



# TOPICS IN EXERCISE SCIENCE AND KINESIOLOGY

*Implementation Strategies*

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## **Physical Activity Interventions for Older Adults in the Age of COVID-19 and Beyond**

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### **ABSTRACT**

*Topics in Exercise Science and Kinesiology Volume 2: Issue 1, Article 6, 2021.* As the coronavirus (COVID-19) pandemic continues, it is important to understand why older adults are at higher risk for more severe morbidity and higher mortality compared to younger age groups. At the same time, there is a growing body of evidence suggesting physical activity and exercise can have positive benefits for older adults' health. Point of application #1: The first step in keeping older adults active is motivating them to adhere to a structured program either at home, in a community setting, or in a long-term care facility. Point of application #2: There are many exercise programs that can be utilized to encourage older adults to stay active in order to improve their immune function and overall fitness. Point of application #3: Bingocize® is an example of an evidence-based program that has been successful during the pandemic in keeping participants motivated by being enjoyable, encouraging intergenerational connections and being feasible for older adults with a wide range of abilities.

**KEY WORDS:** Immunology, exercise, coronavirus

### **INTRODUCTION**

Coronavirus (COVID-19) has negatively affected much of the world, but perhaps no group has been more impacted than older adults. Roughly 18% of patients over the age of 80 had COVID-19 symptoms severe enough to warrant hospitalization (Begley, 2020) and the United States Center for Disease Control (CDC) found that roughly 32.5% of patients >85 years of age died because of the virus. As we age, our immune system gradually deteriorates in a process called immunosenescence. One major consequence of immunosenescence is the decline of the adaptive immune system, comprised of T cells and B cells. The decline of T cells leaves the body less able to program a defense against a new microbe, while the decline of B cells results in less efficient production of circulating antibodies (Begley, 2020). In addition to this natural decline, COVID-19 impacts the innate immune system by inhibiting the production of interferons allowing the virus to rapidly spread throughout the body (Yong, 2020). If the virus continues to reproduce, it

may take longer for the immune system to catch up possibly leading to a “cytokine storm” (Damiot, Pinto, Turner, & Gualano, 2020) resulting in excessive inflammation and potential multiple organ damage. Fortunately, there is an abundance of evidence showing acute and chronic physical activity and exercise interventions can improve immune function. The aims of this paper are to briefly examine the existing literature to understand the impact of acute and chronic physical activity on immunosenescence and provide practical solutions for practitioners to help increase older adult physical activity participation during the COVID-19 pandemic and beyond.

## **METHODS**

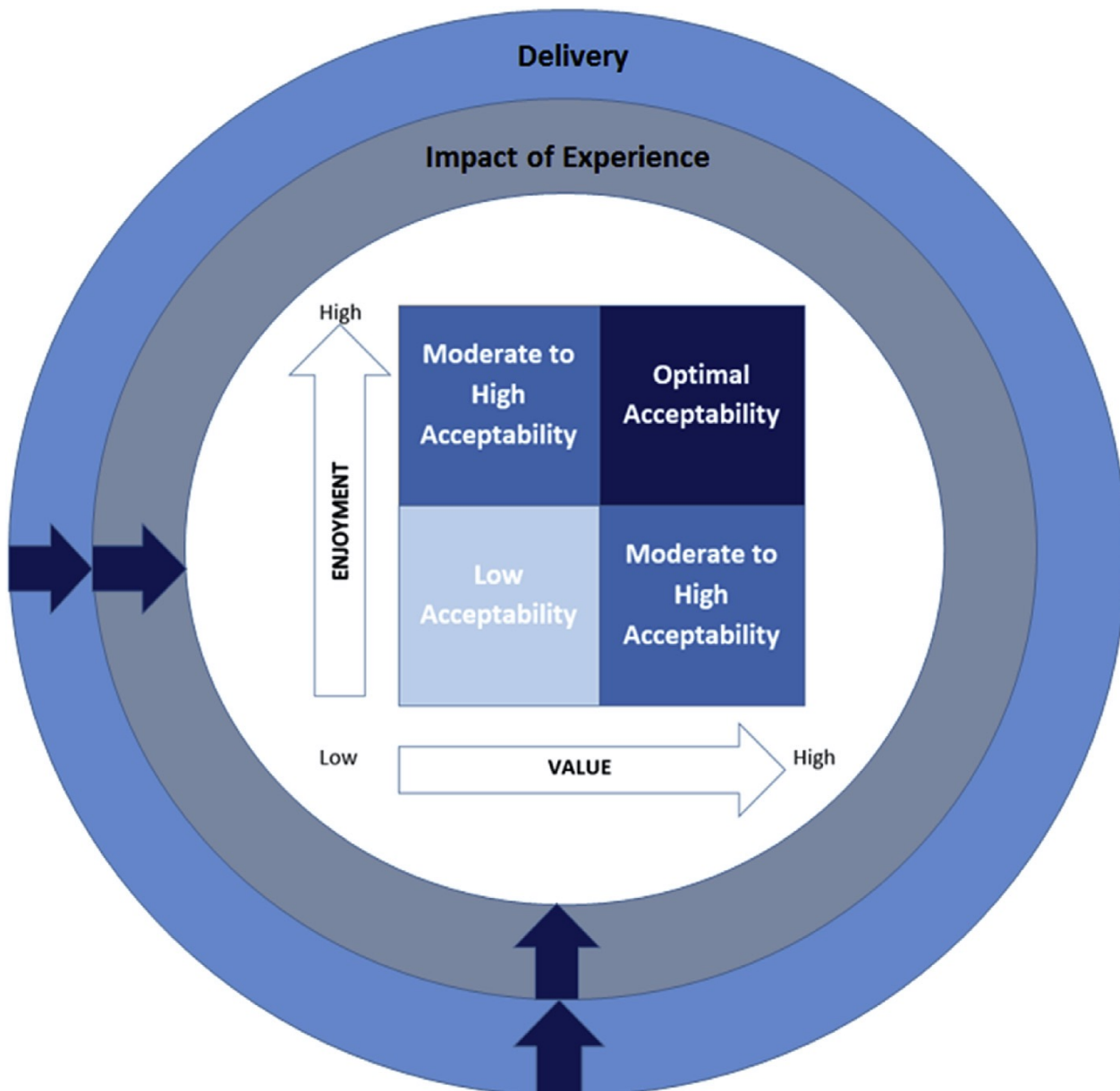
Since the start of the pandemic, activity levels have decreased significantly worldwide (Tison, et al., 2020; Barkley, et al., 2020; López-Bueno, et al., 2020). Since many older adults were confined to their rooms and houses along with the rest of the population, it can be assumed this decrease in physical activity applies to them as well. While there are some theories that claim vigorous bouts of prolonged exercise can temporarily suppress the immune system (Campbell & Turner, 2018), others suggest exercise increases immunosurveillance and therefore may reduce excessive inflammation and oxidative stress (Hall & Church, 2020). They also suggest that exercise can restore elasticity and strength to lung tissue and respiratory muscles which could protect older adults from developing acute respiratory distress syndrome, the leading cause of death from COVID-19 (Hasan, et al., 2020). In addition to these findings, Damiot, Pinto, Turner, and Gualano (2020) found that older adults who were regularly physically active throughout most of their lifetime had lower concentrations of proinflammatory biomarkers and higher concentrations of anti-inflammatory cytokines, which would assist the body in managing the inflammation that occurs as a result of this virus. Lastly, there is evidence that aerobic exercise can prolong the effects of vaccinations to provide more protection for previously sedentary older adults (Woods, et al., 2009). Despite the known benefits, including improved immune function, many older adults were not physically active prior to the pandemic (Watson, et al., 2016). To further this issue, efforts to control the virus, such as social distancing, have likely made it even more difficult to motivate older adults to participate. Since practitioners were forced to pivot to remote delivery, it is imperative that older adults are motivated to adhere to a physical activity plan at home to maintain their functional health and immunity.

## **POINTS OF APPLICATION**

### **1. Motivating Older Adults in a Remote Environment**

Devereux-Fitzgerald et al. (2016) suggest the most successful older adult exercise interventions were fun, involved social interaction with their peers, and were feasible for them to complete (Devereux-Fitzgerald, Powell, Dewhurst, & French, 2016). Unfortunately, due to social distancing requirements, the main problem is using these factors (See Figure 1) to get older adults to adhere to an exercise program and stay physically active at home. In addition, older adults recognize the need for physical activity, but struggle to exercise on their own at home

because they cannot find the time, do not remember what to do, or simply cannot find the motivation due to lack of interest in exercising alone (Geothals, et al., 2020). While online resources and social support can be effective for motivating older adults to stay physically active, these things are not always accessible to older adults (Cunningham & O'Sullivan, 2020). Especially important for delivery of remote exercise interventions is the ability to use technology. Older adults may not have access to or feel confident using technology. In addition, they may not be able to navigate telehealth or access online resources on their own. Family members, friends and caregivers are the main line of defense for keeping older adults physically active in these times.



**Figure 1.** Factors involved in the acceptability of physical activity interventions (Devereux-Fitzgerald, Powell, Dewhurst, & French, 2016). An intervention with high enjoyment and high perceived value is associated with optimal acceptability.

## **2. Remote Evidence-Based Exercise Programs for Older Adults**

Evidence-based exercise programs have the potential to increase physical activity in older adults during and after this pandemic which may improve their immune function and overall fitness. There are many programs designed for older adults. See Table 1 for examples (National Council on Aging, 2020).

**Table 1.** Remotely delivered evidence-based physical activity programs.

<i>Program</i>	<i>Remote Delivery</i>	<i>Delivered By</i>	<i>Training Requirement</i>	<i>Equipment needed</i>	<i>Results</i>
Bingocize®	Always	Lay leaders (no prior certifications required)	All online asynchronous training; 1-2 hour to complete	Tablet or mobile device	This program was shown to improve upper and lower body muscular strength, gait, updating (cognition), health knowledge, health activation, and balance
EnhanceFitness	Temporary	Certified fitness instructor	Certified fitness instructors need 12-hour, 1.5 day in-person instructor training.	Computer or Tablet Cuff weights (optional)	Mays et al. (2020) found participants reported less severe levels of loneliness and social isolation. Fishlender et al. (2019) found participation as a predictor for improvements in function tests.
Geri-Fit Strength Training	Temporary	Certified and non-certified fitness instructors, lay leaders	Online training and certification through gerifit.com	Light dumbbells Sturdy chair Stretch band Computer or Mobile device	Baker et al. (2021) found that participation in this program lead to improved dynamic postural control and balance. This helps older adults maintain independence and reduces risk for falls
Active Choices	Always	Health professionals or trained volunteer or peer mentor	Advisor training workshop (can take 8-16 hours)	Home or Cell Phone Program Materials	This program uses telephone-supervised physical activity counseling along with dietary advice. Participants showed more improvements in functional capacity and physical activity adherence, when compared to those in group-based, structure classes.
Tai Chi	Temporary	Certified trainers	Attend training workshop and certification	Computer or mobile device	This program was shown to benefit older adults by relieving pain and stiffness, improving strength and overall fitness, and improved balance.



### 3. A Closer Look at One Evidence-Based Program: Bingocize®

Since COVID-19 placed an unexpected hold on in-person physical activity programs, many organizations had to quickly adjust to offer online options. We chose to highlight Bingocize® as our primary example of an exercise program for older adults because it has been offered remotely since before the pandemic arose and our research teams have firsthand experience implementing it during the pandemic. This evidence-based intervention that combines bingo and exercise has been shown to increase patient engagement and has an adherence rate of over 90% (Dispennette, et al., 2019). There are two versions of this program, the original “hard copy” version and the mobile app version. For the web-based app version, each participant simply needs to have a tablet or mobile device (See Figure 2), and after each number/letter combination is called virtually, there are video demonstrations and timers for each exercise. Older adults who have participated in this program identified enjoyment and intergenerational connection as motivating factors for participation and did not experience a lack of self-efficacy while performing the exercises (Taylor, Piatt, Stanojevic, & Crandall, 2020). These findings align with the key factors for optimal acceptability of an exercise intervention previously stated.

Bingocize® can be used by older adults in any setting, but especially appeals to facilities that provide older adult services (e.g., independent living retirement villages/communities, county senior centers, assisted living facilities, nursing homes). This program could be useful in facilities where residents are required to adhere to social distancing, since the mobile app can be used by each person individually. This may allow facilities to continue to motivate their residents to participate in physical activity, even during these challenging times. The objective of this review was to emphasize the importance of physical activity for improving immune function in older adults and encourage health care providers and organizations working with older adults to prioritize exercise as a preventative treatment for immunosenescence.



Figure 2. Older adults using the Bingocize® mobile app.

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