involving in Pattern Stepping is social age normative for younger adults” – to be (in accordance with) their own when these norms were situationally salient to them because the contrasting social identity is (more) in line with ‘who’ they were or (wanted to be). They might have experienced: “It is (social age) normative for me to involve in Pattern Stepping because I am *not*/I do *not* want to be an older adult – I am/want to be a younger (than older) adult.” However, when positive social older adult identity norms for Pattern Stepping were situational salient to the study participants, they might have experienced these social identity norms as a form of social control. When individuals

do not identify themselves in terms of a salient social identity, but they experience that their social environment identifies them in terms of this salient social identity, situationally salient social identity norms would indicate to them what (behavior) their social environment appreciates of them. Among the study participants (who did not identify themselves as an older adult), the confrontation with a social environment that communicated “You are an older adult and Pattern Stepping is social age normative for older adults” potentially increased the controlled motivation to involve in exercise. They might have felt more socially pressured to involve in exercise by the situationally salient positive social older adult identity norms for Pattern Stepping. This rationale would explain why, compared to when positive social older adult identity norms for Pattern Stepping were situationally salient, the participants experienced more self-regulation (i.e., autonomy) in their motivation for involvement in exercise when negative social older adult identity norms for Pattern were situationally salient.

Contrary to our expectations, the (manipulated) situational salience of older adult age did not diminish the intention to involve in Pattern Stepping in the future (Hypothesis 3a), and did not thwart Pattern Stepping performance (Hypothesis 4a). This finding seems to indicate that the situational salience of older adult age – and the implicitly associated existent social older adult identity norms for exercise – neither thwarts older adults’ intention to involve in (an) exercise (activity), nor thwarts their performance on (this) exercise (activity). However, because (most of the) study participants did not identify themselves as an older adult, it could also be that they were not affected in their intention for, and in their performance on Pattern Stepping, because they experienced that the social older adult identity norms for involving in exercise did not apply to themselves. Despite affecting (aspects of) the autonomous motivation for Pattern Stepping and for exercise involvement in general, the situational salience of social older adult identity norms for Pattern Stepping or the valence of these norms, neither determined the intention to involve in Pattern Stepping in the future (Hypothesis 3b-c), nor affected the performance on Pattern Stepping (Hypothesis 4b-c). This indicates that the situational salience of social older adult identity norms for (an) exercise (activity) and the valence of these situationally salient social older adult identity norms do not influence older adults’ intention to involve in (this) exercise (activity) and do not affect older adults’ performance in (on this) exercise (activity).

In sum, the findings of this study do not confirm that older adults – who identify themselves as an older adult – are less autonomously motivated and are less intent to exercise, and perform worse in exercise, when their older adult age is situationally salient to them. The situational salience of older adult age neither reduced older adults' autonomous motivation and intention to involve in (an) exercise (activity), nor did it thwart their performance on (an) exercise (activity). Nevertheless, considering that the older age adults who participated in this study did *not* identify themselves as an older adult, it is in line with the assumptions of our proposed integration of SIA and SDT that the situational salience of their older adult age did not diminish their autonomous motivation for exercise involvement and their exercise intention, and did not thwart their exercise performance: The situationally salient social older adults identity norms for exercise were not internalized/experienced as their own. Due to this plausible alternative explanation, it remains unclear whether the situational salience of older adult age does or does not thwart the (autonomous) exercise motivation, and subsequently, the exercise intention and performance of older age adults who identify themselves as an older adult.

It should be noted that our alternative explanation (for the absence of this effect in the present study) is supported by the (observed) effects of the (valence of the) situational salience of social older adult identity norms on the autonomous motivation to exercise. When older age adults do *not* identify themselves as an older adult (i.e., "I am *not* an older adult – I am a younger (than older) adult"), they become more autonomously motivated to exercise in accordance with the *inverse* of this social older adult identity's norms (i.e., the norms of the contrasting social identity 'younger (than older) adult') for exercise involvement when their older adult age and the contrasting social identity's norms (the norms for younger (than older) adults) for exercise involvement are situationally salient to them. It suggests that when individuals do *not* identify themselves in terms of a situationally salient social identity (e.g., older adults), they would internalize the (salient) norms of the contrasting social identity (e.g., younger (than older) adults) and experience these norms as their own because they consider themselves in terms of this social identity.

An inverse explanation is that individuals are autonomously motivated to behave in line with the (salient) norms of the contrasting social identity (e.g., younger (than older) adults) because they value not having a salient social identity (i.e., I *do not want to be* an older adult) and value having the contrasting social identity (i.e., I *want to be* a younger than older adult) more. For example, the study

participants might have become more autonomously motivated for involving in exercise when Pattern Stepping was described as normative for (the social identity of) younger adults because they valued having the social identity (i.e., belonging to the social age group of) 'younger (than older) adult(s)' more than having the social identity (i.e., belonging to the social age group of) 'older adult(s)'. When individuals do not value having a social identity (i.e., belonging to a social group) and do not value this social identity's (i.e., social group's) norms, they (if possible) dissociate themselves of this group (e.g., and they (are autonomously motivated to) adopt a social identity (i.e., to join a social group) they value more (e.g., Ellemers, Spears & Doosje, 1997), which can be achieved by behaving in line with this social identity's (or social group's) behavioral norms. This process is referred to by SIA as 'individual mobility' and might have occurred when the study participants, who did not identify themselves as an older adult, were confronted with situationally salient social 'younger (than older) adult' identity norms for Pattern Stepping: They were able to identify themselves as a 'younger (than older) adult' (i.e., join the social age group 'younger (than older) adults) by behaving accordingly.

The findings further suggest that when older age adults do *not* identify themselves as an older adult, but experience that their social environment identifies them as an older adult, they will feel more socially pressured (i.e., will have more controlled motivation) to exercise in accordance with this social older adult identity's norms for exercise involvement when this socially-imposed older adult identity and its norms for exercise involvement are situationally salient to them. In this circumstance, they do not internalize this social older adult identity's norms for involvement in exercise, but rather experience them as a social pressure to exercise accordingly. This implies that the situational salience of older adult age would not diminish the autonomous exercise motivation of the older age adults who do not identify themselves as an older adult because they would not internalize the existent negative social older adult identity norms for exercise involvement. However, they would feel pressured to exercise in line with the existent negative social older adult identity norms for exercise involvement when they feel that the older adult identity is socially imposed on them.

These study findings correspond with the assumptions of our proposed integration of SIA and SDT. They confirm that individuals are more autonomously motivated to involve in (health) behavior that is socially normative for a situationally salient social identity when they identify themselves in terms of this social identity, and the social identity and its norms are situationally salient to them. This

confirms prior findings that individuals become more autonomously motivated to involve in a behavior when this behavior is in line with their (salient) social identity (Amiot et al., 2014; Sassenberg et al., 2011). Furthermore, the study findings extend the existing empirical evidence for the assumptions of our proposed integration of SIA and SDT by showing that, when individuals do *not* identify themselves in terms of a salient social identity, but experience that their social environment does identify them in terms of this salient social identity, they seem to experience these social identity norms as autonomy-thwarting: Their controlled motivation to behave in line with the social identity's norms will increase. Our proposed integration of SIA and SDT should be further evaluated in order to better comprehend if and when social identity norms determine either autonomous or controlled motivation, and therein effectively support persisted involvement in (health) behavior.

Limitations

The main limitation of the study is that the study design did not allow us to control for the effect of identification as an older adult. According to our proposed integration of SIA and SDT, identification as an older adult determines whether the situational salience of older adult age, the situational salience of the social older adult identity norms for Pattern Stepping, and the valence of these social older adult identity norms for Pattern Stepping, would affect the autonomous or the controlled motivation for involvement in Pattern Stepping and/or exercise. Self-identification as an older adult could not be included as a covariate in the analyses: Self-identification as an older adult was measured after the manipulation took place (i.e., at the end of the evaluation trial), and consequently could have been affected by the manipulation. Using self-identification as an older adult as a covariate in the analyses could even have eliminated the effect of the manipulation of the (situational) salience of older adult age. It would have been better if we had measured self-identification as an older adult at recruitment. However, it should be noted though that asking potential study participants to indicate the extent to which they identify themselves as an older adult at recruitment could have made their older adult age salient to them during their study participation.

A second limitation is inherent to the study setup. In order to control for any pre-manipulation differences between the four conditions, we used a between-within subjects (mixed) study design. The dependent variables were measured before and after the manipulation with the same measures, and

the effect of the manipulation was examined by comparing the conditions on the within-subject change on the measures over time. However, individuals' responses on questionnaire measures of motivation are relatively stable over a short timespan (e.g., a participant's response to the item 'I enjoy exercising' on a five-point Likert-scale from 'completely do not agree' to 'completely degree' is unlikely to change significantly over a 15 to 20 minutes timespan). This may have prevented observing (more) substantial changes in motivation as the result of (the subtle manipulation of) the situational salience of the older adult identity and (the valance of) the older adult identity norms for exercise involvement. Nevertheless small effects were found on the measures of motivation. This is a strong indication that the situational salience and the valance of social older adult identity norms for exercise involvement determine older adults motivation to involve in exercise. However, it remains questionable whether the small effect size is due to the limited (variation in the) change over time that can occur on the measures of motivation, due to the subtlety of the manipulation, or due to the situational salience and valance of social older adult identity norms for exercise involvement merely having small effects on the motivation to exercise. Further research is needed to identify the cause for the small effect size because this has significant consequences for the implications of the findings.

Similarly, there was only a limited variation in (the measures of) the intention for involvement in Pattern Stepping in the future. It is possible that no effect was found on intention because the effect (i.e., the variance in the intention measure that could be explained) was too limited to be detected with the number of study participants per condition in this study. Inversely, the performance of individuals of a complex exercise activity is a measure that is highly subject to change over this period of time due to alternative determinants (e.g., the ability to maintain concentration over time, physical fitness/stamina) which were not controlled for in this study. This might have thwarted the detection of the (potentially) small effects of (the subtle manipulation of) the situational salience of the older adult identity and (the valance of) its associated norms for exercise involvement. As a consequence, it is unclear whether the situational salience and valance of social older adult identity norms for exercise involvement have an effect on the exercise intentions and the exercise performance of older adults, or whether these effects were undetected. Conclusively, the study might have had insufficient power to detect any significant changes on the measures of intention and performance. Future research should evaluate the effects of the situational salience and valance of social older adult identity norms for exercise involvement on

intention measures that allow sufficient variation in the responses of the study participants (e.g., Likert-scales with a wider range of response options) and with performance measures on which the potential effects of significant confounders is limited.

Implications

The findings of this study suggest that addressing individuals on social identities is a valuable strategy to promote the self-regulated (i.e., autonomous) motivation for a (health) behavior, but only when individuals identify themselves in terms of the social identity. When individuals do not (want to) identify themselves in terms of a social identity, addressing these individuals on this social identity and highlighting this social identity's associated norms for a (health) behavior could increase controlled motivation to adhere to this social identity's norm for the (health) behavior. It implies that it is essential to know the extent to which individuals identify themselves in terms of a social identity before addressing them on this social identity and highlighting its norms for a (health) behavior in order to promote this (health) behavior. This consideration seems essential for the effective use of SIA for the promotion of health behavior.

With respect to the promotion of exercise among older adults, the study findings imply that when exercise activities are presented to older adults, these exercise activities should be presented as socially normative for their self-perceived social age identity in order to increase their autonomous motivation for involving in these exercise activities. Presenting an exercise program 'for older adults' to older age adults who do not identify themselves as an older adult is prone to fail in promoting their (maintained) involvement in the (exercise) program because this social age normative description would not affect their autonomous motivation to involve in (the) exercise (program), but instead would promote their controlled motivation to involve in (the) exercise (program). Potentially, they would even resist involvement in (the) exercise (program) because it increases their autonomous motivation to do the opposite (i.e., to adhere to the norms of the contrasting social (age) identity for involvement in the exercise program). However, it remains unclear how potent these effects of the salience and valance of social older adult identity norms are, and therefore how salient and unequivocal the social identity norms for exercise involvement need to be to have a meaningful effect on older adults' (motivation for) exercise involvement.

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Chapter 4

“Every Step Counts!”
Effects of a Structured Walking Intervention
in a Community-Based Senior Organization

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Abstract

This study evaluated 'Every step counts!' – a ten-week, structured walking intervention in a community-based senior organization – on promoting physical activity participation, fitness and well-being among older adults (age ≥ 55 years). The intervention prescribed pedometer-defined walks in weekly walking schedules. These were fitness-tailored and structured in walking load (intensity/volume) according to the principles of training progression. This intervention was offered as a social activity at meeting points of a community-based senior organization. Twenty-nine meeting points (n = 432) constituted the intervention condition. Ten meeting points (n = 148) formed the wait-list control condition. Measurements were organized at intervention start (pretest) and end (posttest). Intention-to-treat linear mixed models showed small positive intervention effects on physical activity, fitness and aspects of well-being. These results confirm the effectiveness of structured walking interventions with systematic training progression and underscore the value of community-based senior organizations as intervention setting among older adults.

Keywords: older adults, exercise promotion, community-scale interventions.

Introduction

The world population is “graying” or “silvering”. The societal presence of adults age 60 and over is expected to double from 11% in 2010 to 22% in 2050 (United Nations, 2009). This expanding population segment has an age-associated increased susceptibility for chronic health conditions and functional disability (Chodzko-Zajko et al., 2009; Nelson et al., 2007). Regular physical activity is reported to reduce the risk among older adults for several of these chronic health conditions (e.g. cardiovascular disease, various types of cancer, Type II diabetes, osteoporosis) and functional disability (Chodzko-Zajko et al., 2009; Nelson et al., 2007). In addition, it is related with a decreased risk for depression and anxiety (Chodzko-Zajko et al., 2009; Lampinen, Heikkinen & Ruoppila, 2000), and with enhanced quality of life (Elavsky et al., 2005). Although older adults generally recognize this (Crombie et al., 2004), a vast majority is insufficiently physically active to enjoy these benefits (e.g. Kruger, Carlson, & Buchner, 2007; Philippaerts et al., 2006; Varo, Martinez-Gonzalez, De Irala-Estevez, Kearney, Gibney & Martinez, 2003). This reality underscores the need for the wide-scale promotion of health-enhancing physical activity among older adults.

In this perspective, community-based social organizations with numerous older adult members (i.e. senior organizations) need to be considered as intervention settings for physical activity promotion among older adults. These organizations gather older adults in a social atmosphere by providing social communal activities (e.g. art classes) in their community-based meeting points. Their established organization structures and social activities enable considerable numbers of older adults to be reached in their trusted environments through their involvement in social communal activities. Therefore the integration of physical activity interventions in the social activities of such organizations represents a valuable opportunity to promote health-enhancing physical activity among older adults. In confirmation, Opdenacker, Boen, Vanden Auweele, and De Bourdeaudhuij (2008) demonstrated that implementing a physical activity intervention in a similar community-based social organization for women is an effective strategy to promote physical activity at the community level.

Walking interventions are promising interventions for promoting health-enhancing physical activity among members of a community-based social organization for older adults. First, walking meets the abilities and preferences of older adults. The majority of older adults are able to participate in walking, and walking is the most participated in and preferred physical activity among older adults

(Taylor et al., 2004). Barriers to participation are minimal: Walking is low-cost, independent of exercise facility, and easy to integrate in daily life activities (e.g. walking to the store). Second, walking can be a social activity. The moderate intensity of walking allows for social contact and conversation during participation. Consequently, walking interventions can be designed and integrated as a social communal activity in social organizations for older adults. Third, walking interventions have been reported to be effective in promoting physical activity on both the individual and the community level (Ogilvie et al., 2007). Finally, participation in walking can contribute to meeting the guidelines for health-enhancing physical activity. Walking at moderate intensity for thirty minutes per day, in bouts of ten minutes or more, on at least five days of the week, is sufficient to meet the guidelines for health-enhancing physical activity (Chodzko-Zajko et al., 2009; Nelson et al., 2007). In conclusion, walking interventions promote a preferred and accessible physical activity among older adults, allow for integrating a social dimension, and have the potential to result in significant benefits for the (public) health of older adults.

To achieve their full potential for health enhancement, research indicates that walking interventions need to result in significant improvements in the cardiorespiratory or aerobic fitness levels of older adults. Lee et al. (2011) demonstrated that cardio-respiratory or aerobic fitness is more strongly related in a negative way to all-cause mortality than physical activity. When cardiorespiratory or aerobic fitness were controlled for, this negative relation between physical activity and all-cause mortality dissipated. Therefore, to achieve optimal adaptive effects in cardiorespiratory or aerobic fitness, physical activity should be structured to increase in intensity (i.e. increase of speed or resistance; decrease of rest intervals) and/or volume (i.e. increase of time or distance) over repeated participation according to the principles of training progression. After the entry level according to personal fitness level has been determined, the intensity and/or volume load of physical activity needs to increase gradually over repeated participation. This progression in physical activity load should be maintained until (at least) health-enhancing physical activity levels are realized and a health-enhancing fitness level is achieved. This means that walking interventions should promote regular walking that is structured in intensity and/or volume according to these principles to lead to adaptive effects on cardiorespiratory or aerobic fitness and, subsequently, to benefit health optimally.

Based on these arguments, a structured walking intervention, designed according to the principles of training progression, in a community-based senior organization, can be considered a promising approach to promoting health-enhancing physical activity among older adults. To our knowledge, no study has addressed community-based senior organizations as community-scale intervention settings and systematic training progression in structured walking programs. This study tried to fill this void by evaluating 'Every step counts!' (ESC) – a ten-week, structured walking intervention with systematic training progression in a community-based senior organization – in terms of its effects on promoting physical activity, fitness and well-being among older adults (age ≥ 55 years). It was hypothesized that this intervention would result in a significant increase in physical activity (Hypothesis 1), fitness (Hypothesis 2) and well-being (Hypothesis 3) over ten weeks compared with the start of the intervention (pretest) and compared with a wait-list control condition.

Method

Intervention

The ESC intervention was implemented in a region-wide, local community-based senior organization in Flanders (Belgium) called OKRA. OKRA is open to older adults, age 55 and older, and has more than 211,000 members. This represents 12% of the Flemish older adult population. The organization is layered in three levels. The base level consists of 1,180 meeting points in local communities (i.e. villages and city neighbourhoods). The number of older adult members per meeting point, ranging from ten to over two hundred, depends on the population size of the community. Local volunteer members manage the local community-based meeting points. The central managerial structure (top level) manages the organization. It guides and supports the community-based meeting points through 18 regional structures (intermediate level) and promotes a broad range of social communal activities (e.g. artistic, culinary, and excursion activities), including sports-oriented activities (e.g. pétanque, a form of outdoor bowling), in the local community-based meeting points. Likewise, all local community-based meeting points were offered the opportunity to participate in the ESC intervention during any of three organization social-activity seasons (fall 2009; spring 2010; fall 2010).

The ESC intervention was offered as a social communal activity in the community-based meeting points of OKRA. The intervention consisted of an individualized structured walking program. This walking program was initiated and completed as a social communal activity in the local meeting point, including weekly group meetings and walks.

The individualized structured walking program consisted of 21 weekly pedometer-based walking schedules. Each walking schedule prescribed walks of a number of aerobic steps (≥ 10 minutes) on most to all weekdays. These walking schedules increased in walking intensity (reduction of rest intervals or increase in number of steps per walk) and/or volume (increase in amount of prescribed steps per week) with every subsequent weekly schedule according to the principles of training progression (see Appendix for the walking schedules). Based on the results of the six-minute walking test (Butland, Pang, Gross, Woodcock & Geddes, 1982; Enright et al., 2003) at the start of the intervention, participants were assigned a starting walking schedule that matched their personal fitness level. Twelve starting levels were differentiated. Intervention duration was ten weeks, and participants were expected to complete ten subsequent walking schedules. Each participant received printed slides of the walking schedules and a pedometer to complete the walks and to monitor progress. Participants were free to complete the walks in their personally preferred manner (e.g. time of day, location) as long as they completed the walks (as a whole) on the designated days.

Over the course of the ten-week intervention, the participating local meeting points planned and organized weekly group meetings and walks as a prescribed component of the intervention. Different group walks with various levels of walking intensity and/or volume were offered to allow all participants to participate in a group walk. These walks completed the weekly walking schedule. The group meetings and walks allowed participants to share their experiences and participation, and to support each other in participation in the walking program. In addition, the meetings and walks stimulated social contact between participants. The shared participation in the program, including the group meetings and walks, made the walking program a shared communal activity among the participants in the meeting points.

Volunteer members of local meeting points were responsible for organizing the intervention in their meeting points. Their tasks included: the recruitment of participants, the organization of the weekly group walks, and providing motivational, practical, and social support to participants (during the

weekly meetings and walks) with regard to participation in the walking program. The central organization structure provided all intervention leaders with training (i.e. a one-day intervention instruction course) and support in the organization of the intervention.

Design

The study used a 2 x 2 between-within subjects (Condition × Time of Measurement) design. The intervention condition consisted of a randomly assigned selection of meeting points participating in the first ESC season (fall 2009). Measurements took place at the start (pretest – week 1) and after the completion of the ESC intervention (posttest – week 10). Meeting points that were registered to offer the ESC intervention only during the second season (spring 2010) formed a wait-list control condition. In these meeting points of this condition, measurements were organized at pretest (week 1) and posttest (week 10) in the format of information sessions on the intervention (fall 2009). Participants of the control condition were not offered any intervention between these two information sessions and were asked to continue their social communal activities (e.g. art or theatre activities, excursions) in the meeting point. The timeline of the intervention study is presented in Figure 1.

Participants

Intervention condition. The intervention was advertised in several media, including local papers, local radio and television, and the region-wide organization magazine and newsletter. Intervention leaders of participating meeting points were stimulated to recruit participants in their local community. No older adults were excluded from participation, although a minimal age of 55 was required to be included in this study.

Of more than one hundred meeting points that were registered for participation during the first intervention season (fall, 2009), 32 meeting points were randomly assigned to the intervention condition. A total of 479 older adults in the 32 meeting points completed all pretest measures. Three meetings points (n = 47) were excluded because it proved impossible to organize standardized measurements at posttest. This resulted in an intervention condition of 29 meeting points and 432 participants (Table 1).

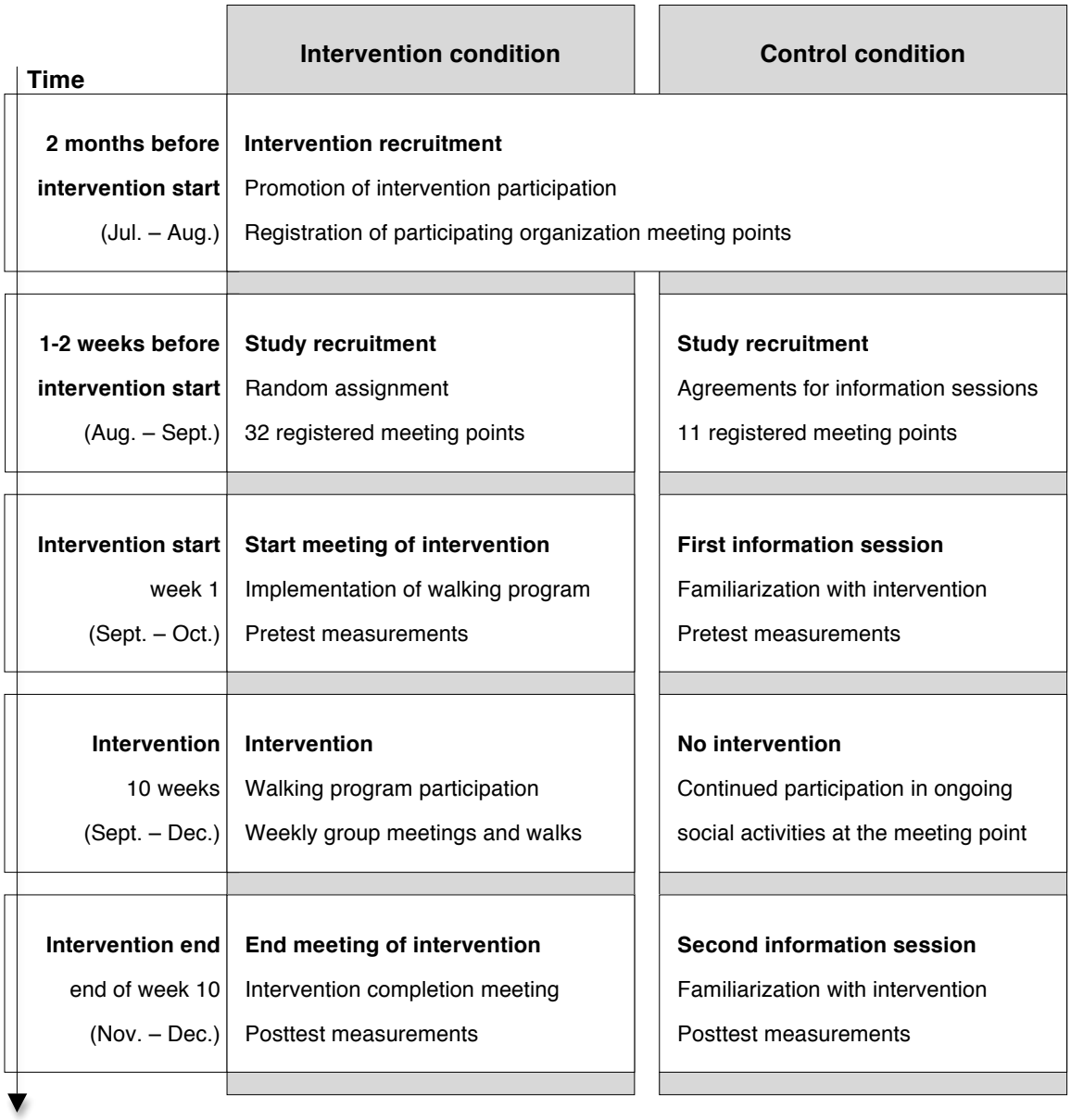

Figure 1. Timeline of the Intervention Study

Control condition. In total thirty meeting points had registered for participation in the ESC intervention during the second intervention season (spring 2010). Of these thirty registered meeting points, 27 were contacted for participation in the two information sessions. Eleven of these meeting points agreed to participate. The main reasons for participation refusal were the inability to organize the two information sessions because of involvement in other social communal activities and the inability of the meeting point leader to gather sufficient participants within the provided timeframe. As a consequence, the sample size of the control condition is considerably smaller than that of the

intervention condition. A maximum of meetings points was included in the study for both conditions considering the availability of participating meeting points and the availability of researchers.

The registered intervention leaders of the meeting points participating in the control condition recruited the participants for the two information sessions. They were instructed to recruit older adults who explicitly confirmed intervention participation during the second season to avoid motivational differences with the intervention condition participants.

Participants agreed to attend both information sessions (pretest and posttest). In total 159 older adults in the eleven meeting points completed all baseline measures. One meeting point (n = 11) was excluded because of the absence of all but one participant at posttest. The remaining control condition consisted of 148 participants in ten meeting points (Table 1). The intervention and control conditions did not differ in participant demographics at pretest, except for organization membership: Fewer participants were members of the OKRA organization in the intervention condition (Table 1).

Table 1. Participant Demographics at Pretest in Means (M) with Standard Deviation (SD) or in Percentages (%), Compared by Condition in Means (F) or Distribution (χ^2)

	Intervention (n = 432)			Control (n = 148)					
Demographic	*M*	*SD*	%	*M*	*SD*	%	*F*	χ^2	*df*
Age	69.40	7.26		70.34	6.38		1.98		1,578
Gender								2.67	1
male			30.6			37.8			
female			69.4			62.2			
Overweight (BMI > 25)								1.54	1
			65.6			71.2			
Marital status								9.03	4
married			63.3			73.6			
widowed			26.7			23.0			
divorced			1.9			0.0			
single			6.0			2.0			
co-habiting			2.1			1.4			
Education level								3.49	4
elementary school			10.3			11.6			
middle school			46.5			45.2			
high school			31.9			26.7			
university college			9.9			14.4			
university			1.4			2.1			
OKRA-membership								4.41*	1
member			90.1			95.8			
non-member			9.9			4.2			

* $p < .05$

Procedure

Intervention condition. The intervention leaders invited all registered participants to the start meeting, attended by a university researcher, in the local meeting point. Participants were informed on the benefits of physical activity and on the content of the intervention, and signed an informed consent form for study participation. They received a pedometer and completed the standardized six-minute walking test to determine their entry level to the walking intervention. Based on their result, participants received their personal structured walking program. Instructions on the use of the program were provided. Finally, participants filled out a questionnaire for the study. In the next ten weeks, participants completed their personal walking program and attended group walks in the local meeting points. At the end of the intervention, participants were again asked to complete the standardized walking test and the study questionnaire at a final group meeting (posttest).

Control condition. For the control condition, the same information on the intervention and same measurement procedure were applied as in the intervention condition. The standardized walking test and study questionnaire were assessed in both information sessions (pretest and posttest).

Measurements

Demographics. Participants were asked to report age, gender, weight, heigth, senior organization membership, marital status, and education level in the study questionnaire.

Physical activity. Physical activity was assessed by an adapted version of the Godin Leisure Time Exercise Questionnaire (GLTEQ; Godin & Sheppard, 1985). Participants had to report the number of times per week they engaged in physical activities of low, moderate, and vigorous intensity for more than twenty continuous minutes. The GLTEQ total score for physical activity was calculated according to the prescribed formula, multiplying the reported numbers of physical activity with their attributed metabolic equivalent or MET values: GLTEQ total score = (3 * GLTEQ low intensity) + (5 * GLTEQ moderate intensity) + (9 * vigorous intensity).

Fitness: The 6MWT. Participants completed the six-minute walking test (6MWT; Butland et al., 1982; Enright et al., 2003) as a measure of fitness. The 6MWT is a validated measure of fitness, and is used among older adults, along with other measures, to assess functionality. The main outcome measure of the 6MWT consists of the total distance covered (in meters) over six minutes. This

outcome measure has been a signifier of fitness and functionality.

The 6MWT was a central construct in the walking program. An adapted score on the 6MWT, obtained by multiplying the distance covered in meters on the 6MWT and a rating of perceived exertion on the 6MWT, determined the entry level to the walking program. The distance covered in meters on the 6MWT was itself determined by multiplying the assessed step length by the number of steps measured by the pedometer on the 6MWT.

Step Length. Two signalization cones marked a twenty-meter distance on a flat surface. Participants were asked to walk the distance between the signalization cones in a straight line twice. An observer (intervention leader or researcher) counted the number of steps needed to complete each of the two distances. Step length was obtained by dividing twenty meters by the mean number of steps over both distances.

Distance Covered. Participants walked for six minutes on a circular, flat-surfaced, back-and-forth, twenty meters distance track marked by two signalization cones. They were asked to walk at a comfortable speed that they could maintain for six minutes. Ensuring standardized assessments over all meeting points, maximally four participants were allowed per walking track and they were assigned spread-out starting positions. Over these six minutes, pedometers measured the number of steps. The distance covered in meters was determined by the multiplication of this number of steps with the assessed step length.

Perceived Exertion. The Borg Rating of Perceived Exertion Scale (Borg, 1990) was used to measure perceived exertion directly after completing the 6MWT. The scale ranged from ‘no exertion at all’ (6) to ‘maximal exertion’ (20). This score was recoded into ‘lowly exerted’ (6-9 became 4), ‘moderately exerted’ (10-11 became 3), ‘more than moderately exerted’ (12-13 became 2), and ‘vigorously exerted’ (14-20 became 1).

Adapted Score. The product of the 6MWT distance covered in meters and the recoded score for perceived exertion was calculated to constitute the adapted score for the 6MWT. This score at pretest determined the entry level (1-12) to the walking program (Appendix).

Well-being. Four measures of well-being or health were assessed at pre- and posttest: anxiety, psychological well-being, physical well-being, and subjective health status.

Anxiety disposition was assessed by means of a shortened trait scale of the State-Trait Anxiety Index (STAI; Spielberger, Gorsuch, Lushene, Vagg & Jacobs, 1983) in the study questionnaire. The STAI scale has been reported to be internally consistent and to have high test-retest reliability in various populations (Barnes, Harp & Sik Jung, 2002), including older adults (Kabacoff, Segal, Hersen & Van Hasselt, 1997; Stanley, Beck & Zebb, 1996). In total five items of the STAI trait-scale were presented (e.g. "I feel I'm failing in most things I do"). Participants indicated on a four-point Likert-scale, ranging from (1) 'almost never' to (4) 'almost always', how often they felt as in the item. Internal consistency of this scale was acceptable, indicated by Cronbach's α of .81 at pretest and .79 at posttest.

Three items of the Marcoen scale for subjective well-being (Marcoen, Van Cotthem, Billiet & Beyers, 2002) were used to measure psychological well-being (e.g. "I am able to deal with my current life situation"). Participants indicated on a seven-point Likert-scale, ranged from (1) 'never' to (7) 'always', how often they felt as stated in the item. The scale was internally consistent: Cronbach's α was .81 at pretest and .84 at posttest.

Four items of the Marcoen scale for subjective well-being (Marcoen et al., 2002) were used to assess physical well-being. Participants reported on a seven-point Likert-scale, ranging from (1) 'never' to (7) 'always', how often they felt as stated in each item (e.g. "I feel good in my body"). The scale was internally consistent with Cronbach's α of .83 at pretest and of .84 at posttest.

One item – "How do you evaluate your health?" – was used to measure subjective health status. Answer options ranged from (1) 'very weak' to (5) 'very good' on a five-point Likert-scale.

Analysis

Intention-to-treat linear mixed models were performed on the measures for physical activity (GLTEQ-scores for low-, moderate- and vigorous-intensity physical activity, and GLTEQ-total score), for fitness (6MWT covered distance in meters, and adapted 6MWT score), and on the four measures of well-being (anxiety, psychological well-being, physical well-being, and health status). Condition (intervention vs. control) was used as between-subjects factor and Time of Measurement (pretest vs. posttest) as a within-subjects factor. Age, gender, marital status, and education level were used as covariates. 'Unstructured' repeated covariance and maximum likelihood estimations were used. In

these analyses, positive Condition × Time of Measurement interactions indicate a beneficial effect of the intervention on the dependent variable over time (pretest to posttest) compared with the change over time (pretest to posttest) in the control condition. In addition, for each dependent variable, contrasts over time were executed per condition to allocate the cause of (eventual) significant interaction effects, varying from changes over time in the intervention condition, the control condition, or both.

Ethical approval

Ethical approval for this study was obtained from the ethical committee of the Biomedical Sciences group of the KU Leuven.

Results

Participation

Figure 2 presents a flowchart of intervention study participation. Intervention and control condition did not differ significantly with respect to dropout ($\chi^2(1)= 3.32$, $p = .09$). In both conditions, participants dropping out of the study did not differ from participants completing the posttest measures on pretest demographics (age, gender, overweight, marital status, education level, or organization membership). In addition, a pretest assessment of motivation with the adapted version of the Behavioral Regulation in Exercise Questionnaire (BREQ-2; Markland & Tobin, 2004) indicated that participants who dropped out of the study did not differ in their quality of motivation from participants in the posttest: Intervention condition, $F(1,402) = 0.18$, $p = .65$; Control condition, $F(1,144) = 0.02$, $p = .89$).

In total 366 (84.7%) completed the ESC intervention. Fifteen participants (3.5%) discontinued participation for various reasons, including health issues or sickness ($n = 8$), injury ($n = 2$), intervention intensity ($n = 1$), inability to combine with family life ($n = 1$) and reasons unknown ($n = 3$). The completion status of 51 participants (11.8%) is unknown.

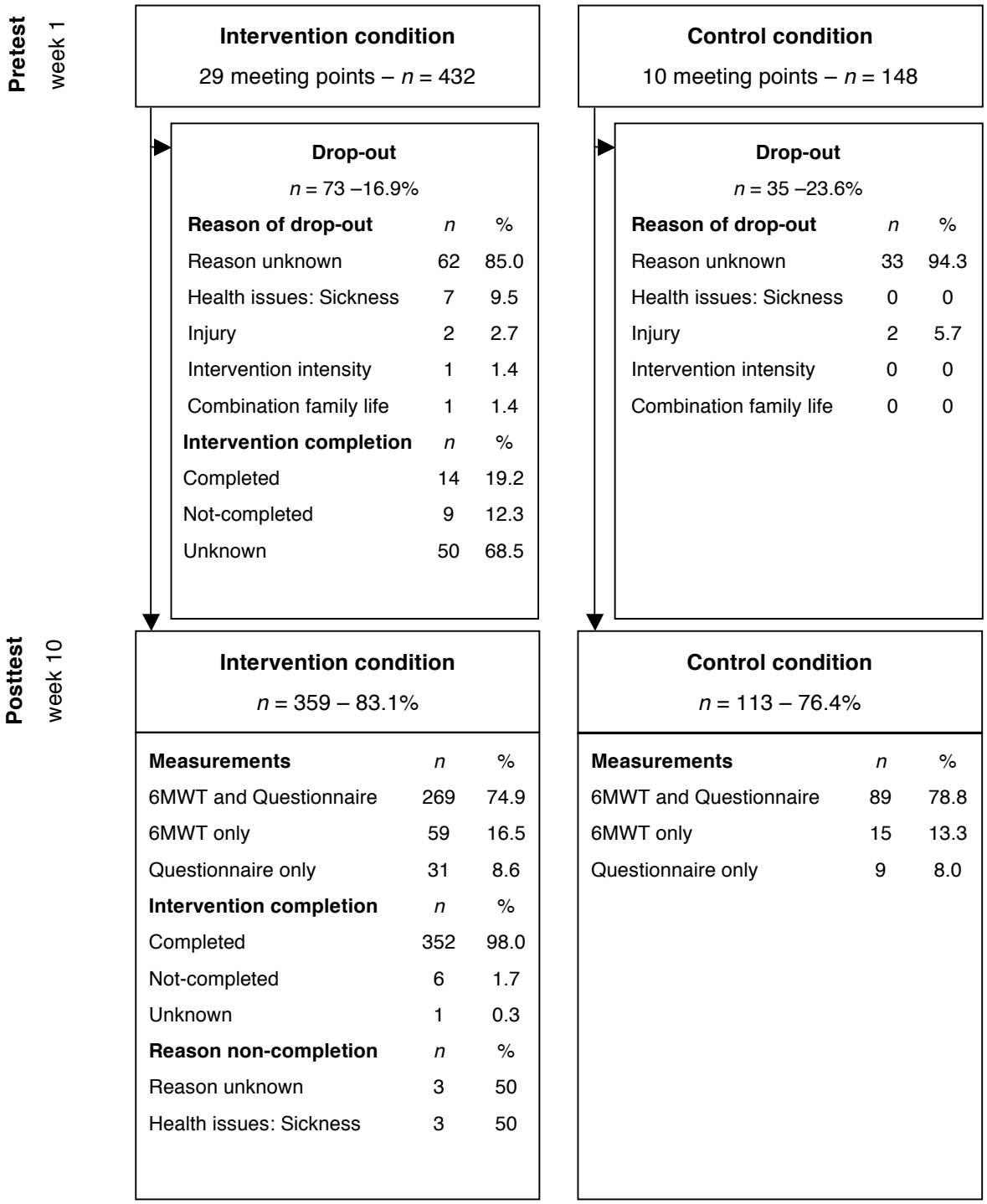

Figure 2. Flowchart of Intervention Study Participation

Intervention Outcomes

Physical activity. Intention-to-treat linear mixed models were performed on physical activity GLTEQ-scores for low-, moderate-, and vigorous-intensity physical activity, and on the GLTEQ total-score for physical activity (Table 2). The interaction between Condition and Time was significant for moderate-intensity and total physical activity, while this interaction approached significance for low-intensity physical activity. More specifically, these results indicate that, compared with the control condition, the intervention had a positive effect over Time on moderate-intensity physical activity and total physical activity, while a similar trend emerged for low-intensity physical activity. The significant effects on moderate and total physical activity were small (Table 2). By contrast, this interaction was not significant for vigorous-intensity physical activity, indicating the absence of an intervention effect.

The positive intervention effects were further explored by means of contrasts over time within each condition. With respect to moderate-intensity physical activity, the contrast over time revealed no significant change in the intervention condition from pretest to posttest, $t(443.73) = 1.71$, $p = .09$. By contrast, the control condition reported to participate fewer times per week at posttest compared with pretest, $t(460.43) = -2.13$, $p < .05$, Cohen's $d = -.12$. In other words, the intervention seems to have counteracted the significant, but small drop in moderate-intensity physical activity participation observed in the control group. With respect to low-intensity physical activity, $t(442.90) = 6.48$, $p < .001$, Cohen's $d = .41$, and total physical activity, $t(435.76) = 3.59$, $p < .001$, Cohen's $d = .20$, the contrasts indicated a significant increase over time in the intervention condition, while for the control condition no significant changes were found over time on both low-intensity physical activity, $t(452.60) = 1.65$, $p = .10$, or total physical activity, $t(441.77) = -0.80$, $p = .43$. These findings imply that the intervention succeeded in promoting participation in low-intensity physical activity, and consequently in total physical activity.

Fitness. Intention-to-treat, linear mixed models were performed on distance covered in meters and the adapted score of the 6MWT. Significant Condition-by-Time interactions with small effect sizes emerged on both measures (Table 2). In order to further explore these interactions, contrasts over time were calculated within each condition. The contrasts indicated that the intervention condition improved significantly with respect to both distance covered in meters, $t(432.84) = 7.02$, $p < .001$, Cohen's $d = .31$, and the adapted score on the 6MWT, $t(449.34) = 5.93$, $p < .001$, Cohen's $d = .27$.

Table 2. Results of Linear Mixed Models on GLTEQ-measures of Physical Activity, 6MWT-measures of Fitness and Measures of Well-being, including Condition Contrasts per Time (*t*) and Condition by Time Interaction Effects (*F*), Contrast Estimates and Effect Sizes (Cohen's *d*) (n =580).

		Intervention (n = 432)		Control (n = 148)		Condition Contrast		Condition x Time				
Measures	Time	*EM*	*SE*	*EM*	*SE*	*t*	*df*	*F*	*df*	*Contrast*	*SE*	*Cohen's d*
GLTED low	Pre	2.37	0.10	1.66	0.18	-3.48**	550.50	3.29°	1,450.21	0.53	0.29	.17
	Post	3.32	0.12	2.08	0.21	-5.07***	389.90					
GLTEQ moderate	Pre	2.50	0.10	2.19	0.17	-1.62	553.19	7.28**	1,456.33	0.65	0.24	.25
	Post	2.70	0.11	1.74	0.19	-4.42***	410.49					
GLTEQ vigorous	Pre	0.33	0.03	0.28	0.06	-0.73	546.92	0.88	1,431.82	-0.09	0.09	-.09
	Post	0.32	0.04	0.36	0.07	0.48	393.45					
GLTEQ total score	Pre	23.26	0.82	19.79	1.39	-2.15*	554.11	6.19*	1,440.32	4.83	1.94	.24
	Post	26.75	0.89	18.45	1.55	-4.65***	409.65					
6MWT distance (m)	Pre	465.16	3.24	466.52	5.54	0.21	559.04	9.49**	1,433.73	20.22	6.56	.30
	Post	488.06	3.84	469.20	6.67	-2.45*	489.49					
6MWT adapted score	Pre	1564.10	24.07	1626.35	40.94	1.31	558.58	7.41**	1,449.26	131.67	48.38	.26
	Post	1707.10	26.62	1637.69	46.24	-1.30	492.37					
Anxiety	Pre	1.60	0.02	1.60	0.04	-0.80	511.16	5.26*	1,419.20	-0.11	0.05	-.22
	Post	1.48	0.02	1.55	0.04	1.46	436.03					
Psychological Well-being	Pre	5.80	0.05	5.71	0.08	-0.95	564.33	0.16	1,416.99	0.04	0.09	.04
	Post	5.85	0.05	5.73	0.09	-1.23	444.46					
Physical Well-being	Pre	5.24	0.05	5.29	0.08	0.52	565.72	2.36	1,420.32	0.14	0.09	.15
	Post	5.41	0.05	5.32	0.09	-0.85	468.26					
Health status	Pre	3.67	0.03	3.76	0.05	1.52	562.12	3.96*	1,427.72	0.11	0.06	.19
	Post	3.80	0.03	3.78	0.06	-0.36	474.95					

* $p < .05$, ** $p < .01$, *** $p < .001$, ° $p = .07$

By contrast, the control condition did not change significantly on the distance covered, $t(434.00) = 0.47$, $p = .64$, or the adapted score, $t(449.17) = 0.27$, $p = .79$. These results suggest that the intervention effectively promoted fitness among intervention participants over the intervention period.

Well-being. Intention-to-treat linear mixed models were performed on the measures of well-being: anxiety, psychological well-being, physical well-being and subjective health status. Significant condition by time interactions effects with small effect sizes emerged on anxiety and subjective health status (Table 2). Time of measurement contrasts within each condition indicated that in the intervention condition anxiety was reduced, $t(417.63) = -4.96$, $p < .001$, Cohen's $d = -.29$, over period of the intervention, while subjective health status increased significantly, $t(426.59) = 4.72$, $p < .001$, Cohen's $d = .21$. In the control condition, no such significant changes over time emerged on anxiety, $t(419.57) = -0.22$, $p = .83$, or subjective health status, $t(428.03) = 0.44$, $p = .66$. The results indicate that the intervention improved intervention participants' anxiety disposition and subjective health status.

Discussion

This study evaluated ESC – a ten-week, structured walking intervention with systematic training progression in a community-based senior organization – in promoting physical activity participation, fitness and well-being. In this evaluation, the study addressed the combined effectiveness of community-based senior organizations as community-scale intervention settings and systematic training progression in structured walking interventions. The intervention was expected to lead to positive effects on physical activity (Hypothesis 1), fitness (Hypothesis 2) and well-being (Hypothesis 3) compared with the start of the intervention (pretest) and a wait-list control condition. Intention-to-treat linear mixed models confirmed that the ESC intervention was effective in promoting physical activity, fitness, and various aspects of well-being among older adults (age ≥ 55 years).

The results showed that the intervention was effective in promoting physical activity among older adults. In line with Hypothesis 1, total physical activity participation improved significantly over the course of the intervention and compared with the control condition. Considering that walking is a physical activity of (predominantly) moderate intensity, one might expect this positive intervention

effect resulted from a significant increase in moderate-intensity physical activity. This expectation is disconfirmed by the study results: The ESC intervention did not result in a significant increase of moderate-intensity physical activity compared with the start of the intervention. Nevertheless, the intervention can be considered to have promoted moderate-intensity physical activity. Participation in physical activity of moderate intensity remained stable over the intervention period, whereas it decreased in the control condition. Seasonal effects can explain this significant drop in participation in the control condition. Physical activity levels are lower during colder and rainy seasons than during warmer and dryer seasons (e.g. Tucker & Gilliland, 2007). The onset of the fall and winter seasons during the intervention was associated with temperature drops and increases in rain (Koninklijk Meteorologisch Instituut, 2011). This is likely to have resulted in a decrease in moderate-intensity physical activity among older adults not participating in a physical activity intervention. In contrast, the ESC intervention cancelled out this seasonal effect on moderate-intensity physical activity. Similar counteractions of seasonal effects in physical activity have been reported in other intervention studies (e.g. Opdenacker, Delecluse & Boen, 2011). In conclusion, the ESC intervention was most likely effective in promoting moderate-intensity physical activity by counteracting a seasonal drop in participation.

In contrast, the ESC intervention effect on total physical activity participation can be attributed to the combined effects of the intervention on low- and moderate-intensity physical activity. First of all, the ESC intervention did improve in low-intensity physical activity compared to pretest, but this increase was not different from the control condition (p = .07). Second, as mentioned above, the ESC intervention kept participation in moderate-intensity physical activity stable over the intervention period (pretest) and counteracted a significant negative seasonal effect in the control condition. These results imply that the intervention resulted in increased participation in total physical activity in the combination of an increase in low-intensity physical activity (compared with pretest) and the maintenance of moderate-intensity physical activity (compared with control group). Therefore it can be argued that the ESC intervention was effective in promoting total physical activity through the promotion of low-intensity and moderate-intensity physical activity participation.

Second, in validation the second hypothesis, the ESC intervention was effective in promoting fitness compared with the pretest and with the control condition. These findings emphasize the value of structured walking interventions with systematic training progression in promoting fitness among older adults. However, it should be acknowledged that within the framework of health promotion, the mean increase of 22.90 meters on the distance covered in meters on the 6MWT was rather limited. Studies on the 6MWT and (functionality related) health conditions mention that an increase of more than fifty to seventy meters is needed to profoundly affect (functionality-related) health conditions, such as sarcopenia (Morley et al., 2011) and severe chronic obstructive pulmonary disease (Enright et al., 2003), profoundly. Therefore, although the intervention resulted in significant improvements in fitness among older adult participants, it can be argued that these small improvements are unlikely to result in profound health benefits. Nevertheless, the results imply that the intervention in current format is valuable for the initial promotion of cardiorespiratory or aerobic fitness levels.

Finally, the ESC intervention enhanced several aspects of well-being. In line with Hypothesis 3, the intervention was effective in reducing anxiety and improving perceived health status. In contrast, no improvements emerged on physical and psychological well-being. These findings suggest that the ESC intervention can be a valuable intervention to promote specific aspects of well-being among older adults.

Although the ESC intervention was effective in promoting physical activity, fitness and several aspects of well-being, the effects were limited (the Cohen's *d* effect sizes ranged from .19 to .30, with a Cohen's *d* of -.22 for anxiety). With regard to the small improvements in cardiorespiratory fitness, the exercise load of the ESC walking program might have been insufficient to result in more pronounced improvements in fitness. Alternatively, the duration of the intervention (i.e. ten weeks) might have been too limited to produce more profound effects on cardiorespiratory fitness. With regard to well-being, the high mean scores on well-being measures at pretest might have caused a ceiling effect. This reduced their ability to detect profound effects. Considering this, further research should determine whether this type of intervention, in this format or in adapted format, could elicit greater improvements in physical activity, fitness and well-being. Nevertheless, this study confirms that the ESC intervention is, at least, an effective first-stepping-stone intervention to promote initial improvements in physical activity, fitness, and well-being among older adults.

In addition to the positive intervention effects, participants were able and motivated to maintain their participation in the ESC intervention: More than eighty percent (84.7%) of the participants completed the intervention. In contacts with participants, the researchers were informed that the social experience (i.e. walking and talking with friends) of the intervention was a major reason for (maintained) participation. Qualitative interviews have indicated that this social contact is an important motive for maintaining participation in walking programs with a social orientation (South et al., 2011). These findings on social motives are in line with the assumptions of the currently dominant theory on motivation, namely Self-Determination Theory (Deci & Ryan, 1985, Ryan & Deci, 2000). According to Self-Determination Theory, individuals are qualitatively better motivated to participate in activities when this is expected to promote feelings of relatedness. The ESC intervention constituted a social communal activity with social group meetings and walks. Intervention participants may have experienced feelings of relatedness, which are assumed to contribute to a better quality of motivation for a maintained participation in the intervention. The obtained anecdotal evidence and study results signal the potential value of community-based senior organizations as community-scale intervention settings and confirm the findings of Opdenacker et al. (2008) on the potential of interventions in these kinds of organizations. Future research should be aimed at investigating the role of the social intervention environment (e.g. social support of the intervention leader, social support of other participants, the social climate) in motivation for (maintained) intervention participation and in intervention outcomes.

In conclusion, the ESC intervention succeeded in promoting physical activity, fitness and several aspects of well-being among older adults. Although the intervention effects were small, ESC seems to be an effective stepping-stone intervention for promoting physical activity, fitness and well-being on a community-level among older adults. This confirms the effectiveness of structured walking interventions with systematic training progression and highlights the potential of community-based senior organizations as intervention settings.

Strengths

A major strength of the study is its ecological validity. The intervention was organized in the existing community-based meeting points of a senior organization. The central organization structure and volunteer intervention leaders organized the intervention. Researchers performed measurements at pretest and posttest, but refrained from further interaction. In other words, the intervention was offered as a natural part of the social activities in the meeting point, without extensive influence from outside parties.

Limitations

Although the minimal interference by the researchers added to the ecological validity, it resulted in limited control on the implementation of the intervention, which may have facilitated unmeasured variability between the meeting points. Moreover, only a limited number of intervention process measures or qualitative experiential measures were assessed between the start and end of the intervention, which limits our understanding of the intervention execution, processes and experiences. Furthermore, the study design cannot be considered a completely randomized controlled trial (RCT). Despite randomized assignment of registered meeting points to the intervention condition, the meeting points were assigned to one of both conditions according to their seasonal registration for intervention participation. Assignment of the participants to the conditions was depended on the seasonal registration of their meeting point. This quasi-experimental study design limits the exclusion of influence of diverging participant and situational factors between conditions in intervention results. Finally, the major reasons for dropout are unknown. When participants dropped out of the intervention, they stopped attending the weekly social meetings. However, because they had the individualized walking schedules in their possession, they could have completed the program by themselves. Therefore, their completion status of the walking program is unknown. This limits the evaluation of the reasons for dropping out and of the effectiveness of the intervention in drop-out diminution.

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Appendix

The 'Every step counts!' Structured Walking Schedules with Systematic Training Progression

Schedule	6MWT adapted score	Prescribed walk in number of steps							Weekly number of steps
		Day 1	*Day 2*	*Day 3*	*Day 4*	*Day 5*	*Day 6*	*Day 7*	*Volume*
1	0 – 500	1000**	1000**	1000**	1000**	1000**	1000**	1000**	7000
2	500 – 700	1000*	1000*	1000*	1000*	1000*	1000*	1000*	7000
3	700 – 900	1000	1000	1000	1000	1000	1000	1000	7000
4	900 – 1100	1500	1000	1500	1000	1500	1000	1500	9000
5	1100 – 1300	1500	1500	1500	1500	1500	1500	1500	10500
6	1300 – 1500	2000	1500	2000	1500	2000	1500	2000	12500
7	1500 – 1700	2000	2000	2000	2000	2000	2000	2000	14000
8	1700 – 1900	2500	2000	2500		2500	2000	2500	14000
9	1900 – 2100	3000	2000	3000		3000	2000	3000	16000
10	2100 – 2400	3000	3000	3000		3000	3000	3000	18000
11	2400 – 2700	4000		3000		4000		3000	14000
12	> 2700	4000		4000		4000		4000	16000
13		4000		4000		4000		4000	16000
14		6000		4000		6000		4000	20000
15		6000		4000		6000		4000	20000
16		8000		4000		6000		4000	22000
17		8000		4000		8000		4000	24000
18		8000		8000			8000		24000
19		8000		6000			10000		24000
20		10000		5000			10000		25000
21		10000		7000			10000		27000

** = 1 resting break; ** = 2 resting breaks*

Chapter 5

Using Social Capital to Promote Exercise

Experienced Social Support in a Social Walking Program for Older Adults Explains Motivation and Intention to Participate

Pelssers, J., Vanbeselaere, N., Delecluse, C., & Boen, F.

Abstract

Social support is a key social propeller of older adults' regular exercise involvement. According to Self-Determination Theory (SDT), its effectiveness depends on the extent to which it promotes older adults' autonomous motivation (i.e., originating from their self) by enhancing their self-inherent appreciation of involvement in exercise. This study aimed to determine the extent to which older adults' experience of social support in a social walking program in a social organization for older adults explained their autonomous motivation and their intention to participate in the program. In total, three hundred participants (Age = 69.58) completed measures on experienced social support, experienced social belonging at the social organization, motivation and intention. Overall, results of Linear Regression-based analyses confirmed that the experience of social support for the self-inherent appreciation of program participation explained participants' autonomous motivation and intention to participate. The findings imply that social support that fosters the self-inherent appreciation of involvement in exercise is essential to promote exercise involvement among older adults. Using the existing social capital of social organizations for older adults to provide this kind of social support is a potent approach to promote (the motivation and intention to) exercise among older adults.

Keywords: Elderly, Physical Activity, Self-Determination Theory, Basic Needs Support.

Introduction

In a world population that is projected to expand vastly at a rapid pace, the segment of individuals who are sixty years old or older is expected to increase from 12% in 2012 to 21% in 2050 (United Nations, 2013). In order to experience a good quality of life at this older age, it is imperative for these older adults that they remain in good health (i.e., absence of chronic disease and/or disability), retain their functional independence (i.e., do not require support for self-care), and maintain an effective involvement in life, while growing older. In the prospect of the progressive graying of our societies over the upcoming decades, the promotion of such 'Successful Aging' (Rowe & Kahn, 1997) has become a focus point of action in public health policy (World Health Organization, 2002).

One valued approach to the promotion of Successful Aging is to stimulate older adults to involve in regular physical activity. Regular physical activity essentially contributes to the Successful Aging of older adults by benefiting their health (i.e., by diminishing their risks for disease-associated mortality, disease, and disability), their functional independence, and their well-being (Chodzko-Zajko et al., 2009; Fiatarone Singh, 2002; Nelson et al., 2007). Despite these benefits, the majority of older adults insufficiently engage in regular physical activity to maintain their health, functional independence, and well-being (Kruger, Carlson, & Buchner, 2007; Sjöström, Oja, Hagströmer, Smith, & Bauman, 2006; Varo et al., 2003; Wijndaele et al., 2006). Effectively convincing (these) older adults to engage in regular (physical) exercise would profoundly promote (their) Successful Aging.

Providing older adults with a social environment that supports involvement in regular exercise is an effective approach to motivating older adults for regular exercise involvement. Social support has been identified as a key social determinant of regular physical activity and exercise (McNeill, Kreuter, & Subramanian, 2006; Wendel-Vos, Droomers, Kremers, Brug, & van Lenthe, 2007) among older adults (van Stralen, De Vries, Mudde, Bolman, & Lechner, 2009). However, its potency in promoting (maintained) regular physical activity and exercise involvement is proposed to depend on the extent to which it succeeds to enhance older adults' self-inherent appreciation of exercise involvement.

Self-Determination Theory (SDT; Deci & Ryan, 1985; Ryan & Deci, 2000), presently the dominant theory on the motivation for (regular) exercise involvement (Teixeira, Carraca, Markland, Silva, & Ryan, 2012; Wilson, Mack, & Grattan, 2008), proposes that individuals' exercise motivation is more potent the more it is experienced as originating from their 'self'. Individuals are better motivated

to exercise the more they *want* to involve in exercise out of their *own* (*volition*) – i.e., out of their self. According to SDT, the extent to which individuals are motivated out of their self – i.e., are 'autonomously' motivated – would be dependent on the satisfaction of three innate basic psychological needs in exercise involvement: The needs for autonomy, competence and belongingness. To our knowledge, SDT does not explain *why* the fulfillment of these three basic needs determines individuals' feeling of *volition* to involve in exercise. We propose that the experienced satisfaction of the three basic needs reflects that individuals *self*-inherently appreciate involving in exercise and therein feel that they *want* to involve in it out of their self.

The basic need for autonomy is satisfied when exercise involvement is in line with the individual's personal preference – because he/she appreciates (the outcomes of) involving in exercise). The basic need for competence is satisfied when the individual feels that he/she is effective in exercise involvement (because his/her exercise involvement results in self-valued outcomes). The basic need for belongingness is satisfied when the individual feels positively connected to meaningful others (i.e., individuals/groups whom he/she values) through his/her exercise involvement, which is an outcome each individual appreciates. The more these basic needs are satisfied in exercise involvement, the more that individuals would (*self*-inherently) value exercise involvement, and the more they would *want* to involve in exercise out of their own (*volition*).

According to SDT, individuals naturally strive to meet these three basic psychological needs. We presume that this is because individuals would innately desire to be effective (i.e., to achieve self-valued outcomes) in their interaction with their social environment. Therefore, the more that individuals experience basic needs satisfaction in exercise involvement (i.e., the more that they experience that their exercise involvement results in outcomes they value), the more probable it is that they will involve in exercise. Exercise motivation is thus more potent the more it originates from individuals' self (i.e., from a self-inherent appreciation of exercise involvement) and the more individuals *want* to involve in exercise out of their own (*volition*).

SDT distinguishes between motives that predominantly originate in the self – i.e., that arise from a predominantly self-inherent appreciation of exercise involvement – and motives that predominantly originate external to the self – i.e., that arise from a predominantly social appreciation of exercise involvement. *Autonomous* motivation refers to motives that originate in the self. When

individuals have such autonomous motives for exercise involvement, they feel they (*want to*) involve in exercise out of their own *volition* – because they self-inherently appreciate (the outcomes of) exercise involvement. Autonomous motives include *wanting to* exercise because one experiences feelings of self-inherent appreciation, such as enjoyment, in exercise involvement (i.e., self-intrinsic regulation) or because one appreciates (the outcomes of) exercise involvement – e.g., considers (the outcomes of) involving in exercise important (i.e., self-identified regulation).

By contrast, *controlled* motivation refers to motives that originate external to the self. When individuals have such controlled motives for exercise involvement, they feel pressured by their social environment to involve in exercise. They feel that they have to/should exercise because their social environment values (the outcomes of) (their) exercise involvement. Their involvement in exercise is *controlled* by this social appreciation. Controlled motives include *having to* involve in exercise because one experiences feelings of social appreciation, such as pride and/or reduced guilt/shame, in exercise involvement (i.e., self-introjected regulation), or because (one's) exercise involvement is appreciated by one's social environment with social rewards or with the withdrawal of social punishment (i.e, self-external regulation).

Although both autonomous and controlled motives can drive individuals to involve in exercise, only autonomous motives have been found to result in a maintained involvement in regular exercise (Teixeira et al., 2012). Experienced (support for) basic needs satisfaction has been found to promote the autonomous motivation for exercise involvement (Teixeira et al., 2012). Therefore, for social support to be effective in promoting maintained regular exercise involvement among older adults, it is essential that it enhances the autonomous motivation of older adults to involve in exercise by increasing their experienced basic needs satisfaction in – i.e., their self-inherent appreciation of – exercise involvement

Social organizations for older adults represent valuable social capital to older adults because they can be a source of social support. In such social organizations, older adults meet to engage in social activities. Both the organizations and fellow members in the organizations are (potential) social sources of support for exercise involvement to older adults. Addressing this social capital to provide older adults with a basic needs supportive social environment for exercise involvement could be a valuable approach to promoting maintained regular exercise involvement among older adults. The

present study aimed to evaluate whether the experience of social support for the satisfaction of the basic needs in involvement a walking program that was offered by a social organization for older adults would enhance older adult participants' autonomous motivation to involve in the walking program, and would foster their intention to participate in a similar (exercise) program in this social organization in the future.

'Every Step Counts!' (ESC) was a walking program of OKRA, a region-wide social organization for older adults – 55 years old or older – in Flanders (i.e., the Flemish-speaking region of Belgium). OKRA provides social activities to over 211,000 card-carrying members in its community-based meeting points. ESC was a ten-week social walking program that was offered at these OKRA-meeting points. Participants met at these meeting points to involve in the walking program as a group. At the start meeting, participants received an individualized walking program that was tailored to their walking ability and fitness. This walking program prescribed walks of a specified number of steps in weekly schedules for a period of ten weeks (for a detailed description of the walking program, see Pelssers et al., 2013). The participants completed the prescribed walks with the use of a pedometer.

The social dimension of the walking program consisted of weekly group meetings and walks at the meeting point. This provided the participants with the opportunity for reciprocal social support. A volunteer member of the participating OKRA meeting point led the walking program. These group leaders received training on implementing and monitoring the walking program. They were responsible for organizing the weekly group meetings and walks, and for providing the participants with (basic needs) support during their involvement in the walking program. This support included emphasizing the value of ESC walking program involvement to the participants and respecting their personal preferences with respect to walking program involvement (i.e., autonomy support), providing informational and organizational support for an effective walking program involvement (i.e., competence support), and offering emotional support with regard to walking program involvement (i.e., belongingness).

In a previous study, we found that this ESC walking program effectively increased the physical activity, fitness, health and well-being levels of participating older adults (Pelssers et al., 2013). Over the ten-week period of the walking program, the ESC participants progressed more on the performance on a walking (fitness/ability) test, indicated to have remained more physically active,

improved more on experienced health, and experienced a stronger decline in experienced anxiety (i.e., well-being) than older adults in a waiting-list control group. This indicates that social organizations for older adults can stimulate physical activity and exercise involvement, and promote experienced health and well-being, among older adults by offering a walking program with a basic needs supportive design to its members.

With the present study we aimed to establish whether the social dimension of the ESC walking program affected the motivation to participate in the program and contributed to the intention to involve in a similar exercise program in OKRA in the future. More specifically, we pursued to evaluate if ESC walking program participants' experience of social basic needs support – i.e., basic needs support by fellow ESC walking program group participants and by the ESC walking program group leader – and their experience of (social) belonging at OKRA benefited their (autonomous) motivation to participate in the walking program, and positively contributed to their intention to involve in a similar exercise program in OKRA in the future. Therein, we aimed to determine if their autonomous motivation for participating in the ESC walking program mediated the effects of experienced social basic needs support and (social) belongingness at OKRA on their intention to involve in a similar exercise program in OKRA in the future.

With respect to the experience of basic needs support by fellow group participants, we aimed to determine whether the experienced motivational climate in the group would predict the autonomous motivation and intention for program involvement. Participants of exercise groups are positively affected in their autonomous motivation for involvement in the exercise activity when they perceive that in their exercise group fellow members support each other to master the exercise activity (e.g., Jõesaar, Hein, & Hagger, 2011, 2012). In such *a mastery group climate*, the intra-personal progress on the ability to execute the exercise activity (e.g., "I am able to complete walks of more steps compared to the start of the walking program.") is socially emphasized. Because of this emphasis on intra-personal progress on the ability to execute the exercise activity, individuals are stimulated to derive their experience of efficacy (i.e., of achieving an appreciated outcome) in involvement from whether they are performing the activity better than they *themselves* did earlier (i.e., "I am effective – i.e., I am achieving valued outcomes – in walking program involvement because, compared to before, now I am completing walks of more steps – i.e., to derive their experience of efficacy from their self). In

a mastery group climate, individuals' appreciation of exercise activity involvement would more likely be affected by whether they achieve self-valu(at)ed outcomes by exercise activity involvement (Vansteenkiste, Matos, Lens, & Soenens, 2007). A mastery group climate would promote the autonomous motivation to exercise because the exercise group members provide each other with support to strengthen their ability to achieve self-valu(at)ed outcomes in their exercise involvement.

Based on these assumptions, we hypothesized that a mastery climate would positively affect the autonomous motivation to involve in the ESC walking program and the intention to involve in a similar OKRA exercise program in the future. We expected that ESC participants would have more autonomous motivation to involve in the ESC walking program the more they experienced a mastery climate in their walking program group (Hypothesis 1a). In line with the proposition of SDT that autonomous motivation leads to maintained involvement in exercise, we expected that the experience of a mastery climate in the group would positively affect the intention to involve in a similar OKRA exercise program in the future (Hypothesis 2a) as the result of increasing autonomous motivation to involve in the ESC walking program (Hypothesis 3a).

In contrast, the autonomous motivation to involve in exercise would be thwarted when participants perceive that the members of their exercise group try to outperform each other in executing the exercise activity. In such a *performance group climate*, inter-personal progress on the ability to execute the exercise activity (e.g., "in comparison to the other participants in my walking group, I am able to complete walks of more steps.") is socially emphasized. This stimulates individuals to derive their experience of efficacy (i.e., of achieving an appreciated outcome) in exercise activity involvement from whether they are executing the activity better than *others* (i.e., "I am effective – i.e., I am achieving valued outcomes – in walking program involvement because, compared to other walking groups participants, I am completing walks of more steps) – i.e., to derive experience of efficacy socially. In such a performance group climate, individuals' appreciation of exercise activity involvement is therefore more likely to depend on whether they are able to achieve socially-valu(at)ed outcomes in their involvement in the exercise activity (Vansteenkiste et al., 2007). In such a performance group climate, the exercise group participants are encouraged to involve in the exercise activity at a level that is socially valu(at)ed as effective. This social valuation would control their involvement in the exercise activity: They (would) feel (socially) pressured to involve in the exercise activity.

A performance climate would therein reduce the autonomous (i.e., the level of autonomy in) the exercise motivation of participants by increasing their controlled motivation for involvement in (the) exercise (activity).

In line with this reasoning, we expected that the experience of a performance climate in the ESC walking program group would enhance the controlled motivation to involve in the walking program, and would thwart the intention to participate in a similar exercise program of OKRA in the future. More specifically, we expected that the ESC participants would have a more controlled motivation for involving in the walking program the more they experienced a performance climate in their walking program group (Hypothesis 1b). Furthermore, based on the propositions of SDT, we hypothesized that their experience of a performance climate in their walking program group would thwart their intention to involve in a similar exercise program of OKRA in the future (Hypothesis 2b) as the result of increasing their controlled motivation to involve in the ESC walking program (Hypothesis 3b).

We further aimed to determine whether basic needs support by the group leader would predict the motivation and intention for program involvement. Such basic needs support by a group leader (or coach) has consistently been found to promote (autonomous motivation for) exercise involvement (e.g., Amorose & Anderson-Butcher, 2007; Edmunds, Ntoumanis, & Duda, 2008; Fenton, Duda, Quested, & Barrett, 2014; Jõesaar et al., 2012; Pelletier, Fortier, Vallerand, & Briere, 2001; Puente & Anshel, 2010; Reinboth, Duda, & Ntoumanis, 2004; Van Hoecke, Delecluse, Opdenacker, & Boen, 2014). Therefore, we hypothesized that ESC participants would have more autonomous motivation to involve in the walking program the more they experienced such basic needs support by their ESC walking program group leader (Hypothesis 1c). Furthermore, in line with the assumptions of SDT, we hypothesized that the experience of basic needs support by the ESC walking program group leader would promote their intention to involve in a similar OKRA exercise program in the future (Hypothesis 2c) by enhancing their autonomous motivation to involve in ESC (Hypothesis 3c).

Finally, we aimed to determine if the ESC participants' feeling of (social) belonging at OKRA contributed positively to their autonomous motivation to participate in the walking program and strengthened their intention to involve in a similar OKRA exercise program in the future. In line with the tenets of SDT that the feeling of (social) belongingness – as a self-valued outcome of exercise

involvement – contributes to autonomous exercise motivation, we hypothesized that the ESC participants would have been more autonomously motivated to involve in the walking program the more they felt to belong at OKRA (Hypothesis 1d). We furthermore expected that their feeling of belonging at OKRA would promote their intention to involve in a similar OKRA exercise program in the future (Hypothesis 2d) by enhancing their autonomous motivation to involve in the ESC walking program (Hypothesis 3d).

Method

Design

The study had a cross-sectional design. The study participants completed measures at the end of the ESC walking program, including measures on social support (i.e., motivational climate in the walking program group and basic needs support by the walking program group leader), (social) belongingness at OKRA, (autonomous) motivation for ESC walking program participation, and intention to involve in a similar OKRA exercise program in the future. The expected effects of social support and (social) belongingness at OKRA on motivation and on intention were studied among a sample of the ESC walking program participants.

Participants

More than one hundred local OKRA meeting points offered the ESC walking program in the first OKRA-activity season. Thirty-two of the meetings points were randomly selected for study participation. Three meeting points were excluded from study participation because no standardized measurements could be organized at the final ESC program group meeting at the OKRA meeting point. In the remaining 29 meeting points, three hundred of the 432 ESC walking program participants (69.4%) who were enrolled in the study completed a questionnaire at the end of the program. Their mean age was 69.58 (SD = 7.17) and 31.3% were male.

Procedure

Older adults – aged 55 years old or older – were recruited for participation in the ESC walking program by means of advertisements in the region-wide OKRA magazine and in the OKRA newsletter, in local papers, and on local radio and television. The walking program group leaders were also stimulated to recruit older adults in the local community for program participation at the OKRA meeting point. The older adults who were registered to participate in the walking program were invited to the start meeting in their local OKRA-meeting point by the walking program group leader. At this start meeting, a university researcher informed the ESC participants of the purpose of the present study. Those ESC participants who agreed to participate in the study signed an informed consent form. Subsequently, the participants completed the six-minute walking test to determine their entry level to the walking program. They were provided with their personalized walking program and with a pedometer. Over the following ten weeks the participants completed the walking program, including the weekly group meetings and walks. At the end of the final meeting of the group, the study participants completed a questionnaire that included the measures on social support (i.e., motivational climate in the walking program group; basic needs support by the walking program group leader), (social) belongingness at OKRA, (autonomous) motivation for ESC walking program participation, and intention for involving in a similar OKRA exercise program in the future.

Measures

Social Support. The participants completed measures on the motivational climate in their ESC walking program group in order to indicate their experience of basic needs support (i.e., mastery group climate) and thwarting (i.e., performance group climate) by their fellow program participants, and of basic needs support by their program group leader.

Group Climate. Six items were used to measure the motivational climate in the group. Three items reflected a mastery climate: “In my group … (1) participants helped each other to improve their walking ability; (2) participants helped each other to overcome problems in walking; (3) improving your personal walking ability was emphasized.” Three items reflected a performance climate: “In my group … (1) participants encouraged each other to walk faster or further than other participants; (2) participants felt good about themselves when they were able to walk faster or further than other

participants; (3) walking faster or further than other participants was considered important (i.e., socially emphasized). For each of these items, the study participants reported their agreement on a Likert-scale from (1) 'completely disagree' to (5) 'completely agree'. Exploratory factor analysis distinguished between the three items that were intended to measure a mastery climate (Cronbach's α = .68) and the three items that were intended to measure a performance climate (Cronbach's α = .70). These two measures accounted for 63.10% of common variance. The mean score was 4.02 (SD = .70) for mastery climate and 2.78 (SD = .88) for performance climate.

Group leader. The participants reported their experience of basic needs support by the ESC walking program group leader by responding to a shortened version of the student report form of the Teacher As Social Context Questionnaire (TASCQ; Belmont, Skinner, Wellborn, & Connell, 1988) that was adapted to apply to the program leader. The shortened and adapted version of the TASCQ consisted of twelve items. Four items of the Autonomy Support scale – one item of each subscale (i.e., choice, control, respect, relevance – were used to measure the support for the satisfaction of the basic need for autonomy (e.g. "My program leader explained the (personal) importance of the walking program to me."). Four items of the Competence Support scale – one item of each subscale (i.e., contingency, expectations, support, monitoring and adjustment) – were used to measure the support for the satisfaction of the basic need for competence (e.g., "My program leader showed how I could overcome problems in (completing) the ESC walking program by myself."). Finally, four items of the "Involvement" scale – one item of each subscale (i.e., affection, attunement, dedication of resources, dependability – were used to measure the support for the satisfaction of the basic need for belongingness (e.g., "My program leader knew me well."). For each item, the study participants marked their agreement on a Likert-scale from (1) 'completely disagree' to (5) 'completely agree'.

Exploratory factor analysis showed that the four items that were inversely phrased to measure support for basic needs satisfaction (i.e., these items reflected the thwarting of basic needs satisfaction by the group leader) formed one factor despite addressing support for the satisfaction of different basic needs. This finding indicates that (a subpopulation of) the study participants did not interpret the inverse phrasing of the statements correctly, or did not notice the inverse phrasing of the statements. Therefore we decided to exclude these four inversely phrased items.

When considering the remaining eight items, exploratory factor analysis differentiated between two measures. The five items on experienced support for the satisfaction of the basic needs for autonomy and competence formed one measure of autonomy-competence support. This measure reflects support by the group leader for the feeling that one personally values involvement in the walking program (i.e., autonomy) because it is experienced to be effective (i.e., competence) in leading to self-inherently valued outcomes. This *autonomy-competence support* scale had a high internal reliability (Cronbach's α = .85). The three remaining items of the Involvement scale formed one measure of the experience of support for the satisfaction of the basic need for belongingness. Also this *belongingness support* scale had a high internal reliability (Cronbach's α = .86). The scales accounted for 70.75% of the common variance. The mean scale scores were 3.97 (SD = .83) for the autonomy-competence support scale and 4.15 (SD = .75) for the belongingness support scale.

Social Belonging at OKRA. Four items were used to measure (social) belonging at OKRA. These items were: (1) "Being an OKRA-member is very important to me."; (2) "I am a typical OKRA member."; (3) "I feel strongly connected to the other OKRA-members in my (OKRA) meeting point."; (4) "I feel at home among the 'Every Step Counts!' participants in my (OKRA) meeting point.". For each item, the study participants reported their agreement with the statement on a Likert-scale from (1) 'completely disagree' to (5) 'completely agree'. An exploratory factor analysis indicated that these four items formed one measure of social belongingness at OKRA. This measure accounted for 74.5% of the common variance and had a high internal reliability (Cronbach's α = .88). The mean score was 4.07 (SD = .84). Most of the study participants (85.3%) felt to belong (score > 3) at OKRA. We attribute the high level of social belongingness to OKRA to the fact that almost all of the study participants (92.3%) were registered members of OKRA, with a mean OKRA membership duration of 6.75 years (SD = 6.58) at the start of the ESC walking program.

Motivation. Both autonomous and controlled motivation for participation in the ESC walking program were measured with five items. Five items that reflected self-intrinsic (e.g., "I participated in ESC because I enjoyed it.") and self-identified (e.g., "… because I thought it would benefit my health.") regulation in ESC walking program involvement were used to measure autonomous motivation. Five items that reflected self-introjected (e.g., "… because I would have felt guilty if I had not participated.") and self-external (e.g., "… because I felt pressured by others to participate.") regulation in ESC

walking program involvement were used to measure controlled motivation. The study participants marked their agreement on a Likert-scale from (1) 'completely disagree' to (5) 'completely agree'. These measures of autonomous and controlled motivation were internally reliable, with a Cronbach's α's of .75 and .73 respectively. These measures explained 51.68% of the common variance. The mean score was 4.46 (SD = .58) for autonomous, and 2.49 (SD = .99) for controlled motivation

Intention. The intention to engage in an exercise program similar to the ESC walking program was measured with the item "I would like to involve in a similar (OKRA exercise) program in the future". The study participants reported their agreement with the item on a Likert-scale from (1) 'completely disagree' to (5) 'completely agree'. The mean score was 4.59 (SD = .60).

Analysis

Hayes' Process method for analysis of mediation and moderation (Hayes, 2009, 2013) processes was used. This method of analysis enables the non-parametric testing of mediation processes by using bootstrapping. The social support and social belongingness measures were entered as the predictor variables, the motivation measures were entered as the mediators, and the intention measure was entered as the outcome variable. The number of bootstraps was set at 5,000. IBM-SPSS 19.0 and Hayes' syntax for Process were used to perform the mediation analysis. Missing Value Analysis with the Estimation-Maximization Algorithm was used to impute the missing data.

Ethical approval

The ethical committee of the Biomedical Sciences Group of the KU Leuven provided ethical approval for the study.

Interpretation of Results

The study design (i.e., cross-sectional survey) allows for identifying the associations that exist between the observed constructs (e.g., construct A is positively related to construct B), but it does not allow proving the sequence of causality that is theorized to exist in these relationships (e.g., construct A causes construct B). However, the results are discussed in terms of effects for the purpose of clarity. The sequence of causality is presumed based on the theory that is under evaluation in the study.

Results

Motivation

Together, social support and social belonging at OKRA accounted for 16.2% of the autonomous motivation for ESC walking program participation ($F(5,294) = 11.37$, $p < .001$) (Table 1). In line with our expectations (Hypothesis 1), experiencing a mastery group climate in the ESC walking program group (1a), the experience of receiving autonomy-competence support from the ESC walking program group leader (1c), and the feeling to belong at OKRA (1d) increased the autonomous motivation to involve in the ESC walking program. However, contrary to our expectation, the experience of receiving belongingness support by the ESC walking program group leader did not explain the autonomous motivation to involve in the ESC walking program (1c).

Social support and social belonging at OKRA accounted for 16.6% of the controlled motivation for ESC walking program participation ($F(5,294) = 11.69$, $p < .001$) (Table 1). As expected (1b), experiencing a performance group climate in the ESC walking program group increased controlled motivation to involve in the ESC walking program. However, contrary to our expectation, also social belonging at OKRA increased the controlled motivation to involve in the ESC walking program

Table 1. *Linear Regression of Social Support and Social Belonging at OKRA on Motivation.*

	Motivation					
	Autonomous			Controlled		
Model	β	B	*t*	β	B	*t*
Factors						
Social Support						
Group Climate						
Mastery	.22	.18	3.31**	-.05	-.08	-.80
Performance	.04	.03	.81	.29	.33	5.24***
Group Leader						
Autonomy-Competence	.16	.11	2.35*	.08	.10	1.24
Belongingness	-.06	-.05	-.92	-.01	-.01	-.08
Social Belonging						
OKRA	.17	.12	2.67**	.24	.28	3.81***

** p <. 05, ** p < .01, *** p < .001*

Intention

Direct Effects. Social support and social belonging at OKRA explained 17.1% of the intention to involve in a similar OKRA exercise program in the future ($F(5,294) = 12.10$, $p < .001$) (Table 2 – Total). In line with our expectations (Hypothesis 2), the experiences of a mastery climate in the walking program group (2a) and of receiving autonomy-competence and belongingness support by the walking program group leader (2c) increased the intention to involve in a similar OKRA exercise program in the future. Contrary to what we expected, the feeling of belonging at OKRA did not strengthen (2d), and the experience of performance climate in the walking program group did not weaken (2b) this intention.

Indirect Effects. The autonomous motivation for ESC involvement strengthened the intention to participate in a similar OKRA exercise program in the future, whereas controlled motivation for involving in ESC weakened this intention (Table 2 – Direct). As hypothesized (Hypothesis 3), the experience of a mastery climate in the walking program group (3a), of receiving autonomy-competence support by the walking group leader (3c), and of belonging at OKRA (3d), (indirectly) strengthened the intention to involve in a similar OKRA exercise program by enhancing autonomous motivation, whereas experiencing a performance climate in the ESC walking program group negatively affected this intention by increasing controlled motivation (3b) for ESC involvement (Table 2 – Motivation-Indirect). Contrary to what we had expected, the feeling of belonging at OKRA also thwarted the intention to participate in a similar OKRA exercise program in the future by enhancing controlled motivation for ESC involvement (3d).

Only the experience of a mastery climate in the walking program group strengthened the intention to participate in a similar OKRA exercise program in the future by increasing the (experienced) level of autonomy in the motivation to involve in the ESC walking program (Table 2 – Motivation-Indirect). The experience of receiving autonomy-competence support by the walking program group leader did not strengthen the intention to involve in a similar OKRA exercise program in the future by increasing the experienced level of autonomy in the motivation to participate in ESC despite enhancing the autonomous motivation for involving in ESC. Similarly, the experience of a performance climate in the walking program group did not weaken this intention by diminishing the experienced level of autonomy in the motivation to involve in ESC, despite increasing the controlled

Table 2. *Direct and Motivation-Indirect Linear Regression of Social Support and Social Belonging at OKRA on Intention.*

	Intention												
	Direct			Motivation-Indirect							Total		
				Autonomous		Controlled		Relative Autonomy					
Model	β	B	*t*	B	95% CI	B	95% CI	β	B	95% CI	β	B	*t*
Mediator													
Motivation													
Autonomous	.38	.38	7.02***										
Controlled	-.15	-.09	-2.71**										
Factors													
Social Support													
Group Climate													
Mastery	.10	.09	1.69	.07	[.03, .13]*	.01	[-.01, .03]	.09	.08	[.03, .14]*	.19	.17	2.95**
Performance	-.01	.00	-.11	.01	[-.02, .04]	-.03	[-.06, -.01]*	-.02	-.02	[-.06, .02]	-.03	-.02	-.57
Group Leader													
Autonomy-Competence	.09	.07	1.45	.04	[.01, .09]*	-.01	[-.03, .00]	.05	.03	[-.01, .08]	.14	.10	2.05*
Belongingness	.18	.14	2.73**	-.02	[-.07, .02]	.00	[-.02, .02]	-.03	-.02	[-.07, .02]	.15	.12	2.18*
Social Belonging													
OKRA	.01	.01	.12	.04	[.01, .09]*	-.02	[-.05, -.01]*	.03	.02	[-.02, .07]	.04	.03	.57

** p <. 05, ** p < .01, *** p < .001*

motivation for involving in ESC. Finally, social belongingness at OKRA did not explain this intention by explaining the experience of autonomy in walking program motivation. Because social belongingness at OKRA enhanced autonomous *and* controlled motivation (the two antagonists in the experience of autonomy in motivation), it did not affect the experienced autonomy in walking program motivation. As a consequence, social belongingness at OKRA did not explain the intention to participate in a similar OKRA exercise program in the future by explaining experienced autonomy in ESC walking program motivation.

Overall Effects. An experienced mastery climate in the ESC walking program group and experienced autonomy-competence support from the ESC walking program group leader strengthened the intention to involve in a similar OKRA exercise program in the future. Both promoted this intention indirectly by enhancing the autonomous motivation for involvement in ESC. The ESC participants indicated to have more autonomous motivation the more they experienced a mastery climate in their walking program group and the more they experienced that their walking program group leader provided them autonomy-competence support. As a result of this elevated autonomous motivation, they were more intent to involve in a similar OKRA exercise program in the future.

The experience of receiving belongingness support from the walking program group leader also strengthened the intention to involve in a similar exercise program in the future. ESC participants had a stronger intention to participate in a similar OKRA exercise program in the future the more they experienced to have a walking program group leader that provided them belongingness support. This effect on intention occurred independent from the (absence of the) effect of experienced belongingness support by the walking program group leader on autonomous motivation. The experience of a performance group climate in the ESC walking program group did not thwart the intention of ESC participants to involve in a similar OKRA exercise program in the future, this despite negatively influencing this intention in increasing the controlled motivation for ESC walking program involvement.

Social belongingness at OKRA did not influence the intention to involve in a similar OKRA exercise program because it increased both autonomous and controlled motivation for ESC involvement. ESC participants who felt to belong more at OKRA had more autonomous motivation for ESC involvement. This elevated autonomous motivation for ESC involvement was positively

associated with their intention to involve in a similar OKRA exercise program in the future. However, these ESC participants also had more controlled motivation for ESC involvement. This elevated controlled motivation was positively associated with a decreased intention to involve in a similar OKRA exercise program in the future. Due to these opposing (motivation-indirect) effects, the feeling to belong at OKRA did not influence the intention of the ESC participants to participate in a similar OKRA exercise program in the future. Social support, social belongingness at OKRA, and ESC motivation together explained 30.0% of the intention to involve in a similar OKRA exercise program in the future ($F(7,292) = 17.91$, $p < .001$).

Discussion

The present study had the aim to determine whether the social dimension of the ESC walking program in OKRA enhanced the motivation of participants to involve in the program and strengthened their intention to involve in a similar OKRA exercise program in the future. More specifically, it aimed to evaluate the hypothesis that ESC walking program participants' experience of (social) support by fellow walking program group members and by the walking program group leader for the satisfaction of the basic needs in walking program involvement, and their feeling of (social) belonging at OKRA, would enhance their autonomous motivation to involve in the ESC walking program (Hypothesis 1). In confirmation, both their experience of a mastery climate in their walking program group and their experience of receiving support from their walking program group leader for the satisfaction of the needs for autonomy and competence in program involvement promoted their autonomous motivation to involve in the ESC walking program. The findings indicate that experienced social support for experiencing (self-referenced) feelings of effectiveness – i.e., for achieving self-valued outcomes – in ESC involvement increases the autonomous motivation to involve in the ESC walking program. In overall, (social) support by fellow walking program group members and the walking program group leader for the experiences of autonomy and competence in involvement in the walking program (thus) were potent predictors of autonomous motivation for ESC involvement.

In further confirmation, the more ESC participants experienced a performance climate in their walking program group, the more controlled motivation they had for involving in the ESC walking program. This finding indicates that the (socially-referenced) valuation of what constitutes effective

involvement by fellow program participants may have served as a social pressure to participate in the ESC walking program and strengthened participants' controlled motivation to involve in the walking program at the socially valued level. It suggests that the experience of a performance climate in their walking program group diminished the extent to which their motivation for involving in ESC is autonomous by increasing their controlled motivation to involve in it.

In disconfirmation of the hypothesis, the experience of belongingness support by the program leader did not enhance ESC participants' autonomous motivation for involvement in the ESC walking program. Furthermore, even though feeling to belong at OKRA did enhance participants' autonomous motivation for ESC walking program involvement, it strengthened their controlled motivation for ESC participation even more. Therein the feeling of belonging at OKRA did not enhance the experience of autonomy in the ESC participants' motivation for ESC involvement. Our findings thus disconfirm that social support for the satisfaction of the need for belongingness benefits the autonomous motivation for ESC involvement.

Furthermore the present study was aimed to evaluate the hypothesis that experience of (social) support by fellow program group members and by the program group leader for basic needs satisfaction in ESC walking program involvement, and social belongingness at OKRA, would promote the intention to participate in a similar OKRA exercise program in the future (Hypothesis 2) as the result of enhancing autonomous motivation for ESC walking program involvement (Hypothesis 3). In confirmation, the experience of social support for satisfaction of the basic needs for autonomy and competence in ESC participation (i.e., a mastery climate in the walking program group; autonomy-competence support by the walking program group leader) strengthened the intention to involve in a similar exercise program by increasing the autonomous motivation for ESC walking program participation. Moreover, the experience of a performance group climate in the walking program group indirectly weakened the intention to participate in a similar OKRA exercise program in the future by increasing the controlled motivation, although insufficiently for performance group climate to explain this intention. The findings confirm that (social) support for the satisfaction of the basic needs for autonomy and competence promotes the intention for (a maintained) exercise program involvement by increasing the autonomous motivation for exercise program involvement (among older adults participating in a social walking program).

Support for the experience of belongingness in ESC walking program involvement by the walking program group leader strengthened the ESC participants' intention to participate in a similar OKRA exercise program in the future, but – contrary to our hypothesis – not as a result of enhancing autonomous motivation. Furthermore, the experience of feeling to belong at OKRA even did not affect the intention to participate in a similar exercise program in the future. Although the feeling of belonging at OKRA strengthened this intention by increasing the autonomous motivation for ESC involvement, feeling to belong at OKRA also weakened this intention by increasing the controlled motivation for ESC involvement. Consequently, as a result of these opposing effects, feeling to belong at OKRA did not strengthen the intention to involve in a similar OKRA exercise program in the future (by increasing the autonomous motivation for ESC involvement). The findings indicate that social support for the basic need for belongingness inconsistently influences the intention for (a maintained) exercise program involvement as the result of inconsistently affecting the autonomous motivation to involve in an exercise program (among older adults participating in a social walking program).

One plausible reason for this observed inconsistent association is that the self-intrinsic desire to belong (i.e., to feel positively connected to the ESC walking program leader and/or to OKRA) drove older adults to involve in the ESC walking program, regardless of whether or not they (self-inherently) valued the other outcomes of walking program involvement. For example, they might have been motivated to participate in the walking program because other OKRA members (i.e., the fellow walking program participants/the walking program leader) appreciated their ESC walking program involvement. This experience of social appreciation would have fulfilled their basic need for belonging in the ESC walking program involvement. However, we propose that it is dependent on whether this social appreciation of ESC walking program involvement corresponds with their personal (i.e., self-inherent) appreciation of ESC walking program involvement whether the experience of belongingness that originates from behaving in accordance with what is socially appreciated leads to autonomous or controlled motivation for ESC involvement.

When participants (self-inherently) appreciate (the other outcomes of) involvement in the ESC walking program, the experience of (social) belongingness would have strengthened their autonomous motivation to involve because the social appreciation of ESC involvement is in line with their own (i.e., is basic needs supportive). By contrast, when they do not (self-inherently) appreciate (the other

outcomes of) ESC involvement, the experience of (social) belongingness would increase their controlled motivation to participate in the ESC walking program because the social appreciation of ESC involvement is not in accordance with their own (i.e., is basic need frustrating). Their desire to belong would pressure them to involve in ESC. For example, despite not enjoying walking, they would feel pressured to engage in the walking program because their fellow walking program participants and/or walking program leader appreciated their involvement. The experience of belongingness (in ESC involvement) therefore can reflect both autonomous and controlled motives (for ESC involvement).

In order to distinguish between the directions of the effect of the feeling of belonging (in ESC walking program involvement) on autonomous motivation, we argue that the feeling of belongingness (in ESC walking program) involvement should be measured in terms of the extent of correspondence between the self-inherent (i.e., personal) and the social (i.e., fellow walking program group participants'/walking program group leader's) appreciation (of ESC walking program) involvement. The self-inherent valuation of (ESC) involvement is reflected by individuals' preference to involve (in the ESC walking program) (i.e., autonomy) because it is experienced to be effective (i.e., competence) as the result of it leading to self-inherently valued outcomes, whereas the social appreciation of (ESC) involvement would be reflected by the perception that their (ESC) involvement is preferred by their social environment (i.e., social autonomy) as their social environment considers this effective (i.e., social competence) as the result of leading to outcomes that are valued by the social environment. When the self-intrinsic appreciation of (ESC) involvement is in correspondence with the social appreciation of (ESC) involvement, one will feel to belong in (ESC walking program) involvement. In the opposite direction, a discrepancy would lead to a feeling of not belonging in (ESC walking program) involvement.

This would imply that when ESC participants feel to belong in ESC involvement, the social environment is supportive of their self-inherently valued involvement in the walking program (i.e., is basic needs supportive). Therein this feeling of belongingness would lead to an (increased) autonomous motivation to involve in the ESC walking program. However, when participants do not feel to belong in ESC involvement, this would reflect that the social environment thwarts their self-inherently valued involvement in the walking program (i.e., is basic needs frustrating). The resulting

feeling of *not* belonging would then lead to controlled motivation to involve in ESC in line with the social valuation. This conceptualization of the feeling of belongingness might better explain when the feeling of belongingness would result in autonomous or in controlled motivation. Future research should be aimed at studying how the correspondence of the self-inherent and the social valuation of physical (exercise) activity involvement affects the experience of social belongingness in order to better understand how (social support for) the experience of social belongingness promotes maintained involvement in regular physically activity and exercise.

Combined, the study findings confirm that the autonomous motivation of older adults to participate in an exercise program in a social organization for older adults is promoted by the support provided by their fellow program participants and by their program leader for the fulfilment of the basic needs for autonomy and competence in exercise program involvement (whereas feeling positively connected to the program leader and to the social organization did not). In promoting the autonomous motivation for exercise program involvement, this social support for the self-inherent appreciation of exercise program involvement strengthened older adults' intention to participate in a similar exercise program in the social organization in the future – which reflects their intention for a maintained involvement in regular exercise. The study findings imply that – when providing/in a social exercise program to older adults – it is essential to stimulate the program participants and the program leader to provide (reciprocal) support that satisfies the needs for autonomy and competence in program involvement. The provision of this kind of social support would best be stimulated by explaining the value and the effectiveness of (the provision of) this social support to the walking program participants and leaders (i.e., autonomy) and teaching them how to provide this social basic needs support effectively (i.e., competence). The provision of such social support to older adults would be a worthwhile approach to promoting (the autonomous motivation for) maintained involvement in regular physical (exercise) activity. However, more research is needed to determine if/how social support for the satisfaction of the need for belongingness in physical (exercise) activity could similarly motivate maintained engagement in physical (exercise) activity.

Finally, this study confirmed that social organizations for older adults are a valuable setting for the promotion of the autonomous motivation and the intention for (maintaining) a regular involvement in exercise. By providing its members with (social) basic needs support for involvement in physical

(exercise) activities, these organizations can effectively promote the autonomous motivation and intention for a maintained involvement in regular physical (exercise) activity. Using this available social capital to provide basic needs supportive social environments for physical (exercise) activity involvement to older adults therefore should be considered a worthwhile approach to promoting the autonomous motivation and intention for maintained regular physical (exercise) activity involvement among older adults. In effectively stimulating older adults to involve in regular physical (exercise) activity, it could essentially promote (their) Successful Aging.

Limitations

A first limitation is that there were no follow-up measurements to determine whether the experienced social support for the satisfaction of the needs for autonomy and competence effectively resulted in a maintained regular involvement in the social organization's exercise programs, or in physical (exercise) activity in general. A second limitation of the study is that the walking program was designed to support the satisfaction of the basic needs in program involvement. This may have increased the autonomous motivation for program involvement. This basic needs supportive design of the walking program could account for a (significant) part of the autonomous motivation for walking program involvement, and of the intention to involve in a similar exercise program in OKRA in the future. This potentially includes a part of the variance that was explained by the social support and social belongingness at OKRA measures, but we could not control for this effect of the basic needs supportive design of the program. The absence of measures on the experienced basic need satisfaction in ESC walking program involvement and the absence of a control condition (in which the same measures of social support and social belonging at OKRA could be measured) does not allow accounting for the effect of the basic need supportive design of the walking program on the autonomous motivation of participants to involve in the program, and on participants' intention to involve in a similar OKRA exercise program in the future.

Conclusion

Older adults involved in 'Every Step Counts!' – a social walking program in a social organization for older adults – had more autonomous motivation to participate in this walking program and had a stronger intention to participate in a similar exercise program in the future when experiencing support from their fellow program participants and their program leader for perceiving value (i.e., autonomy) and feeling effective (i.e., competence) in their program involvement. The feeling of social belongingness (i.e., belongingness) in involvement in the program did not lead to more autonomous motivation for involvement. The effectiveness of social exercise programs in promoting a maintained regular involvement is thus dependent on the extent that its participants provide each other, and its leader provides its participants, with support for their self-inherent appreciation of exercise program involvement. When providing a social physical (exercise) activity, it is essential to create a social environment that supports the self-intrinsic appreciation of physical (exercise) activity involvement in order to promote a sustained involvement in the physical (exercise) activity. Using the social capital of social organizations for older adults to provide such basic needs supportive social environments for physical (exercise) activity involvement should be considered a worthwhile approach to the promotion of (the autonomous motivation and the intention for) a maintained involvement in regular physical (exercise) activity among older adults.

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General Discussion

The purpose of the present PhD thesis was twofold: 1) to corroborate and extend the empirical evidence for the effects of social group support on older adults' (motivation for) exercise involvement; and 2) to elaborate the theory on the motivational processes that underlie the effects of social (group) support. In each of the five previous chapters, the effect of a specific form of social group support on older adults' (motivation for) exercise involvement was studied. In this concluding chapter, I will first present a summary of the main findings. Second, I will discuss the implications of the findings for the currently dominant theoretical frameworks on the motivational processes that underlie the effects of social (group) support. Third, their implications for the practice of the promotion of physical activity and exercise among older adults will be discussed. Fourth, the strengths of (the studies presented in) this PhD thesis will be highlighted and the limitations will be considered. Fifth, I will suggest a number of potentially worthwhile avenues for future research. Sixth and finally, I will conclude by presenting the main implications of the findings in this thesis as a take home message for its three target groups: (1) for policy makers, (2) for health professionals who aim to promote physical activity and exercise (among older adults), and (3) for older adults.

1. Summary of the main findings

1.1. Does Older Adults' Social Capital Benefit Their Health and Well-being by Promoting Exercise?

Individual social capital – i.e., the extent of an individual's (social) connectedness to others or to groups – has been found to benefit health and well-being, assumedly *in part* by promoting health behavior involvement (Berkman & Glass, 2000; Uchino, 2004). In the **first chapter** of this thesis, we conducted a survey among a population-representative sample (n = 1,298) of older adults (age ≥ 55), including a baseline (n = 949) and a three-year follow-up (n = 409) survey. The purpose of this survey was to examine whether older adults' social capital of their connectedness to (*the groups of*) society and their community predicted their present and three-year future physical health and well-being as a result of explaining their present and three-year future involvement in exercise. As hypothesized, we found that aspects of older adults' social capital of connectedness to society and to their community contribute to their present physical health and well-being, and, in lesser extent, to their future physical health and well-being. However, despite that exercise involvement benefited their physical health and

well-being, the wholesome influence of (aspects of) this social capital predominantly seemed *not* to be the result of explaining older adults' exercise involvement.

The only (evaluated) aspect of older adults' social capital of connectedness to society and to their community that substantially promoted their present and future involvement in exercise was the experience of safety in society. Moreover, this experience of safety in society *in part* benefited their physical health and well-being by promoting their present and future exercise involvement. This is probably because the experience of safety in society is the only aspect of this individual social capital that essentially facilitates their exercise involvement (e.g., to dare to walk in the streets).

The findings of **Chapter 1** underscore that the individual social capital of being connected to society and to the community, and exercise involvement *independently* benefit the physical health and well-being of older adults. In order for (this) individual social capital to promote involvement in exercise (and therein benefit health and well-being), it should provide individuals with resources that facilitate them to engage effectively in exercise (e.g., feeling safe in the streets). By reinforcing such aspects of individual social capital, it seems that society can enhance older adults' physical health and well-being through the beneficial outcomes of both social connectedness and exercise involvement.

1.2. When Do Social Older Adult Identity Norms Affect Older Adults Exercise Motivation?

In **Chapters 2 and 3**, we examined whether and when older adults' experience of social age *group* normative support for exercise involvement determines their autonomous – i.e., their self-based – motivation to exercise. Based on an elaborated integration of Self-Determination Theory (SDT; Deci & Ryan, 1985; Ryan & Deci, 2000) and Social Identity Approach (SIA; Haslam, 2004), we expected that social older adult identity (i.e., social older adult *age group*) norms for exercise involvement would determine older adults' autonomous exercise motivation, but only when they identify themselves as an older adult (i.e., experience to be positively connected to the social *age group* of older adults). Only then they would experience the norms that are associated with their social identity of older adult as (in line with) their own, and would these social identity norms determine their experience of basic needs satisfaction in – i.e., their personal valuation of – exercise involvement. In affecting their autonomous motivation for exercise involvement, these social older adult identity norms would in turn influence their (intention for) exercise involvement.

In **Chapter 2**, we conducted a survey among older adults (age ≥ 55) to determine if and when older adults' perceptions of the social older adult identity norms for exercise involvement that exist in society predict their autonomous motivation to exercise by explaining their experienced basic needs satisfaction in exercise involvement, and as a result predict their exercise involvement. Among the surveyed older adults (n = 409), the perceived social older adult identity norms for exercise predicted the autonomous motivation to exercise by explaining experienced basic needs satisfaction in exercise involvement. More specifically, the more participants perceived (1) that older adults exercise, (2) that older adults are expected to involve in exercise, and (3) that exercise involvement is normative for older adults (in comparison to younger adults), the more they experienced basic needs satisfaction in exercise involvement, and the more they were – in part as a consequence of explaining experienced basic needs satisfaction – autonomously motivated to engage in exercise.

In explaining basic needs satisfaction and/or, to a lesser extent, autonomous motivation, each of the social older adult identity norms was associated with involvement in exercise. However, only the injunctive norm – i.e., the social expectation that older adults should involve in exercise – (therein) predicted exercise involvement. This social older adult identity norm (more) strongly explained basic needs satisfaction in exercise and (in part therein) autonomous exercise motivation.

As hypothesized in line with SDT, the social older adult identity norms predicted autonomous exercise motivation by explaining the experience of basic needs satisfaction in exercise involvement. However, contrary to our expectation based on SIA, this mediation did *not* differ depending on the extent to which survey respondents considered themselves an older adult. It should be noted that the vast majority of the survey respondents (86%) explicitly identified themselves as an older adult, while only a small minority (7%) did not. However, considering that throughout the survey we used the label '55-year-old-and-plus adult' instead of 'older adult' (in measuring the social older adult identity norms and identification as an older adult), even those 7% of the respondents implicitly identified themselves as an 'older adult': They were 55 years old or older and responded to a survey among '55-year-old-and-plus adults'. These survey respondents may – despite reporting to not identify themselves as an older adult – still have internalized the older adult identity norms implicitly and experienced them to be partly (in line with) their own.

The findings of **Chapter 2** findings suggest that – among older adults *who identify themselves as an older adult* – perceptions of social older adult identity norms for exercise involvement determine the autonomous motivation to exercise by influencing their experience of basic needs satisfaction in exercise. In particular the injunctive norm (i.e., the social expectation that older adults should exercise) strongly benefits their autonomous motivation to engage in exercise by promoting experienced basic needs satisfaction in exercise involvement, and therein stimulates their exercise involvement. Based on the findings of chapter 2, it remains unclear whether the perceptions of social older adult identity norms for exercise work differently on the autonomous motivation to exercise among older age adults who outspokenly reject the(ir) older adult identity.

In **Chapter 3**, we conducted an experiment in order to determine the effect of (1) the salience of older adult age, (2) the salience of social older adult identity norms for exercise, and (3) the valence of such salient social older adult identity norms for exercise, on the autonomous motivation to exercise (i.e., basic needs satisfaction and self-regulation), on the intention to exercise, and on involvement in exercise (i.e., exercise performance). We asked older adults (n = 120; age 65-70) to evaluate a new exercise activity, named 'Pattern Stepping', in one of four conditions that differed in (1) the situational salience of older adult age, (2) the situational salience of social older adult identity norms for the new exercise activity, and/or (3) the valence of these social older adult identity norms for this new exercise activity. Presuming that the participants identified themselves as an older adult, we formulated three expectations.

First of all, we expected that, because of the existent negative social older adult identity norms for exercise involvement in society – i.e., in comparison to younger adults, involving in exercise is *not* social age normative for older adults – (1) the situational salience of older adult age would weaken the autonomous motivation for (the) exercise (activity), diminish the intention to involve in a group class of the exercise activity, and thwart the performance on the exercise activity. Second, we expected that (2) these maladaptive effects would be even stronger when *also* negative social older adult identity norms for involvement in the new exercise activity – i.e., in comparison to older adults, involving in the new exercise activity is social age normative for younger adults – would be situationally salient. Third and finally, we expected that (3) these maladaptive effects would be overturned when positive social older adult identity norms for involvement in the new exercise activity – i.e., in comparison to younger

adults, involving in the new exercise activity is social age normative for older adults – would become situationally salient instead. More specifically, we expected that the autonomous motivation to involve in (the) exercise (activity) would increase, the intention to involve in a group class of the new exercise activity would strengthen, and the performance on the exercise activity would improve.

The findings were contrary to what we had expected. With respect to our first expectation, the situational salience of older adult age did *not* weaken the autonomous motivation for involving in (this) exercise (activity). Furthermore, with respect to our second expectation, it was found that when older adult age was salient, instead of having a maladaptive effect, the situational salience of negative social older adult identity norms enhanced the basic needs satisfaction in involvement in the new exercise activity, and strengthened the autonomous motivation for exercise involvement. Finally, with respect to our third expectation, compared to when negative social older adult identity norms were situationally salient, the situational salience of positive social older adult identity norms for involvement in the new exercise activity decreased the experienced level of autonomy (i.e., of self-regulation) in the motivation to exercise, instead of increasing it. Despite these influences on motivation, the situational salience of older adult age, the situational salience of social older adult identity norms, and the valence of these situationally salient social older adult identity norms, did not determine the intention to participate in a group class of the new exercise activity, or the performance on this new exercise activity.

One possible reason why the findings were not in line with what we had expected is that the majority of the participants in the experiment (91%) did *not* identify – i.e., did not feel to be – an older adult. Consequently, when older adult age became situationally salient to them, they probably did not experience the existent negative social older adult identity norms for exercise involvement in society to be (in line with) their own and were not negatively affected in their autonomous motivation (i.e., basic needs satisfaction and self-regulation). As they did not (want to) identify themselves as an older adult, their autonomous motivation (i.e., basic needs satisfaction and self-regulation) might have increased when the negative social older adult identity norms were situationally salient to them. These norms were presented in the form of positive social age norms for younger adults – i.e., in comparison to older adults, involving in this new exercise activity is social age normative for younger adults. In not feeling (or wanting) to be an older adult, the participants probably experienced the situationally salient positive social age norms for younger (than older) adults involvement to be (in line with) their own.

Therein the situational salience of negative social older adult identity norms would have promoted the autonomous motivation of these older adults to engage in exercise. When positive social older adult identity norms were situationally salient to them, their experienced level of autonomy (i.e., level of self-regulation) in their motivation for involvement in exercise most likely diminished for the same reason. Because they did not (want to) identify themselves as an older adult, they would not have experienced these norms to be (in line with) their own, and their autonomous motivation would not be determined by these norms. However, in being asked to evaluate a new exercise activity that is presented to them as (socially age normative) for older adults, they might have experienced that their social environment (i.e., the researcher) identified them as an older adult, and considered this social identity as an older adult to apply to them. Consequently, they (might have) experienced the norms associated with the salient social identity of 'older adult' to be a social pressure (i.e., as controlled motivation) to involve in exercise accordingly. As a result of this feeling that they are socially expected – i.e., have to or should – involve in (this) exercise (activity), they would have experienced less autonomy (i.e., self-regulation) in their motivation to exercise, compared to when positive social age norms for younger (than older) adults for involvement were situational salient to them.

The findings of **Chapter 3** reveal that – among older adults *who do not identify themselves as an older adult* – the situational salience of older adult age (i.e., feeling having older adult age) does not thwart the autonomous motivation to exercise. When older age adults *do not identify themselves as an older adult*, only the social norms for exercise involvement that are associated with *not* being an older adult – i.e., with the 'younger-than-older-adult' identity that they perceive or want to have – determine their autonomous motivation to exercise when they are salient to them because they experience that these social age identity norms for exercise are (in line with) their own. Furthermore, when older age adults *do not identify themselves as an older adult*, but they experience that *their social environment identifies them as an older adult*, they seem to experience to have less autonomy (i.e., self-regulation) in involving in exercise accordingly, because then they interpret the social older adult identity norms as a form of social control. However, it remains unclear if the autonomous motivation to exercise of older age adults *who do identify themselves as an older adult* is negatively affected when they feel older, and their older adult identity and its (implicitly or explicitly) associated negative social age norms are salient to them.

Combined, the findings of **Chapters 2 and 3** indicate that identification as an older adult (i.e., the experience of being positively connected to the social group of older adults) determines whether or not social older adult identity norms (i.e., social older adult age group norms) for exercise involvement influence the autonomous motivation to exercise. *When older age adults do identify themselves as an older adult*, they are autonomously motivated for involving in exercise in line with their perception of the existing social older adult identity norms for exercise involvement (Chapter 2). In contrast, *when older age adults do not identify themselves as an older adult*, they are not autonomously motivated to involve in exercise in line with their perception of the existing/salient social older adult identity norms, but are autonomously motivated to involve in line with the social identity norms of their social identity of not being an older adult (i.e., of being a younger than older adult). When their social environment imposes social older adult identity norms on them by identifying them as an older adult, they may even experience the social older adult identity norms as social pressure to involve in exercise accordingly (Chapter 3).

1.3. Is it Effective to Address Older Adults' Social Capital to Promote Exercise?

Social organizations for older adults represent valuable social capital to older adults. To older adults who are a member of a social organization (*i.e., group*), the social organization and the fellow members of the social organization are potential sources for support for (i.e., resources that facilitate) dealing with the demands of life. In **Chapters 4 and 5**, we evaluated the value of utilizing this social capital of social organizations for older adults to promote physical activity, fitness, health and well-being among older adults. 'Every Step Counts!' (ESC) was a social walking program that was offered by a region-wide social organization for older adults, named OKRA. In the community-based OKRA meeting points, older adults (age ≥ 55) met to involve in the ESC walking program in a group. In order to facilitate older adults to experience efficacy – i.e., experience achieving personally valued outcomes – in their walking (program) involvement, the ESC walking program was (basic need) supportive in design. In promoting walking – an exercise activity that is preferred by (and is social age normative for) older adults – and letting participants complete the program according to their own preferences, it supported the satisfaction of the basic need for autonomy. In prescribing a walking program that was tailored to individual participants' walking-ability and -fitness, and that was structured according to the

principles of training progression, it facilitated the satisfaction of the basic need for competence. In including weekly group walks and meeting within the safe and trusted social environment of the social organization, it supported the satisfaction of the basic need for belongingness by promoting the social connectedness to fellow ESC-walking program participants, to the ESC-walking program leader, and to the social organization. By providing such a social walking program, the social organization for older adults provides older adults with (social) support to involve in exercise.

In **Chapter 4**, we studied the effectiveness of the ESC walking program in promoting physical activity, fitness, subjective health, and physical and mental well-being. We evaluated whether the ESC participants (n = 432) of randomly assigned ESC-participating OKRA meeting points (n = 29) – i.e., the intervention condition – progressed more on measures of physical activity, fitness (i.e., a six-minute walking test), subjective health, and physical and mental well-being, compared with study participants in a waiting-list control condition. In this waiting-list control condition, OKRA members (n = 148) who had confirmed to participate in the ESC-walking program in OKRA meeting points that were registered for ESC-participation (n = 11) during the next OKRA activity season were not provided with an activity. Over the ten weeks of the ESC walking program, the ESC participants progressed more on measures of total physical activity, physical fitness and subjective health, and regressed more on the measure of anxiety. With regard to physical activity, ESC participants' involvement in moderate-intensity physical activity did not change over the course of the walking program, but moderate-intensity physical activity involvement did diminish over the same period among the study participants in the waiting-list control condition. Moreover, ESC participants' involvement in low-intensity physical activity tended to increase more over the course of the intervention.

The findings of **Chapter 4** confirm that the ESC walking program promoted physical activity, physical fitness, health and (aspects of) well-being (i.e., diminished anxiety) among older adults over a limited period of time (i.e., ten weeks). The ESC walking program succeeded in promoting involvement in physical activity by increasing the involvement in low-intensity physical activity, and by stimulating a maintained involvement in moderate-intensity physical activity, while the weather worsened during the fall and the onset of winter. It was concluded that the ESC walking program is an effective stepping-stone intervention to promote involvement in physical activity, and (therein) physical fitness, health and well-being, among older adults.

In **Chapter 5**, we examined whether the experienced social support during participation in the ESC walking program contributed to participants' autonomous motivation to participate in the walking program and (therein) determined their intention to involve in a similar OKRA exercise program in the future. At the end of the ESC walking program, participants completed measures on their experiences of basic needs support by their fellow ESC group participants (i.e., the motivational climate in the ESC walking program group) and by their ESC group leader, and of social connectedness to OKRA. Among the participants who completed the study questionnaire at the end of the walking program (n = 300), it was found that experiencing a mastery group climate (i.e., receiving support for the experience of self-valued-competence) and receiving autonomy-competence basic needs support from the group leader increased the autonomous motivation for involving in the ESC walking program. Therein these forms of support strengthened the intention to participate in a similar OKRA exercise program in the future. Experiencing a performance climate in the group (i.e., receiving support for the experience of socially-valued-competence) increased the controlled motivation for ESC walking program involvement, but did not diminish the intention to involve in a similar OKRA exercise program in the future.

Even though feeling positively connected to the group leader did not increase the autonomous motivation for involving in ESC, this positive connection did promote the intention to involve in a similar OKRA exercise program in the future. Social connectedness to OKRA did strengthen the autonomous motivation for involving in the ESC walking program, but fortified the controlled motivation for involving in the ESC walking program even more. As a result, social connectedness to OKRA neither increased, nor diminished the intention for participating in a similar OKRA exercise program in the future.

The findings of **Chapter 5** indicate that experienced social support for the satisfaction of the basic needs for autonomy and competence in exercise involvement – i.e., for experiencing to achieve personally valued outcomes in exercise involvement – enhances autonomous exercise motivation among older adults. However, social support for the satisfaction of the basic need for belongingness (i.e., for the experience of being positively connected to others and/or groups) inconsistently influences autonomous exercise motivation among older adults: The experience of social belonging in exercise involvement seems to contribute to both autonomous and controlled exercise motivation. Combined, the findings of **Chapters 4 and 5** confirm that addressing the social capital of social organizations for older adults to provide older adults with social (group) support for exercise involvement is an effective

approach to the promotion of exercise involvement among older adults, *provided* that the supplied support for exercise involvement facilitates older adults to experience being effective in their exercise involvement by enabling them to achieve self-valued outcomes.

The combined findings of **all chapters** confirm social group support – i.e., the support that is available as the result of being connected to a group – promotes older adults' autonomous motivation for involving in exercise – and consequently promotes their intention to involve in exercise, and their exercise involvement – *provided* that it increases their personal/self-inherent appreciation of – i.e., the satisfaction of their basic needs for autonomy and competence in – exercise involvement. By contrast, being socially connected and feeling to belong – i.e., having social capital – inconsistently contributes to their autonomous motivation for involving in exercise – and therefore to their (intention for) exercise involvement. The findings have specific implications for the assumptions on the role of (the experience of) social connectedness (i.e., the satisfaction of the basic need for belongingness) in the motivational processes that are assumed to underlie the effect of social (group) support on exercise involvement.

2. Implications for motivation theory

With the deliberate purpose to elaborate the motivational processes that underlie the effect of social (group) support – i.e., the support that is available as a result of being connected to groups – on the exercise involvement of older adults, we examined the determining role of (forms of) this support in the exercise motivation of older adults from the perspective of Self-Determination Theory (SDT; Deci & Ryan, 1985; Ryan & Deci, 2000), presently the dominant theory on motivation. The main assumption of this theory is that the motivation of individuals to engage in behavior is of better quality the more it originates from their 'self', and the more they *want to* engage in the behavior out of their own (volition). It is proposed that individuals would be more 'autonomously' motivated – i.e., be more self-motivated – to involve in a behavior the more that involvement in this behavior satisfies their basic psychological needs for autonomy, competence, and belongingness. Only the autonomous motivation that originates from the experienced satisfaction of these basic psychological needs in behavioral involvement would lead to (a persisted) involvement in the behavior. These assumptions have consistently been validated (Deci & Ryan, 2008) for involvement in exercise (Teixeira, Carraca, Markland, Silva, & Ryan, 2012; Wilson, Mack, & Grattan, 2008).

In order to strengthen autonomous motivation – i.e., the volition – of older adults to engage in exercise, it was predicted that social (group) support should facilitate their experienced satisfaction of SDT's basic psychological needs in exercise involvement. According to SDT, a social environment that facilitates the satisfaction of these basic psychological needs (in exercise involvement) would enhance (the) autonomous motivation (for exercise involvement), whereas a social environment that thwarts the satisfaction of these basic psychological needs would diminish (the) autonomous motivation (to involve in exercise). This implies that (the potency of) the influence of social (group) support – i.e., resources that are available as the result of being socially connected (to groups) – on autonomous motivation for (exercise) behavior would depend on the extent that it facilitates the satisfaction of these proposed basic psychological needs in involvement.

Social support for the satisfaction of these basic psychological needs in exercise involvement has indeed been found to enhance autonomous motivation for exercise involvement, and (resultantly) to promote exercise involvement (Teixeira et al., 2012). However, even though SDT presumes that the satisfaction of each of the proposed basic needs essentially contributes to autonomous motivation, the findings presented in this PhD thesis indicate that only social (group) support for the satisfaction of the basic needs for autonomy and competence in exercise consistently enhances autonomous exercise motivation and – resultantly – promotes (the intention for) exercise involvement (among older adults). Social (group) support for the satisfaction of the basic need for belongingness in exercise involvement did not consistently influence autonomous exercise motivation. For example, the findings in Chapter 5 showed that receiving (social) autonomy-competence support meaningfully strengthened older adults' intentions to involve in exercise in the future by promoting their autonomous motivation for involving in exercise. By contrast, experienced (social) belongingness support did not influence their experience of autonomy in their (motivation for) exercise involvement. The evaluated forms of (social) belongingness support either (1) did not enhance older adults' autonomous motivation for exercise involvement at all, or (2) enhanced their controlled motivation for involving in exercise even more.

The finding that social support for the satisfaction of the basic need for (social) belongingness does not (consistently) promote the autonomous motivation (of older adults) for exercise involvement corresponds with the findings of other studies. Reviews of the validity of the assumptions of SDT for exercise motivation and involvement have shown that satisfaction of the basic need for belongingness

does not contribute to (the autonomous motivation for) exercise involvement (Teixeira et al., 2012) and that support for the satisfaction of the basic need for belongingness sometimes even strengthens the controlled motivation to involve in exercise (Wilson et al., 2008; e.g., Wilson, Mack, Muon, & LeBlanc, 2007). Based on the findings presented in this PhD thesis, I propose that (social) belongingness is not a basic psychological need, but is an outcome (of behavior) that individuals essentially value. Before I present the obtained empirical evidence for this interpretation, I will present the reasoning behind it.

2.1. Social belongingness is a double-edged sword in autonomous motivation

SDT proposes that the satisfaction of the basic needs for autonomy, competence, and (social) belongingness promotes individuals to *want to* engage in this behavior out of themselves – i.e., out of their own. However, to my knowledge, SDT does not stipulate exactly why experienced satisfaction of these basic needs actually leads to this experience of volition. I propose that the satisfaction of the basic needs for autonomy and competence in a behavior reflects that individuals (self-)inherently *value* (the outcomes of) their involvement in the behavior: Individuals will *want to* involve in a behavior when this involvement in this behavior is in line with their personal preference (i.e., autonomy) because they feel and/or think that it is effective (i.e., competence) in leading to outcomes they *appreciate*. However, the experience of (social) belongingness – i.e., the feeling and/or thought of being *positively* connected to (*self-valued*) individuals or groups – is in essence an experience of appreciation, which would arise when individuals behave in accordance with what is socially appreciated. Individuals would feel more socially connected to others or groups in a behavior, the more their personal valuation of involvement in this behavior corresponds with the (social) valuation of (their) involvement in the behavior by those others or those groups, and vice versa (Figure 1). As a by-product of this correspondence between the personal valuation and the social valuation of behavior involvement, this feeling of (social) belonging in a behavior is a double-edged sword in explaining autonomous motivation.

When individuals report to experience a feeling of social belonging in involving in a behavior, this feeling can reflect autonomous motivation, as well as controlled motivation for involvement. When the social appreciation of the individuals' involvement in the behavior matches with their own valuation of involvement in this behavior, the experienced feeling of social belonging in this behavior contributes

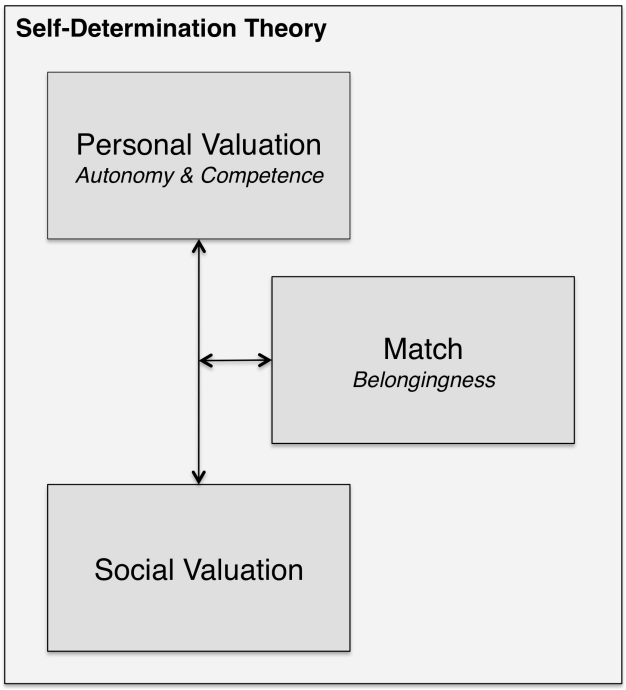

Figure 1. Proposed Revised Structure of SDT's Basic Psychological Needs

to autonomous motivation: The social valuation is in line with (i.e., it contributes to the satisfaction of) the individuals' basic needs for autonomy and competence. However, when this social valuation does not match with their personal valuation, the experienced feeling of social belonging in this behavior contributes to controlled motivation: The social valuation then thwarts the individuals' basic needs for autonomy and competence. Finally, the more an individual would appreciate this experience of social belongingness, the more they would experience value in behaving in line with what is socially valued, and thus the more they would be autonomously motivated to do so. These assumptions are supported by the empirical findings in this PhD, and by the empirical findings of others.

2.2. An Integration of Social Identity Theory and Self-Determination Theory

In Chapters 2 and 3 of this PhD, we proposed an integration of Social Identity Approach (SIA; Haslam, 2004) and SDT (Figure 2) to explain when social older adult identity norms for involvement in exercise strengthen or thwart older age adults' autonomous motivation to exercise, and therein would promote their exercise involvement. SIA proposes that when individuals perceive themselves in terms of a social identity – i.e., feel to *belong* to a (social) *group* – they internalize the social identity norms – i.e., the social group's norms – and experience them to be (in line with) their own. As social norms are

argued to indicate what socially is considered to be *effective* and *valuable* behavior (Cialdini, 2007), we proposed that when individuals identify themselves in terms of a social identity, this social identity's norms for a behavior would influence their experience of basic needs satisfaction in this behavior, and (as a result) determine their autonomous motivation for involving in this behavior. However, this would not occur when individuals do *not* identify themselves in terms of this social identity because then the social identity's norms would not apply to them. Furthermore, when individuals would experience that their social environment identifies them in terms of a social identity, they would experience that their social environment values that they behave in line with the social identity norms. In this circumstance, the individuals who identify themselves in terms of this social identity would feel socially supported in behaving in line with their social identity norms, and (thus) would experience positive feelings of social appreciation (e.g., pride) in behaving accordingly. The individuals who do not identify themselves in terms of this social identity would feel that they should or have to behave in accordance because it is socially expected of them, and would experience to avoid feelings of social depreciation (e.g., guilt or shame) in behaving accordingly. The social identity's norms would thus contribute to their controlled motivation to behave accordingly. These assumptions are in line with the proposed structure of SDT's basic needs.

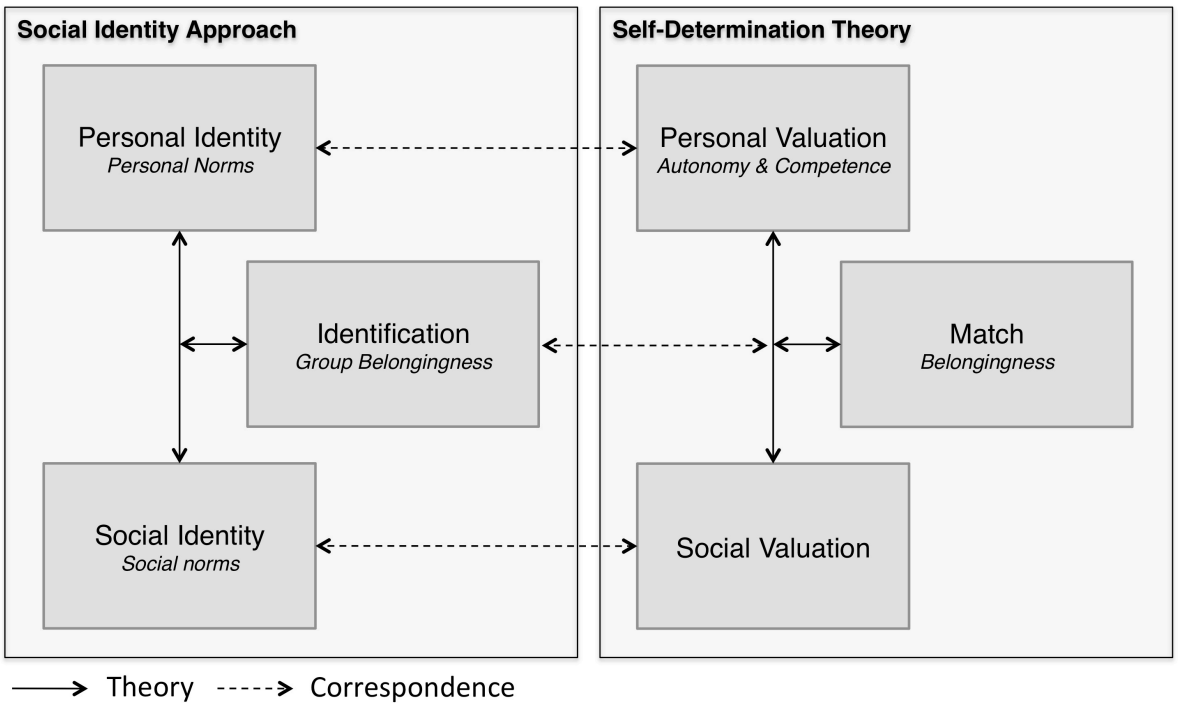

Figure 2. The integration of Social Identity Approach (SIA and Self-Determination Theory (SDT)

Our findings were in line with this proposed integration of SIA and SDT (and therefore with the proposed revised structure of SDT's basic needs). In two studies (i.e., the survey presented in Chapter 2 and the experiment presented in Chapter 3), we found that among individuals who identify in terms of a social identity, the behavioral norms associated with this social identity determine the experience of basic needs satisfaction in, and the autonomous motivation for, involvement in this behavior. More specifically, we found that among older adults who identify themselves as an older adult, social older adult identity norms for exercise involvement explain the experienced basic needs satisfaction in, and the autonomous motivation for, exercise involvement (Chapter 2). We further found that among older adults who do not identify themselves as an older adult, the social norms for involvement in exercise that are associated with their social identity of '*not* an older adult' – i.e., of 'younger-than-older-adult' – affect the experience of basic needs satisfaction in, and the autonomous motivation for involvement in exercise (Chapter 3). Both findings confirm the assumption that when individuals identify themselves in terms of a social identity – i.e., they *feel to belong to a social group* – they internalize this social identity's norms for involvement in a behavior – i.e., the social valuation of involvement in a behavior – and experienced them to be (in line with) their own – i.e., to be (in line with) their personal valuation of involvement in the behavior, and as a result, will be (more) autonomously motivated – i.e., (more) *want* – to behave in accordance with the social identity's norms for this behavior.

The assumptions of our proposed integration of SIA and SDT (and of the proposed revised structure of SDT's basic needs) are furthermore supported by our finding that among individuals who experience that their social environment identifies them in terms of a social identity, the behavioral norms associated with this social identity are experienced as a form of social control and diminish the experience of autonomy in (the motivation for) involving this behavior. More specifically, we found that in a social situation in which older adults – who did *not* identify themselves as an older adult – are addressed as an older adult and are confronted with the norms of their social identity as an older adult for involvement in an exercise activity, these older adults experience less autonomy in their motivation compared with when they perceive the same social norms to be associated with their social identity of 'not an older adult' (i.e., 'younger than older adult'). This finding is in accordance with the assumption that when individuals experience that their social environment identifies them in terms of one of their social identities, these individuals experience social pressure to behave in line with what they perceive

to be socially normative behavior for individuals with this social identity. As the result of valuing feeling positively connected to their social environment (i.e., *feeling to belong socially*), individuals experience pressure to behave in line with the social identity norms, and consequently experience less autonomy – i.e., volition – to involve in this behavior.

Our proposed integration of SIA and SDT (and thus the proposed revised structure of SDT's basic needs) is in line with the findings of other studies. It has been demonstrated that individuals who strongly identify themselves in terms of a social identity (1) experience that behaving in line with this social identity's norms is more in line with their personal standards for this behavior (Christensen, Rothgerber, Wood, & Matz, 2004); (2) are more autonomously motivated to behave in accordance with this social identity's norms for a behavior (Amiot, Sansfaçon, & Louis, 2014); (3) persist longer in a behavior in order to match the social identity's norms for (the outcomes on) this behavior (Sassenberg, Matschke, & Scholl, 2011); and (4) experience that their (intention for) involvement in the behavior that is social normative for this social identity is more in line with their personal values and attitudes for this behavior (for an overview of the evidence, see: Smith & Louis, 2009), than individuals who do not or weakly identify themselves in terms of this social identity. Each of these findings indicates that when individuals identify themselves in terms of a social identity, they experience that the behavioral norms associated with this social identity are in line with their own norms for involvement in this behavior. As a result, they are/become (more) autonomously motivated to involve in this social identity's normative behavior (when this social identity is salient to them).

2.3. The Controlling and Driving Force of Injunctive Norms

From a theoretical perspective, a noteworthy finding in this PhD thesis is that among older age adults who identified themselves as an older adult, in particular the injunctive social older adult identity norm for involvement in exercise emerged as a potent predictor of their autonomous motivation (i.e., of their experienced basic needs satisfaction and their experience of autonomy) in exercise involvement (Chapter 2). This finding indicates that among individuals who identify themselves in terms of a social identity, the social beliefs about how individuals with this social identity should behave are experienced to be (in line with) their beliefs about how they should behave. In determining this personal valuation of

involvement in a behavior, they can be a powerful determinant of autonomous motivation. This finding is noteworthy for two reasons.

First, injunctive social norms have been repeatedly found *not* to affect automatic – i.e., snap decision – behaviors (e.g., Mollen, Rimal, Ruiter, & Kok, 2013). It was assumed that this was the case because injunctive norms are a cognition (i.e., a belief), and consequently determine behavior through cognitive regulation. Injunctive norms are thought to determine an individual's behavior when (1) this behavior requires (significant) cognitive regulation by the individual (e.g., goal setting and planning) and (2) individuals have sufficient mental resources to cognitively regulate their behavior (Jacobson, Mortensen, & Cialdini, 2011). Given that regular involvement in physical activity and exercise requires significant cognitive – i.e., self-identified – regulation, the injunctive (social) norm should be considered as an important driver of individuals' (motivation for) exercise involvement.

Second, this finding is important because there is a dark side to such injunctive social norms. When individuals do *not* identify themselves in terms of a social identity, but experience that the social environment does identify them in terms of this social identity, this social identity's injunctive norms can be experienced as a form of social pressure. This is the case when lowly self-identified individuals experience that their social environment appreciates – *i.e., social valuation* – that they behave in line with how individuals with this social identity should behave, while they personally believe they should not behave in this way – i.e. personal valuation. This discrepancy in the appreciation of the social identity injunctive normative behavior might contribute to controlled motivation to behave accordingly (i.e., involving in the behavior because it is socially expected), and it might contribute to autonomous motivation not to behave accordingly, or even to behave oppositely, – i.e., reactance – in order to not have this social identity. Whether their motivation will become controlled or autonomous is dependent on the extent to which (1) they value feeling positively connected to whom is holding the social identity normative expectations of them and (2) they value not having this social identity and/or not engaging in the expected normative behavior. In line with this reasoning, individuals have been found to indicate a stronger intention to behave contrary to an injunctive norm that was associated with one of their social identities – but that was discrepant of their personal norm – when a person (with another social identity) confronted them with this norm (Stok, de Ridder, de Vet, & de Wit, 2014). This was argued to reflect reactance. In other words, they became autonomously motivated – i.e., more intent – to behave

contrary to what the person who presented this injunctive social norm to them expected of them based on their social identity, because they probably did not value involving in the socially expected behavior themselves.

When addressing or presenting a social (identity) injunctive norm to promote a health behavior among individuals, it is imperative (1) that these individuals identify themselves in terms of this social identity and (2) that this social (identity) norm corresponds with their personal norm. If this is the case, this salient injunctive social (identity) norm contributes to their autonomous motivation to involve in this behavior, as they would experience that this social valuation of involvement in this behavior is (in line with) their personal valuation of involvement in this behavior. If this is not the case, the salience of this social norm contributes to their controlled motivation to involve in this behavior, as the social valuation of involvement in this behavior is not experienced to be (in accordance with) their personal valuation of involvement in this behavior – *or* – it contributes to their autonomous motivation to behave in contrary to this norm, as behaving in contrary to this norm is in line with not having this social identity – i.e. with not feeling to belong to this social group. Addressing or presenting a social (identity) injunctive in such conditions would then have a (potentially powerful) maladaptive effect.

2.4. Being Socially Connected and Feeling To Belong is Not Enough (for Autonomous Motivation)

Our proposed restructuring of the needs assumed by SDT is not only supported by the results in this PhD thesis that focus on when social identity norms support or thwart autonomous motivation. Also the findings in this PhD thesis that indicate that merely being socially connected and feeling to belong socially does not consistently enhance the autonomous motivation of older adults to involve in exercise, and (therein) inconsistently affect (their intention for) involvement in exercise, underscore the need for reinterpreting the determining role of the experience of (social) belongingness in autonomous motivation even further. Two specific findings stand out.

First, among the participants in the walking program in the social organization for older adults, feeling to belong at this social organization strengthened the autonomous motivation to involve in the walking program, but reinforced the controlled motivation to involve in the walking program even more (Chapter 5). On the one hand, feeling to belong at the social organization might have contributed to their personal appreciation of involvement in the walking program because (1) involving in activities of

the social organization is in line with their social identity of being a member of the social organization, or (2) because they appreciate the social contact with the other members of the social organization in walking program involvement. On the other side, feeling to belong at the social organization might have contributed to controlled motivation because (1) they felt that they should involve in the walking program because involvement in activities of the social organization is in line with their social identity of being a member of the social organization, despite personally not valuing involvement in the walking (program), or (2) because they felt they should participate in the walking program because this was expected by the (other members of) the social organization. In promoting autonomous and controlled motivation, the feeling of belonging at the social organization did not promote the intention to involve in a similar exercise program in the social organization in the future. This particular finding is in line with the proposition that the experience of (social) belongingness can function as a double-edged sword in promoting the autonomous motivation to behave in a behavior.

Second, in a survey of older adults it was found that merely being socially connected to society or to the community did not contribute to involvement in exercise (Chapter 1). Considering that merely having social capital – being positively connected to others or groups in general – does not guarantee social support for exercise involvement, this non-finding is not surprising. However, these findings do indicate that only individual social capital that facilitates individuals to be effective – i.e., to achieve outcomes they appreciate – in exercise involvement, effectively promotes exercise involvement. Only safety – i.e., the only evaluated aspect of older adults' social capital of connectedness to society and the community that essentially facilitates them to achieve effective outcomes in exercise involvement – substantially promoted exercise involvement among older adults. The other (evaluated) aspects of this individual social capital (e.g., their connectedness to the community) did not (substantially) determine exercise involvement, because it depends on whether the resources that are available as the result of this social connectedness support or thwart individuals to feel effective – i.e., to achieve outcomes they appreciate – in exercise involvement. Individual social capital would contribute to the autonomous motivation of individuals to engage in exercise, and (subsequently) promote their *maintained* regular involvement in exercise, *only* when it provides access to resources that facilitate individuals to feel effective in their exercise involvement. This finding underscores that having individual social capital in itself does not promote exercise involvement, but

that having social capital that succeeds in increasing individuals' personal appreciation of exercise involvement by facilitating them to achieve self-valued outcomes in exercise involvement, including feeling positively socially connected, does. For SDT, this implies that the influence of social support (and of any other social determinant) on autonomous motivation for (exercise) behavior should be defined and – in order to account for it correctly – measured in terms of the extent to which it is successful in increasing individuals' personal appreciation of (i.e., individuals' experience/perception of satisfaction of the basic needs for autonomy and competence in) exercise involvement.

2.5. How to Account for the Effects of Social Belongingness in Autonomous Motivation?

In order to distinguish between when a feeling of social belongingness in behavior contributes to/reflects autonomous motivation or controlled motivation, the basic need for belongingness needs to be conceptualized as the match between the personal valuation and social valuation of involvement in a behavior. The proposed structure of SDT's basic needs indicates that only when these valuations match, the experience of social belongingness in involvement in a behavior would contribute to/reflect autonomous motivation for involvement in this behavior. However, this conceptualization of the basic need for belongingness would in essence reflect social support for the satisfaction of the basic needs for autonomy and competence in behavior involvement. As a consequence, it could be argued that it is needless to measure the experience of social belongingness in behavior involvement. Nevertheless, I propose that – in addition to such measures of experienced autonomy and competence basic needs support by individuals and/or by groups – it is important to measure the extent to which individuals feel positively connected to those individuals and/or groups who provide support for involving effectively in a self-valued behavior. This measure would reflect the extent that individuals value/appreciate these individuals and/or groups, and indicate the inclination of individuals for autonomously adhering to the behavior that is valued/appreciated by these individuals and/or groups.

3. Implications for the Practice of Physical Activity Promotion (Among Older Adults)

The empirical findings in this PhD thesis and their theoretical implications clarify when social support strengthens or weakens the autonomous motivation of older adults to exercise. Therein these findings have implications for the practice of physical activity and exercise promotion among older adults. Two implications stand out.

3.1. Addressing Social (Age) Identity Norms in Promoting Exercise Involvement Among Older Adults

At present, a number of authors advocate the use of Social Identity Approach (SIA; Haslam, 2004) to promote healthy behavior, such as regular involvement in physical activity (Haslam, Jetten, Postmes, & Haslam, 2009; Jetten, Haslam, & Haslam, 2012). They propose to address individuals on social identities with positive social norms for involvement in a health behavior, as this would stimulate them to engage in this behavior *when they identify themselves in terms of this social identity*. It has indeed been found that physical activity interventions in which physical activity was presented to be socially normative for a social identity that participants valued, increased physical activity involvement (Pearson, 2008; Van Hoecke, 2013). The findings in this PhD thesis further underscore that in order for this approach to be effective, it is imperative that these individuals (want to) identify themselves in terms of this social identity.

The findings indicate that it depends on whether older adults identify themselves as an older adult, whether perceiving involvement in (an) exercise (activity) as socially normative for older adults either strengthens or thwarts their autonomous motivation to involve in (the) exercise (activity). When older adults identify themselves as an older adult, they are autonomously motivated – i.e., they *want* – to involve in exercise in line with what they socially perceive to be exercise behavior that is normative for older adults (Chapter 2). However, when they do not identify themselves as an older adult, they are more autonomously motivated for involving in (an) exercise (activity) when this is social age normative for their social identity of ‘not an older adult’ – i.e., ‘younger-than-older-adult’. Presenting involvement in the same exercise activity to be social age normative for older adults undermines these older adults’ autonomous motivation to involve in the exercise activity. They *want* to involve in this exercise activity less out of their own because they feel socially pressured to involve in it: They feel they *should* involve

in this exercise activity because the social environment identifies them as an older adult, and therefore expects them to involve in this exercise activity (Chapter 3).

For the practice of physical activity promotion among older adults, these findings imply that the decisions (1) to present exercise activities to be normative for older adults or (2) to offer exercise activities that are normative for older adults (e.g., lawn bowling, Nordic walking) should *not* be based on individuals having older adult age (i.e., the age that is socially considered to mark being an older adult), but should be based on whether individuals feel to be an older adult. Presenting an exercise activity as normative for older adults, or offering an exercise activity that is normative for older adults to older age adults who do not feel to be an older adult would undermine their willingness to involve in this exercise activity. When such older adults feel that they are considered to be an older adult, they might feel they are expected to involve – i.e., they *should* involve – in this exercise activity, and vice versa. When these individuals highly value not being considered to be an older adult, this might even cause them to resist involvement in the exercise activity. Consequently, it is critical to establish – for example by means of a guided interview or a questionnaire – whether (and to which extent) older age adults feel to be an older adult before offering them to involve in exercise activities, classes, programs, or interventions, that are presented to be normative for older adults. As said before, only when older adults identify themselves as an older adult, they will become autonomously motivated to involve in such activities (as a result of this age normative framing).

Moreover, when presenting an exercise activity as normative for older adults to older adults who identify themselves as an older adult, it is vital that this presented social older adult identity norm is in line with these older adults' personal injunctive norm for involving in this exercise activity. When they value/appreciate this exercise activity (i.e., when they think they *should* involve), presenting this exercise activity as normative for older adults strengthens their willingness to involve in this exercise activity. When they do not value/appreciate this exercise activity (i.e., when they think they *should* not involve), presenting this exercise activity as normative for older adults causes them to experience pressure to involve in the exercise activity. As they identify themselves to be an older adult, they feel that they *should* involve in this exercise activity because this is expected of older adults. When they highly value not involving in this exercise activity (i.e., when they think they 'really should not' involve), this might even cause them to resist involvement in the exercise activity).

For example, in 2009, BLOSO – i.e., the sports administration of the Flemish Government in Belgium – launched a campaign to promote exercise involvement among adults of 50 years old and older, named 'Sportelen'. In this campaign, the social normative involvement in exercise for individuals with this age was presented to be of a low-intensity and of a non-competitive nature (i.e., for pleasure only). For example, in a campaign advertisement, a football goalkeeper was wearing barbeque gloves instead of goalkeeping gloves, and kept an eye on the barbeque, while posing for the team picture. Although this campaign was successful in promoting exercise involvement, a number of individuals of this age group who perceived that the presented norm was not in line with their own norm for involving in exercise at this age reacted negatively to the campaign. They considered it 'belittling' for suggesting that adults of this age would not (be able to) involve competitively in exercise (Vander Linden, 2009).

It can be questioned whether presenting exercise activities to be normative 'for older adults' is a worthwhile strategy altogether. Considering that older adults are pervasively stereotyped as being 'incompetent' (Cuddy, Norton, & Fiske, 2005), individuals do not value this social identity and do not appreciate feeling to be (an) older (adult). As they do not want to identify themselves as an older adult, they are prone to resist involving in physical activity or exercise programs that are explicitly labeled to be for older adults (e.g., the 'senior' hour in the community pool). The aversive labeling is a barrier to involving in such exercise activities. Therefore it is essential to find positive labels for older age adults, i.e., social identities that older age adults value. However, it is probably most effective and worthwhile to circumvent this problem by presenting an exercise activity to be normative for an alternative social identity that they value. This has been shown to be effective in promoting older adults' physical activity involvement. For example, Van Hoecke (2013) demonstrated that addressing older adults on their self-valued social identity of being a 'socially-committed citizen' and framing their exercise involvement in terms of it being normative for this social identity, effectively promoted physical activity.

In conclusion, when using SIA to promote involvement in a health behavior, it seems essential (1) to address individuals on social identities that they value (i.e., they identify themselves in terms of this social identity), and (2) that they value involvement in the social identity normative health behavior (i.e., it is in line with their personal injunctive norm). Only then will they become (more) autonomously motivated for involving in the social identity normative health behavior. Otherwise, the salience of the social identity might lead to controlled motivation for involving in the social identity normative health

behavior, and might even lead to individuals wanting to behave oppositely. As autonomous motivation is essential for a *maintained* involvement in a health behavior, this is specifically important for health behaviors that require repeated involvement and (thus) persisted self-regulation.

3.2. Promoting Social Capital that Facilitates The Personal Appreciation of Involving in Exercise

In line with previous findings that individual social capital (i.e., (social) connectedness to others and groups) predominantly benefits health and well-being independently from involvement in health behaviors (Berkman & Glass, 2000; Uchino, 2004), the findings in this PhD thesis show that (aspects of) individual social capital and exercise involvement independently contribute to the physical health and well-being of older adults. Individual social capital is proposed to benefit health and well-being by, in providing the availability of social support, facilitating individuals to deal *effectively* with the demands of their life. Therein it prevents the harmful effects of stress. When considering that involving in health behavior is a demand of life, the findings in this PhD emphasize that for social capital to promote older adults physical activity and exercise involvement effectively, it is essential that social support facilitates older adults to feel *effective* in regular physical activity and exercise involvement (because only then this social support strengthens their volition to involve in regular physical activity and exercise). In this perspective, the findings in this PhD indicate that addressing the social capital of social organizations (for older adults) to provide a social exercise program that facilitates older adults to feel effective (i.e., to achieve self-valued outcomes) in exercise involvement is an effective strategy to promote physical activity involvement, physical fitness, health, and well-being, among older adults. In joining a social organization that promotes involvement in social physical activity and exercise (e.g., by offering social exercise activities or integrating physical activity in their social activities) older adults can meaningfully enhance their health and well-being, and increase their chance of Successful Aging in two ways: (1) the available social support for involving in regular physical activity would promote their involvement in physical activity and exercise; (2) the available social support for dealing effectively with the demands of life would reduce the harmful effects of stress. Consequently, it should become a priority in public health policy to promote older adults to join such social organizations, and to stimulate these social organizations to provide social exercise programs that facilitate older adults to feel effective in exercise involvement.

3.3. Having a Significant Impact by Providing Social Support

The findings in this PhD show that the effect of social (group) support is consistent, but small. Social (group) support probably only has a limited impact on older adults' experience of being effective – i.e., achieving personally valued outcomes – in exercise involvement in comparison to their personal experience of being effective in exercise involvement, and in comparison to their physical environment (i.e., proximity of a gym, the safety of bike trails), specifically when the provided social (group) support is subtle (e.g., the situational salience of older adult identity group norms). In order for social (group) support to have a significant impact on older adults (autonomous motivation for) exercise involvement, it should be tailored and pronounced (i.e., provide older adults with resources that highly facilitate their experience of achieving personally valued outcomes in their involvement), and it should be continuous (i.e., provided regularly), by individuals whom they personally value (for providing this kind of support).

4. Strengths and Limitations

4.1. Strengths

There are four major strengths to this PhD thesis. First, the effect of social (group) support on older adults' (motivation for) exercise involvement was studied from the perspectives of the dominant theories on this determinant role of social (group) support in three scientific domains: sociology, social psychology, and exercise psychology. By evaluating and interpreting the study findings in terms of the integrated assumptions of these theories, this PhD thesis provides a multi-domain perspective on the processes that underlie the effect of social support on involvement in physical activity and exercise, on health, and on well-being. Moreover, the effects and underlying processes of social (group) support were examined by means of the leading methods within each of these scientific domains, including a survey (sociology), an experiment (social psychology) and a field intervention (exercise psychology). As a consequence, this PhD thesis provides a multi-method evaluation of the effects of social (group) support on exercise involvement, health and well-being, and of its underlying (motivational) processes.

Second, in proposing an elaborated integration of Self-Determination Theory (SDT) and Social Identity Approach (SIA), and by evaluating the validity of the assumptions of this integration, this PhD thesis contributes to a better understanding of when, how, and why, social (identity) norms determine

motivation. This is essential knowledge for the promotion of (health) behavior by means of SIA, which is at present being advocated and elaborated as a new and valuable theoretical framework for public health interventions (Jetten et al., 2012). Moreover, the results presented in this PhD thesis suggest that the basic need for belongingness, which is proposed by SDT to essentially determine autonomous motivation, should not be considered a basic psychological need, but an appreciated/valued outcome of behavior.

Third, the external validity of the findings in this thesis is relatively high. More specifically, the sample of participants in the (baseline) survey study was (largely) representative for the population of older adults in the region of Flanders in Belgium (Chapter 1). As a result, the findings of this study can probably generalized to the older adult population of this region. Furthermore, in the field intervention study (Chapters 4 and 5), we evaluated a walking program that was being offered to older adults as a part of a social organizations' offer of social activities to its members. Our studies only interfered in the process of the walking program by asking participants to complete a questionnaire at the start and end of the walking program. Consequently, the results reflect what happens when offering such a walking program runs its natural course.

Fourth and finally, 'we actually practiced what we preached'. In organizing the baseline survey of the survey study (Chapter 1), we promoted the social participation of older adults by involving them in conducting the survey. Over two hundred older adults collected surveys at the participants' home, or entered the data of these surveys into a database.

4.2. Limitations

We acknowledge that the studies in this PhD thesis have five major limitations. First, there is a lack of consistent use of measures. Because of practical reasons, different measures were used for measuring the same construct between the studies. More specifically, in order to fit the purpose of the different studies, (1) items were selected from scales in order to shorten the measure and reduce the work load for the participant, (2) items were selected from scales in order to measure a construct that we wanted to measure, (3) items were translated from English to Dutch (because the scales were not available in Dutch), and (4) items were adapted to fit the purpose of the study (e.g., the items of the Teacher as Social Context Questionnaire were adapted to apply to the walking program leader instead

of to a teacher). However, we like to point out that these items were carefully selected and adapted in order to measure the targeted construct, and that we found acceptable factor structures for the scales.

Second, the combined findings of two studies (Chapter 2 and 3) suggest that identification in terms of a social identity is the pivotal construct that determines whether the salience of social identity norms contributes to autonomous or to controlled motivation. However, none of both studies confirms this pivotal role of identification, probably because there were either too few older adults who did not identify themselves as an older adult (Chapter 2), or too few older adults who did identify themselves as an older adult (Chapter 3). As a result, the pivotal role of identification can only be interpreted from the combined findings of these studies (Chapter 2 and 3). Furthermore, due to the low number of older adults who identified themselves as an older adult in the experiment (Chapter3), it was not possible to test whether making older adult age salient to older adults and presenting negative older adult identity norms for involvement in exercise would thwart the autonomous motivation for exercise involvement of older adults who identify themselves as an older adult.

Third, in three of the five studies presented in this PhD thesis (Chapters 1, 2 and 5), the effect of (specified forms of) social (group) support on (motivation for) exercise involvement, and/or on health and well-being, is studied by measuring these constructs at the same moment in time and identifying the associations that exist between these constructs, among (a cross-section of a population) of older adults. However, this study design does not enable determining the (sequence of) causality that exists in the identified associations (e.g., Chapter 2: Do older adults' perceptions of social older adult identity norms determine their autonomous exercise motivation, or does older adults' autonomous motivation to exercise determine their perceptions of social older adult identity norms?). The evaluated/presented (sequence of) causality in the identified associations can only be assumed based on the assumptions by the examined theories on the effects of social (group) support.

Fourth, except for one study (Chapter 3), the study participants were (almost) all members of a social organization for older adults. This social organization provides social (exercise) activities to its members. The study participants could differ meaningfully from older adults who are not members of such a social organization in their experience of social (group) support, their (motivation for) exercise involvement, and their experience of health and well-being. The identified associations/effects of social (group) support with/on the (motivation for) exercise involvement, and on experienced health and well-

being could be different among older adults who are not member of a social organization for older adults. Therefore the study findings cannot be generalized to individuals who are not member of such a social organization, or to the general older adult population.

Fifth and finally, there is the lack of a follow-up evaluation in the field intervention study. More specifically, with regard to the effect of experienced social support, we did not measure whether the experienced support that promoted the intention to involve in a similar exercise program in the future led to actual involvement in a similar exercise program in the social organization in the future. On the other hand, we did study whether the effects of walking program involvement on fitness, health, and well-being, were sustained over a year, but these findings could not be included in this PhD thesis: As the waiting-list control condition had already started walking program participation (in the next activity season in the social organization), there was no control group in this study.

5. Future Research

The findings in this PhD suggest several routes for future research. One worthwhile avenue is to further validate the assumptions of the proposed integration of SIA and SDT. In particular the pivotal role of identification should be examined. More specifically, it needs to be established whether social identity norms determine basic needs satisfaction (i.e., the basic need for autonomy and competence) and autonomous motivation differently depending on whether individuals identify themselves in terms of this social identity or not. The consequences of our proposed integration of SIA and SDT should be further validated for older adults and involvement in physical activity and exercise, but also for other social identities with strongly associated (social) normative behaviors.

Another worthwhile avenue is to use this proposed integration of SIA and SDT to examine the motivational processes that underlie stereotype threat. It could be examined whether individuals who have a social identity with strongly associated social/stereotyped norms for involving in a behavior that is maladaptive (i.e., that is not valued/appreciated by the individual and by society), such as unhealthy behavior, become autonomously motivated to behave accordingly, experience controlled motivation to behave accordingly, or become autonomously motivated to behave oppositely.

A final worthwhile avenue for research is to further examine when the feeling of belongingness strengthens autonomous or controlled motivation in order to evaluate the proposed revised structure of the basic psychological needs in SDT.

6. Take Home Messages

For Public Health Policy

- In order to stimulate older adults' regular involvement in physical activity and exercise, it is essential to reinforce their social capital that essentially promotes their experience of being effective in their exercise involvement (i.e., that enables them to achieve self-valued outcomes in exercise involvement). One way to achieve this is providing older adults access to a safe and trusted social environment that facilitates them to involve effectively in exercise activities that they commonly appreciate (e.g., walking, biking, swimming). From this perspective, stimulating older adults to join a social organization that offers opportunities for involving in such exercise activities constitutes a valuable strategy to enhance their regular physical activity involvement. Consequently, it should become a priority in public health policy to encourage older adults to have this kind of social capital. This could be achieved by providing such social organizations (for older adults) with subsidies (1) for reducing their membership fees, (2) for providing meeting points in local communities, and (3) for developing and offering exercise activities that support older adults to feel effective in involvement in exercise. Alternatively, providing a support portal where older adults can receive support on how to involve effectively in exercise constitutes a potentially worthwhile approach to the promotion of older adults' regular physical activity involvement.

For Public Health Promoters

- In order to be effective in promoting maintained regular involvement in physical activity and exercise among older adults, it seems essential that the provided social support (including exercise activities, classes, programs, or interventions) is in line with, and strengthens their experience of effectiveness in involvement. Only when older adults

perceive that they are achieving self-appreciated outcomes by engaging in a specific form of physical activity or exercise, will they *want* to involve in this activity out of their own, also in the long term. In order to achieve this, it seems critical (1) to provide only (support for involving in) exercise activities, classes, programs, and interventions that older adults value (i.e., that they enjoy or they consider to be important to them); (2) to facilitate and to strengthen the experience of effectiveness in exercise involvement by providing (support for involving in) exercise activities that match their ability to involve effectively, and that emphasize and facilitate intra-personal progress in their exercise ability; and (3) to present exercise activities, classes, programs, and interventions to be normative for 'older adults' (or another label that applies to individuals of an older adult age) to older adults *only* after establishing that they (a) feel to be an older adult (or value having this label) *and* (b) that they value involvement (i.e., they experience they *should* involve) in these exercise activities, classes, programs, and interventions, as only then this age normative framing will contribute to their willingness to involve.

For Older Adults

- Having a good physical and mental health, and being able to cope independently with the demands of life are essential for enjoying a good quality of life at older age. While you are growing older, being positively connected to others, to organizations, to your community, and to society, as well as regularly engaging in physical activity, will help you to achieve this Successful Aging by substantially contributing to your physical and mental health, functioning and well-being. Therefore joining a social organization (for older adults) that provides social physical and exercise activities can be wholesome because they provide opportunities for having social contact (with other older adults) and for involving in physical activity and exercise.
- If you decide to involve in exercise on your own/or out outside of an exercise program, ask a certified exercise coach to help you (1) to identify healthy physical and exercise activities that you enjoy or appreciate, and (2) to increase your involvement in physical activity and exercise gradually. Improving your physical fitness level and ability step by

step will benefit your health, as well as your enjoyment in involvement, the most, in the long term

- Ask others to join you in your physical activity and exercise involvement, or consider joining others when they ask you, and support each other to improve your personal exercise ability.
- Finally, when feeling that you are 'too old to exercise', remember that age is merely a perception that exists momentarily. In his masterpiece "The unbearable lightness of being", Milan Kundera (1984) wrote "*There is a certain part of all of us that lives outside of time. Perhaps we become aware of our age only at exceptional moments and most of the time we are ageless."* In order for you to keep enjoying exercise, keep exercising even when you are feeling that you are too old for it. Why let an exceptional moment of awareness of your older age withhold you from doing what you enjoy? And besides, nothing will make you feel better when this moment has passed.

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Appendices

Academic Curriculum Vitae of Johan Pelssers

2001 – 2005	**Master in Psychology** *Cognitive Ergonomics* Maastricht University
2006	**Master in Psychology** *Industrial Psychology and Human Resource Management* Ghent University
2007 – 2008	**Researcher** Centre for User Experience Research Department of Communication Sciences Faculty of Social Sciences KU Leuven
2007 – 2009	**European Master in Exercise & Sport Psychology** KU Leuven & University of Jyväskylä
2009 – now	**PhD Student** Physical Activity, Sports and Health Research Group Department of Kinesiology Faculty of Kinesiology and Rehabilitation Sciences KU Leuven
2014 – now	**Postgraduate Degree in Sport Psychology in Practice** KU Leuven

List of Publications

1. Papers in International Peer-Reviewed Journals (Included in the PhD)

Pelssers, J., Delecluse, C., Opdenacker, J., Kennis, E., Van Roie, E., & Boen, F. (2013). 'Every step counts!' - Effects of a structured walking intervention in a community-based senior organization. *Journal of Aging and Physical Activity, 21 (2),* 167-185.

2. Papers in International Peer-Reviewed Journals (Not Included in the PhD)

Martien, S., Delecluse, C., Boen, F., Seghers, J., **Pelssers, J.**, Van Hoecke, A., & Van Roie, E. (2015). Is knee extension strength a better predictor of functional performance than handgrip strength among older adults in three different settings? *Archives of Gerontology and Geriatrics, 60 (2),* 252-258.

3. Books

Scheerder, J., Boen, F., Vos, S., **Pelssers, J.**, Thibaut, E., & Vandermeerschen, H. (2011). *Ouderen in-actie(f)? Sociaal wetenschappelijk onderzoek naar sportdeelname en sportbehoeften van 55-plussers in Vlaanderen.* Ghent, Belgium: Academia Press.

4. Chapters in Books

Boen, F., & **Pelssers, J.** (2011). Moeder, waarom fietsen wij? Een vergelijking tussen fietssporters naar identificatie en motivatie. In J. Scheerder, W. Lagae & F. Boen (Eds.)*, Vlaanderen fietst! Sociaalwetenschappelijk onderzoek naar de fietssportmarkt* (pp. 211-232). Ghent, Belgium: Academia Press.

5. Meeting Abstracts, Presented at International Conferences or Symposia

Boen, F., **Pelssers, J.**, Vanbeselaere, N., & Scheerder, J. (2015). *I am too old to work out! Perceived age norms affect autonomous motivation to exercise.* Association for Researchers in Psychology and Health Conference. Ghent, Belgium, 5-6 February 2015.

Pelssers, J., Delecluse, C., Opdenacker, J., Schotte, A., & Boen, F. (2013). *'Walking every step together' – Social support explains intervention effects of a structured walking intervention in a community-based senior organization.* Annual Conference of the International Society for Behavioral Nutrition and Physical Activity, Ghent, Belgium, 22-25 May 2013.

Pelssers, J., Delecluse, C., Opdenacker, J., Kennis, E., Van Roie, E., Boen, F. (2012). *Walking and talking for fitness and well-being: Effects of a structured walking intervention in a community-based social organization for older adults.* 17th Annual Congress of the European College of Sport Science. Bruges, Belgium, 4-7 July 2012.

Pelssers, J., Delecluse, C., Van Roie, E., Kennis, E., Opdenacker, J., Schotte, A., & Boen, F. (2011). *Meeting for walking, talking, coffee and pie: Evaluation of a walking intervention in a social organization for older adults.* 3rd Conference and 7th Annual Meeting of HEPA Europe. Amsterdam, The Netherlands, 11-13 October 2011.

6. Meeting Abstracts Presented at National Conferences or Symposia

Pelssers, J., Delecluse, C., Opdenacker, J., Kennis, E., Van Roie, E., & Boen, F. (2011). *Walking and talking for fitness and well-being: Effects of a structured walking intervention in a community-based social organization for older adults.* Vereniging voor Kinesiologie Symposium. Ghent, Belgium, 16 December 2011.

Appositions

Apposition 1

Academic success is increasingly being defined by the quantity of published research (i.e., number of publications) and acquired research funds. The pressure on researchers to produce threatens the core aspects of the scientific process: the time to read, to reflect, and to review, as well as the motivation to explore which is uncertain to yield publishable (i.e., significant) findings or research funds.

Apposition 2

Instead of being passive-instructive (e.g., lectures), academic teaching should require students to use scientific thinking in exploring and applying the new subject matter in finding solutions to problems that they might encounter in their professional life, or they already have to deal with in their daily life (i.e., problem-based learning).

Apposition 3

Sports psychologists should have training in clinical psychology because the counseling and treatment techniques that are used in clinical practice (e.g., for the treatment of mild depression) complement the techniques that are used for the individual psychological counseling and mental training of athletes. This training enhances the effectiveness of a sports psychologist in providing mental training, and in recognizing and treating performance and well-being-thwarting clinical pathology in athletes.

Bijstellingen

Bijstelling 1

Academisch succes wordt steeds meer bepaald door de hoeveelheid van gepubliceerd onderzoek (nl., het aantal publicaties) en verworven onderzoeksmiddelen. De druk op onderzoekers om te produceren bedreigt de kernaspecten van het wetenschappelijk proces: De tijd om te lezen, te reflecteren, en elkaars' werk kritisch te beoordelen, evenals de motivatie om te onderzoeken wat niet met zekerheid publiceerbare (i.e., significante) bevindingen of onderzoeksmiddelen zal opleveren.

Bijstelling 2

Academische onderwijsmethodes zouden in plaats van passief-instructief te zijn (vb. lezingen) studenten actief het wetenschappelijke denkproces moeten laten gebruiken bij het exploreren en gebruiken van de nieuwe materie in het oplossen van problemen die zij in hun loopbaan kunnen tegenkomen, of waar zij in het dagelijkse leven reeds mee moeten omgaan (nl. probleemgestuurd onderwijs).

Bijstelling 3

Sportpsychologen moeten een opleiding in de klinische psychologie hebben omdat de consultatie- en behandelingstechnieken uit de klinische praktijk (vb. voor het behandelen van een milde depressie) de technieken voor de individuele psychologische begeleiding en mentale training van atleten aanvullen. Die opleiding verhoogt de effectiviteit van een sportpsycholoog in het aanbieden van mentale training, en in het herkennen en het behandelen van prestatie- en welzijnsondermijnende klinische pathologie bij atleten.