

Empowering women to be more physically active through high-intensity resistance training

by

Aspen Elaine Streetman

B.A., University of Denver, 2005
M.S., American Public University, 2020

AN ABSTRACT OF A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

DOCTOR OF PHILOSOPHY

Department of Kinesiology
College of Health and Human Sciences

KANSAS STATE UNIVERSITY
Manhattan, Kansas

2024

Abstract

Background: Empowering women is a global sustainable development goal. Being empowered means being able to accomplish goals despite adversity. Women are less likely than men to meet the physical activity guidelines, perhaps because they do not feel empowered. Feeling empowered by exercise may increase exercise adherence. Engaging in regular physical activity offers benefits for the body and the mind. Powerbuilding is a popular form of resistance training combining powerlifting with body building exercises that, to our knowledge, has not been used as an exercise intervention. The purpose of this dissertation is four-fold: 1) examine how empowerment is defined and measured, especially as it relates to physical activity; 2) determine if some types of physical activity are ranked more empowering than others; 3) explore the relationship between self-rated empowering exercise types, exercise engagement, and exercise self-efficacy; and 4) examine the effects of an applied powerbuilding intervention on physical activity, strength, and empowerment. **Methods:** This dissertation comprises three studies (Chapters 2, 3, and 4). The first, a narrative review complying with the Scale for the Assessment of Narrative Review Articles guidelines, explored sports participation as a mechanism to facilitate empowerment globally. The second study implemented an explanatory sequential mixed-methods design (survey $N = 147$; interviews $N = 17$). It examined the relationship between physical activity empowerment, engagement, and exercise self-efficacy. The third study ($N = 18$) in this dissertation was an applied exercise intervention that investigated the impact of an eight-week powerbuilding intervention on women's physical activity, strength, and empowerment. **Results:** Chapter 2 found empowerment is inconsistently defined and measured between geographical contexts, yet sports empowerment defies geography. Sports empowerment describes feelings of empowerment that are the product of sports experiences that spillover to daily life. Results in Chapter 3 found that women ranked

resistance training as the most empowering form of physical activity in which they participated. However, physical activity engagement and self-efficacy for exercise did not vary statistically among women who were empowered by resistance training compared to those who were empowered by other types of physical activity. Four themes emerged from interview data. They were: 1) women's physical activity participation barriers are gender-centric, 2) physical activity participation benefits extend beyond physical health, 3) some exercise types are more empowering than others, and 4) empowerment and enjoyment are closely related. Results in Chapter 4 found that an eight-week powerbuilding intervention elicited significant changes in physical activity where participants' total physical activity increased ($t(17) = 3.52, p = 0.003, d = 0.83$), as did the participants who met the physical activity guidelines ($Z = -3.32, p = 0.001$) from pre- to post-intervention. Strength increased significantly from pre- to post-intervention in the squat ($Z = -3.73, p < 0.001$), bench press ($Z = -3.73, p < 0.001$), and deadlift [$t(17) = 16.41, p < 0.001; d = 3.87$]. High exercise empowerment (56.3 ± 6.6 ; out of 65 points) resulted from the intervention; empowerment in exercise scores ranged from 40 to 65, and six were over 60. **Conclusion:** Measuring empowerment in physical activity and exercise remains challenging, but some types of physical activity and exercise are more empowering than others. Feeling accomplished after a demanding workout facilitates feelings of empowerment. Exploring empowerment in exercise may reveal mechanisms to facilitate exercise self-efficacy and engagement in physical activity. Powerbuilding is inherently empowering for individuals with no powerbuilding experience. Lifting heavy weights and building muscle mass was empowering and increased engagement in physical activity. It is critical to encourage women to participate in empowering physical activity to enhance their physical, mental, and social health.

Empowering women to be more physically active through high-intensity resistance training

by

Aspen Elaine Streetman

B.A., University of Denver, 2005
M.S., American Public University, 2020

A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

DOCTOR OF PHILOSOPHY

Department of Kinesiology
College of Health and Human Sciences

KANSAS STATE UNIVERSITY
Manhattan, Kansas

2024

Approved by:

Major Professor
Emily L. Mailey

Copyright

© Aspen Elaine Streetman 2024.

Abstract

Background: Empowering women is a global sustainable development goal. Being empowered means being able to accomplish goals despite adversity. Women are less likely than men to meet the physical activity guidelines, perhaps because they do not feel empowered. Feeling empowered by exercise may increase exercise adherence. Engaging in regular physical activity offers benefits for the body and the mind. Powerbuilding is a popular form of resistance training combining powerlifting with body building exercises that, to our knowledge, has not been used as an exercise intervention. The purpose of this dissertation is four-fold: 1) examine how empowerment is defined and measured, especially as it relates to physical activity; 2) determine if some types of physical activity are ranked more empowering than others; 3) explore the relationship between self-rated empowering exercise types, exercise engagement, and exercise self-efficacy; and 4) examine the effects of an applied powerbuilding intervention on physical activity, strength, and empowerment. **Methods:** This dissertation comprises three studies (Chapters 2, 3, and 4). The first, a narrative review complying with the Scale for the Assessment of Narrative Review Articles guidelines, explored sports participation as a mechanism to facilitate empowerment globally. The second study implemented an explanatory sequential mixed-methods design (survey $N = 147$; interviews $N = 17$). It examined the relationship between physical activity empowerment, engagement, and exercise self-efficacy. The third study ($N = 18$) in this dissertation was an applied exercise intervention that investigated the impact of an eight-week powerbuilding intervention on women's physical activity, strength, and empowerment. **Results:** Chapter 2 found empowerment is inconsistently defined and measured between geographical contexts, yet sports empowerment defies geography. Sports empowerment describes feelings of empowerment that are the product of sports experiences that spillover to daily life. Results in Chapter 3 found that women ranked

resistance training as the most empowering form of physical activity in which they participated. However, physical activity engagement and self-efficacy for exercise did not vary statistically among women who were empowered by resistance training compared to those who were empowered by other types of physical activity. Four themes emerged from interview data. They were: 1) women's physical activity participation barriers are gender-centric, 2) physical activity participation benefits extend beyond physical health, 3) some exercise types are more empowering than others, and 4) empowerment and enjoyment are closely related. Results in Chapter 4 found that an eight-week powerbuilding intervention elicited significant changes in physical activity where participants' total physical activity increased ($t(17) = 3.52, p = 0.003, d = 0.83$), as did the participants who met the physical activity guidelines ($Z = -3.32, p = 0.001$) from pre- to post-intervention. Strength increased significantly from pre- to post-intervention in the squat ($Z = -3.73, p < 0.001$), bench press ($Z = -3.73, p < 0.001$), and deadlift [$t(17) = 16.41, p < 0.001; d = 3.87$]. High exercise empowerment (56.3 ± 6.6 ; out of 65 points) resulted from the intervention; empowerment in exercise scores ranged from 40 to 65, and six were over 60. **Conclusion:** Measuring empowerment in physical activity and exercise remains challenging, but some types of physical activity and exercise are more empowering than others. Feeling accomplished after a demanding workout facilitates feelings of empowerment. Exploring empowerment in exercise may reveal mechanisms to facilitate exercise self-efficacy and engagement in physical activity. Powerbuilding is inherently empowering for individuals with no powerbuilding experience. Lifting heavy weights and building muscle mass was empowering and increased engagement in physical activity. It is critical to encourage women to participate in empowering physical activity to enhance their physical, mental, and social health.

Table of Contents

List of Figures.....	xi
List of Tables	xii
Acknowledgments.....	xiii
Dedication.....	xiv
Preface	xv
Chapter 1 - Introduction	1
1.1 Physical Activity Overview	1
1.2 Resistance Training Overview	3
1.3 Empowerment Theory Overview	4
1.4 Empowerment Theory in Health Promotion.....	7
1.5 Purpose of Dissertation.....	8
Chapter 2 - Female Empowerment Through Sport: An Exploratory Narrative Review.....	10
2.1 Abstract.....	11
2.2 Introduction.....	12
2.3 Methods	15
2.4 Results	16
2.4.1 Empowerment in the Global South.....	20
2.4.2 Empowerment in the Global North.....	23
2.5 Discussion	27
2.5.1 Key Implications.....	29
2.5.2 Methodological Considerations.....	30
2.6 Conclusion	31
2.7 References.....	32
Chapter 3 - A Mixed-Methods Study of Women's Empowerment Through Physical Activities: Relationships with Self-Efficacy and Physical Activity Levels	36
3.1 Abstract.....	37
3.2 Introduction.....	38
3.3 Materials and Methods	42
3.3.1 Study Design and Participants.....	42

4.3.3.1 Familiarization.....	76
4.3.4 Measures	77
4.3.4.1 Physical Activity.....	77
4.3.4.2 Health	78
4.3.4.3 Physical Literacy.....	79
4.3.4.4 Basic Human Movement Competency.....	79
4.3.4.5 Empowerment in Exercise Scale	80
4.3.4.6 Strength Testing.....	81
4.3.4.7 Educational Component	81
4.3.5 Statistical Analysis.....	82
4.4 Results	82
4.4.1 Physical Activity.....	83
4.4.2 Health Measures	83
4.4.3 Physical Literacy	84
4.4.4 Basic Human Movements	85
4.4.5 Empowerment in Exercise	85
4.4.6 Strength Measures	85
4.4.7 Educational Component.....	85
4.5 Discussion.....	86
4.5.1 Strengths and Limitations	89
4.5.2 Conclusion.....	90
4.6 References.....	92
Chapter 5 – Conclusion	97
5.1 Summary of Findings	97
5.2 Explanation of Results.....	97
5.3 Strengths and Limitations	99
5.4 Future Directions.....	100
References – Chapters 1 and 5.....	101

List of Figures

Figure 1.1. Conceptual framework of empowerment as a multidimensional construct.....	6
Figure 2.1. Conceptual framework of empowerment (Perkins & Zimmerman, 1995; Zimmerman, 1995).....	14
Figure 2.2. Article selection flow chart.....	17
Figure 2.3. Comparison between individual empowerment, women’s empowerment, and sports empowerment. Adopted partially from Kabeer (1999), Richardson (2018), and Zimmerman (1995).....	29
Figure 5.1. Conceptual model depicting the relationships between individual empowerment and physical activity engagement.	98

List of Tables

Table 2.1. Overview of the articles selected for full review.....	18
Table 3.1. Survey participant characteristics (N = 147).....	49
Table 3.2. Descriptive statistics for categories of most empowering activity by exercise types (presented as Mean $\pm$ SD).....	50
Table 4.1. Overview of the optional educational component.....	75
Table 4.2. Changes in physical activity (Mean $\pm$ SD).	83
Table 4.3. Changes in health measures (Mean $\pm$ SD).....	84
Table 4.4. Changes in 3-RM (Mean $\pm$ SD).	85

Acknowledgments

I express my sincere gratitude to the following individuals who have played a significant role in completing this dissertation. To my dissertation committee, Katie Heinrich, Emily Mailey, Peter Stoepker, and Filip Kukić, thank you for your unwavering support, guidance, and invaluable insights throughout the research process. Your expertise and encouragement have been instrumental in shaping this dissertation. To my family, your constant love, encouragement, and understanding have been my pillars of strength. Thank you for believing in me and providing the support I needed to pursue this academic endeavor. I express my sincere appreciation to my colleagues who have become friends. You have been a source of inspiration and camaraderie. Your discussions, feedback, and shared experiences have enriched my academic journey and made the challenges more manageable. This dissertation would not have been possible without my study participants, who generously shared their time and insights. Thank you for allowing me to learn from you. I owe a debt of gratitude to Carl Ade and Justin DeBlauw for their mentorship and guidance at crucial academic and professional development stages. Their wisdom and encouragement have been transformative. Finally, to anyone whose name may have been inadvertently omitted, your contribution has not gone unnoticed and is deeply appreciated.

Dedication

This dissertation is dedicated to my family – Murry, Emron and Eli. We did this together!

Preface

Chapters 2-3 of this dissertation represent peer-reviewed articles published in scientific journals. They are written in published format, and the citations are listed below. These original investigations are reproduced with permission from the publishers.

Streetman, A. E., & Heinrich, K. M. (2023). Female empowerment through sport: An exploratory narrative review. *Sport in Society*, 0(0), 1–16.
<https://doi.org/10.1080/17430437.2023.2270443>

Streetman, A. E., Lister, M. M., Brown, A., Brin, H. N., & Heinrich, K. M. (2023). A mixed-methods study of women's empowerment through physical activities: Relationships with self-efficacy and physical activity levels. *Journal of Functional Morphology and Kinesiology*, 8(3), 118. <https://doi.org/10.3390/jfmk8030118>

Chapter 1 - Introduction

1.1 Physical Activity Overview

Current guidelines recommend that adults aged 18-64 perform at least 150 minutes of moderate-intensity aerobic physical activity, or 75 minutes of vigorous-intensity aerobic physical activity, or an equivalent combination weekly (Office of Disease Prevention and Health Promotion, 2020; World Health Organization, 2010). In addition to aerobic physical activity, at least two sessions per week of muscle-strengthening activity are recommended. Evidence suggests women are significantly less likely than men to meet the minimum recommended physical activity guidelines, thus increasing their risk for detrimental health effects (Coen et al., 2018; National Center for Health Statistics, 2019; Zenko et al., 2019). The National Center for Health Statistics (2019) reports that only 20.9% of American women fully meet the physical activity guidelines (i.e., the aerobic and muscle-strengthening portions). Only 24.3% of women report meeting the muscle-strengthening guidelines, whereas over 50% only meet the aerobic guidelines (National Center for Health Statistics, 2019).

Physical activity's benefits are numerous. Participation in regular physical activity is associated with a reduced risk for type 2 diabetes, metabolic syndrome, cancer, cardiovascular disease, and all-cause mortality (Fletcher et al., 2018; González-Ruíz et al., 2018; Hruby et al., 2016; Mansoubi et al., 2014; B. K. Pedersen & Saltin, 2015). Furthermore, physical activity is a major modifiable risk factor that increases life expectancy and significantly decreases the world healthcare system burden (Kohl et al., 2012; Lee et al., 2012). Mental and cognitive health improve with participation in physical activity (Kelley et al., 2016; Schuch & Vancampfort, 2021). Similarly, the benefits of muscle-strengthening exercises like resistance training are well-documented among women (Kitsuda et al., 2021; Westcott, 2012). Resistance training may help

with age-related sarcopenia, reduce bone loss, and improve chronic pathologies (Atherton & Smith, 2012; Gorzelitz et al., 2022; Kitsuda et al., 2021). The benefits of physical activity are clear, especially for women (Moreno & Johnston, 2014).

Barriers to physical activity among women are well-documented (Aasa et al., 2016; Fischer, 2005; Mailey et al., 2014; Moreno & Johnston, 2014; Rhodes et al., 2017; Shurley et al., 2020). Lack of time is a significant barrier to physical activity among women (Mailey et al., 2014; Moreno & Johnston, 2014). Women face time constraints due to various responsibilities such as work, caregiving, and household chores. Balancing these responsibilities can make finding time for regular physical activity challenging. At the same time, women may not feel supported to complete physical activity. Indeed, social support or encouragement from family, friends, or their community plays a crucial role in promoting and sustaining physical activity (M. R. L. Pedersen et al., 2021; Smith et al., 2023). They may not prioritize or engage in such activities without understanding the positive impact on health and well-being (Moreno & Johnston, 2014). Barriers specific to resistance training include fears of being overly muscular, low self-efficacy in performing resistance training, and gender role expectations (Aasa et al., 2016; Fischer, 2005; Hurley et al., 2018; Rhodes et al., 2017; Shurley et al., 2020). Many women worry that lifting heavy weights will cause them to become excessively muscular. However, these fears are not substantiated (Aasa et al., 2016; Fischer, 2005; Hurley et al., 2018; Rhodes et al., 2017; Shurley et al., 2020). If women better understand resistance training outcomes, they might be more likely to engage in it (Aasa et al., 2016; Fischer, 2005; Hurley et al., 2018; Rhodes et al., 2017; Shurley et al., 2020). Low self-efficacy can be mediated through resistance training education. Evolving gender roles also help open resistance training opportunities for women. Sports like CrossFit and Powerlifting have been on the rise among women in the past ten years, making resistance training

more accessible and socially acceptable among women (Ball & Weidman, 2018; Washington & Economides, 2016).

1.2 Resistance Training Overview

Resistance training involves applying resistance to muscular contraction to enhance muscle strength, power, and endurance. Resistance training uses free weights, weight machines, resistance bands, or an individual's body weight. Resistance training challenges the muscles, leading to adaptations that increase muscle mass, improve tone, and enhance functional capacity (Westcott, 2012). It is performed at various intensities, and high-intensity resistance training (i.e., resistance training performed at $\geq 70\%$ of an individual's one-repetition maximum) has been shown to be more beneficial to positive health outcomes than low-intensity resistance training (Watson et al., 2018). High-intensity resistance training focuses on building muscular strength. Strength sports like powerlifting use high-intensity resistance training to increase strength.

Powerlifting is a competitive strength sport with three core lifts: the squat, bench press, and deadlift (Ferland & Comtois, 2019). Powerlifters aim to lift as much weight as possible in these three lifts (Watson et al., 2018). Powerlifting has increased in popularity in recent years as indicated by increased number of competitions, number of participants, and diversity of participants (Ball & Weidman, 2018). Indeed, while more men do powerlifting than women, the ratio of man to woman participants at large competitions is 1:2 (Ball & Weidman, 2018) suggesting women are becoming increasingly involved in powerlifting.

On the other hand bodybuilding is a sport and fitness activity that prioritizes muscular size, symmetry, and definition development (Hackett, 2022). During competitions bodybuilders are ranked on muscle symmetry, definition, size, and posing. Bodybuilders focus on aesthetics rather than strength, which relies on lifting lighter weights for more repetitions to induce hypertrophy

(Hackett, 2022; Hagstrom et al., 2020). Like powerlifting, bodybuilding's popularity has increased over the past two decades (Hackett, 2022).

Powerbuilding is a popular form of resistance training performed in gym settings. It is a hybrid form of resistance training that combines powerlifting and bodybuilding elements to increase strength and promote a muscular physique (Cusano & Di Palma, 2019). Powerbuilding is relatively unexplored in scientific literature, however, reputable websites like breakingmuscle.com, bodybuilding.com, barbend.com, and barbellmedicine.com all define and provide programming for powerbuilding training (Barbell Medicine, 2023; Boly & Dickson, 2023; Bumgardner, 2021; Irizarry, 2023). Powerbuilding is for anyone who wants to improve their muscular strength and size while increasing overall fitness.

Overall, research suggests that physical activities that shift focus from how the body looks to how it performs, such as resistance training (McGlashan et al., 2020), can be more empowering than others especially among women (Walters & Hefferon, 2020). While women are less likely than men to meet the muscle-strengthening portion of the physical activity guidelines, doing muscle-strengthening activities like resistance training may be especially beneficial (McGlashan et al., 2020; Walters & Hefferon, 2020a). Exercise that promotes empowerment may also increase physical activity engagement and maintenance.

1.3 Empowerment Theory Overview

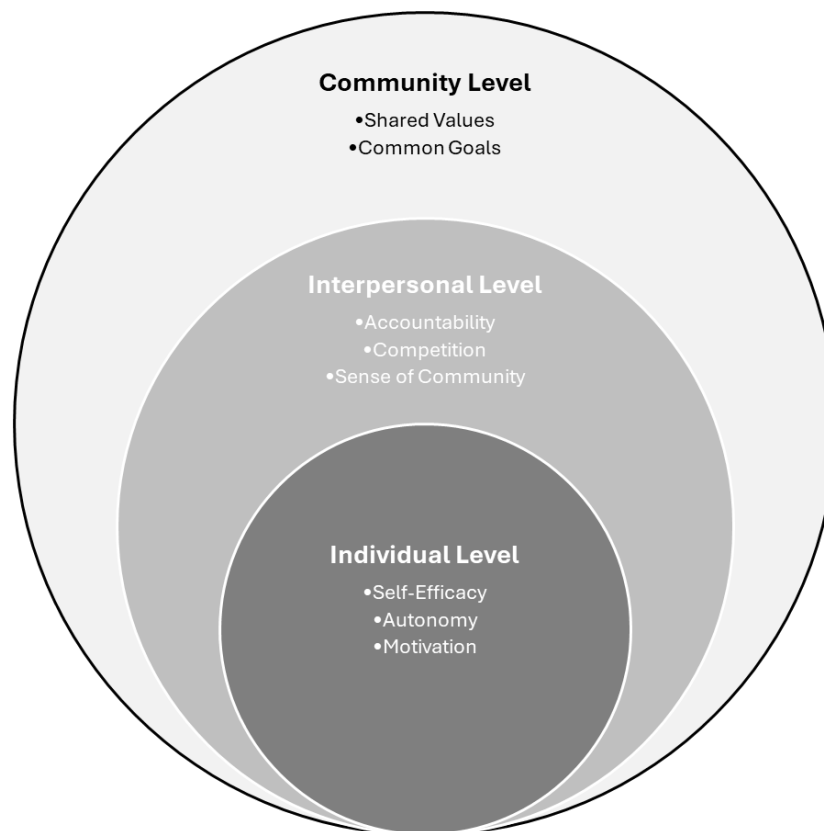
Empowerment theory is a multidimensional framework that gained popularity in the early 1990s (Perkins & Zimmerman, 1995). It encourages individuals and communities to take control of their lives and destinies (Maschi et al., 2021; Perkins & Zimmerman, 1995; Zimmerman et al., 1992). Empowerment theory emphasizes making informed decisions, taking meaningful action, and asserting individual rights. It is often used in social work, psychology, community

development, and other fields to promote positive change and address inequality, oppression, and social justice issues (Cattaneo & Chapman, 2010; Cole & Ullrich-French, 2017; Sianipar et al., 2013; Subandi et al., 2023; Washington & Economides, 2016). Empowerment theory's core principles include participation, autonomy, and self-determination; critical consciousness; access to information and resources; building skills and competencies; social support and networking; advocacy and social change; accountability and transparency; cultural sensitivity and diversity; and evaluation and feedback (Perkins & Zimmerman, 1995).

Empowerment theory attempts to account for individual, community, and social empowerment (Maschi et al., 2021; Perkins & Zimmerman, 1995; Zimmerman et al., 1992) (Figure 1.1). Individual empowerment, often called psychological empowerment, encourages individuals to gain control over their lives despite obstacles when individuals autonomously gain access to information, skills, and power (Zimmerman et al., 1992). Empowered individuals feel competent and believe they can influence outcomes. Overall, individual empowerment describes an individual's perceptions of their agency and how much they feel in control of their life, especially in challenging situations (Maschi et al., 2021; Perkins & Zimmerman, 1995; Zimmerman et al., 1992). Feeling empowered can significantly impact motivation, happiness, and quality of life. Community empowerment is a process through which individuals and groups gain the knowledge, skills, resources, and collective capacity to address their needs and challenges, make informed decisions, and improve their community's well-being (Christens, 2012; Perkins & Zimmerman, 1995). This bottom-up approach focuses on strengthening community members' abilities and influence to shape their locality's future. On the other hand, social empowerment is the process of enhancing the ability and capacity of individuals or groups within a society to participate in, contribute to, and influence social, economic, political, and cultural processes

(Cattaneo & Chapman, 2010; Perkins & Zimmerman, 1995). It involves granting people the means, opportunities, and resources to have a voice, make choices, and access the benefits and opportunities available in their community or society. Social empowerment aims to reduce disparities, promote social justice, and increase the well-being and participation of marginalized or disadvantaged populations (Perkins & Zimmerman, 1995).

Figure 1.1. Conceptual framework of empowerment as a multidimensional construct.



Like any theoretical framework, empowerment theory has its criticisms and challenges (Cattaneo et al., 2014; Cole & Ullrich-French, 2017). Empowerment theory lacks a universally and well-defined framework. Without a strict framework, the operationalization of empowerment differs, leading to confusion. Some argue that it can be vague and overly abstract, making it challenging to implement in practice (Cattaneo et al., 2014; Cole & Ullrich-French, 2017). At the same time, empowerment evaluation and measurement can be challenging. It can be difficult to

capture empowerment's long-term, nuanced effects, especially in research (Gram et al., 2018; Mosedale, 2005; Richardson, 2018). Measuring a program's success is challenging without a precise measurement of empowerment. Despite critiques, international organizations like the United Nations advocate for empowerment. Indeed, one of the United Nations's sustainable development goals is to "Achieve gender equality and empower all women and girls" (United Nations General Assembly, 2015). Researchers advocate for the continued use of empowerment so long as it accounts for the importance and multilevel nature of power while custom-tailoring interventions to be personally meaningful (Cattaneo et al., 2014; Cole & Ullrich-French, 2017).

1.4 Empowerment Theory in Health Promotion

Empowerment theory provides a framework for understanding and addressing health-related barriers and facilitators to physical activity (Deem & Gilroy, 1998; Lindqvist et al., 2014; Rawlett, 2014). It has been used to describe the processes and outcomes of various interventions to improve various health behaviors, including physical activity. Empowerment theory recognizes that individuals are more likely to embrace change when they feel power and control over their choices (Maschi et al., 2021; Perkins & Zimmerman, 1995; Zimmerman et al., 1992). Improving access to information and resources is critical to empowering individuals to make informed physical activity decisions. Health promotion education should address the benefits of physical activity and how to incorporate it into daily life (Lindqvist et al., 2014). Knowledge of the benefits of physical activity is essential to increase physical activity self-efficacy and motivation (Lloyd & Little, 2010). Self-efficacy and motivation help individuals to overcome barriers to physical activity. Thus, empowering individuals to make informed health decisions and have the self-efficacy to implement strategies to increase physical activity may improve initiation and adherence (Lindqvist et al., 2014).

At the community level, empowerment theory describes the importance of belonging to a group of like-minded individuals (Christens, 2012; Sauter et al., 2022). A supportive environment has been shown to facilitate engagement and adherence to physical activity. Fostering a supportive environment and a sense of community increases community empowerment and, thus, can increase physical activity (Christens, 2012; Warner et al., 2013). Lastly, social empowerment may increase physical activity by addressing broader social determinants of health through community mobilization and advocacy (Stronach et al., 2019). It helps marginalized or underserved populations gain the knowledge and skills to understand the importance of physical activity and overcome social, economic, and cultural barriers to initiating and maintaining it. Empowerment theory provides a valuable framework for effective promotion of physical activity. It addresses individual, community, and social empowerment by actively involving individuals in decision-making, providing access to information and resources, and addressing the broader social determinants of health.

1.5 Purpose of Dissertation

This research aims to investigate women's physical activity and exercise experiences and determine whether these experiences contribute to feeling empowered by answering the following questions: 1) How is women's empowerment defined and measured in physical activity and exercise? 2) Are some forms of exercise more empowering than others? 3) What is the relationship between self-rated empowering exercise types, exercise engagement, and exercise self-efficacy? 4) How does an eight-week powerbuilding intervention affect women's physical activity engagement, strength, and empowerment? It was hypothesized that no universal definition or measurement of empowerment would exist in the literature. Furthermore, it was hypothesized that resistance training would be rated most empowering and that women empowered by resistance

training would exercise more and have higher self-efficacy for exercise than those empowered by other exercise types. Lastly, it was hypothesized that participation in an eight-week powerbuilding intervention would increase physical activity engagement, strength, and empowerment.

Chapter 2 - Female Empowerment Through Sport: An Exploratory Narrative Review

Aspen E. Streetman^{1*} & Katie M. Heinrich¹

¹*Department of Kinesiology, Kansas State University, Manhattan, KS 66506 USA*

*Correspondence: aestreetman@ksu.edu; Tel.: +1 (785) 706-8315

2.1 Abstract

Empowering females is a critical global priority. Sports participation is a mechanism to increase female empowerment employed throughout the world. However, measuring empowerment remains challenging because definitions often differ between geographical contexts. For example, empowerment theory constructs, especially individual or psychological empowerment, are frequently used in the Global North to examine and define empowerment. In the Global South, female empowerment, usually referred to as women's empowerment, explicitly addresses women's issues related to their ability to make life choices. Despite these differences, empowerment goals are similar regardless of geography within the sporting context. Therefore, this exploratory narrative review explores differences in empowerment and women's empowerment through sports globally and describes sports empowerment as its own construct. Sports empowerment illustrates feelings of empowerment that are the product of sports experiences that spillover to daily life.

Keywords: women's agency, autonomy, physical health, sport development, review paper, self-actualization

2.2 Introduction

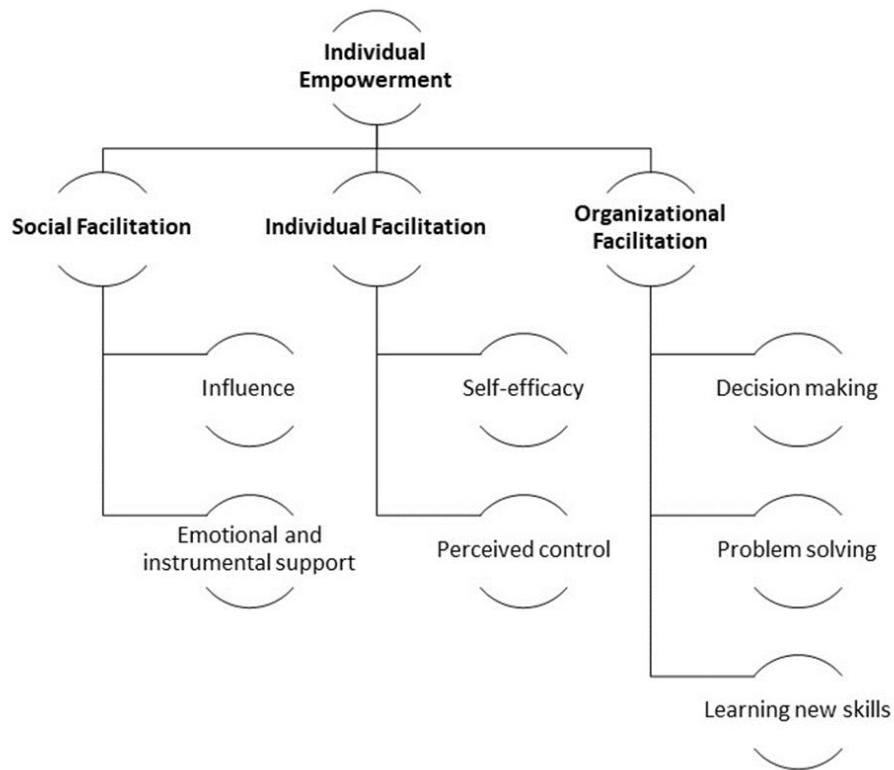
Despite an increased interest in gender equality and the proliferation of female empowerment-related rhetoric in pop culture, development work, and fundraising, little-to-no research has explored the relationship between adult female empowerment and sports participation using consistent empowerment definitions or measurements. The United Nations (UN) General Assembly recognizes the importance of empowerment and gender equality as one of its top five sustainable development goals (United Nations General Assembly, 2015). Compellingly, the UN states, “Goal 5: Achieve gender equality and empower all women and girls.” At the same time, the International Olympic Committee recognizes sport as a human right (International Olympic Committee, 2020b). Empowerment through sports participation is not novel, as sport-for-development (S4D) programs across the globe aim to encourage empowerment through sport (Levermore, 2011; UNICEF, 2019). Since major international organizations recognize the importance of empowering women through sports participation, it is critical to explore this relationship to create evidence-driven pathways to strengthen the mechanisms that facilitate empowerment. To do so, it is necessary to: 1) understand the similarities and differences between the key terms of empowerment, women’s empowerment, and sports participation; 2) explore how empowerment is measured; and 3) operationally define sports empowerment.

The constructs of empowerment and women's empowerment are often perceived as two distinct but similar frameworks, while sports empowerment is novel and has not been previously defined in the literature. Empowerment describes the process and outcomes of obtaining agency, or the power to understand and control one's actions despite environmental challenges (Stronach et al., 2019). Empowerment theory describes empowerment as a multidimensional construct at the individual, organizational, and community levels (Kabeer, 1999; Perkins & Zimmerman, 1995;

Zimmerman, 1995). Individual empowerment is how people think about themselves and interact with their environment through interpersonal, interactional, and behavioural constructs (Lim & Dixon, 2017; Miguel et al., 2015; Perkins & Zimmerman, 1995; Zimmerman, 1995). Moreover, individual empowerment varies between individuals and contexts and may change over time (Miguel et al., 2015; Zimmerman, 1995). Focusing on empowerment as an individual-specific construct may help clarify what makes an experience empowering. Organizational and community empowerment are essential dimensions of empowerment. However, this narrative review will focus on individual empowerment to better understand sports' empowering mechanisms as they are foundational to broader empowerment constructs. For the remainder of the review, we will refer to individual empowerment as either empowerment or women's empowerment, depending on the setting.

Women's empowerment is commonly used in governmental and non-governmental organizations (NGOs), policy, and development work (Velija, 2021). Women's empowerment explicitly addresses women's issues related to their ability to make life choices and includes agency, resources, and achievements (Kabeer, 1999). Women's empowerment is nuanced because household and familial dynamics may lead to different empowerment outcomes than those observed in other disadvantaged groups (i.e., ethnic and racial minorities and those with disabilities) (Richardson, 2018). Some research describes familial and household dynamics as factors rooted in society and culture that may contribute to empowerment or disempowerment (Gressel et al., 2020). While women's empowerment is frequently used to illustrate the processes and outcomes of empowerment in development work, a general definition of empowerment is used in broader contexts, including for women (Figure 2.1).

Figure 2.1. Conceptual framework of empowerment (Perkins & Zimmerman, 1995; Zimmerman, 1995).



Sports, physical activity, and exercise are similar yet different terms. Sports participation is often performed during leisure time; however, sport is deliberate and active (Deelen, Ettema, and Kamphuis 2018). It is competitive, requires specific skills, involves teamwork and social interaction, and is goal-oriented (American College of Sports Medicine, 2014; Deelen, Ettema, and Kamphuis 2018). International organizations like the International Olympic Committee and the UN recognize sport as a universally powerful platform that unites people indiscriminately of geography, race, or creed (International Olympic Committee 2020b; UN General Assembly 2015). Sports participation aligns with the UN’s sustainable development goals for gender equality and good health and well-being since the competitive nature of sports promotes gender equality by empowering women and girls to compete (UN General Assembly 2015). Research describes women’s sports participation as a powerful personal and social change agent (Lim and Dixon

2017; Mayoh, Jones, and Prince 2020). However, not all sports participation leads to high-level competition. Considering this, sports participation is a regular and deliberate engagement in structured exercise that may or may not lead to high-level competition (Deelen, Ettema, and Kamphuis 2018; Kobiela 2018).

While some research aims to understand empowerment within the context of leisure-time physical activity (Raisborough and Bhatti 2007), to our knowledge, this is the first review that addresses empowerment through multiple sports. While women are less likely to meet physical activity guidelines than men, they report meeting the aerobic portions of the guidelines more frequently than the muscle-strengthening portions (Coen, Rosenberg, and Davidson 2018; Zenko, Willis, and White 2019). However, sports like powerlifting or weight training may be more empowering than aerobic exercise as women feel empowered by becoming physically strong (Walters and Hefferon 2020). The competitive nature of sports allows women to challenge gender norms, social norms, and oppressive social structures, thus organically facilitating empowerment (Mayoh, Jones, and Prince 2020). Therefore, this exploratory narrative review examines empowerment and women's empowerment facilitated through sports globally to describe the theoretical framework that guides empowerment research. A secondary aim is to understand how empowerment is measured among women participating in sports.

2.3 Methods

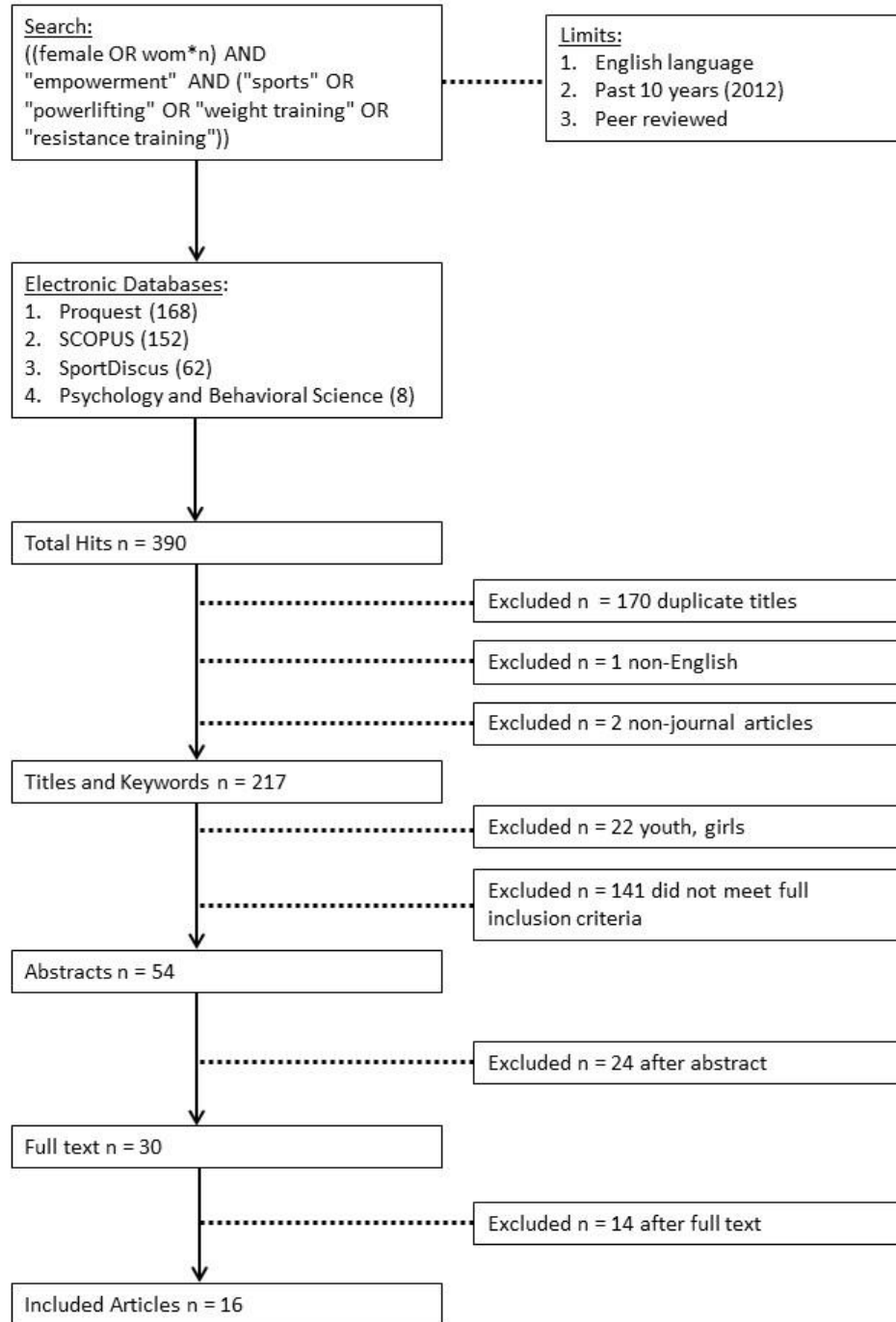
Following methodology consistent with the Scale for the Assessment of Narrative Review Articles (SANRA), a literature review was performed in April 2022 using the following databases: ProQuest Central, SCOPUS, SportDiscus, and Psychology and Behavioral Science (Baethge et al., 2019). The following search strategy was used: ((female OR wom*n) AND "empowerment" AND ("sports" OR "powerlifting" OR "weight training" OR "resistance training")), where an asterisk

symbol represents truncation. The original search strategy focused solely on strength-based sports, including powerlifting, weight, and resistance training, since strength-based sports are the authors' area of expertise. However, the broader term "sports" was included in the final search strategy due to a dearth of strength-based sport-specific results. For article inclusion, three assessment phases were employed: first the title and keywords were reviewed to ensure the article met inclusion criteria, then the abstract, and finally, the full-text article. Inclusion criteria required both empowerment and women (woman, female) and at least one sport-related term (e.g., a specific sport such as powerlifting, hockey, etc.) in the article's title or keywords. In addition to the database search strategy, the author identified previously known articles to include in the review. The reference lists of all articles were screened to identify additional articles that met the search criteria. Only peer-reviewed English language articles from the past ten years were considered. Relevant articles presented an association between women's sports experiences and empowerment.

2.4 Results

The literature search yielded 390 articles (Figure 2.2). Of these, 16 were selected for a full review as they met eligibility for inclusion and presented an association between women's sports experience and empowerment (Table 2.1). These articles varied greatly in scope, methodology, and type. The primary analysis identified empowerment definitions, theoretical underpinnings, and measurements in each article. Similar to existing critiques of empowerment research, no standard method for defining or measuring empowerment emerged (Gram et al., 2018; Mosedale, 2005; Richardson, 2018). Moreover, many articles did not clearly state the theoretical constructs that guided the research. The lack of unifying article characteristics prompted secondary thematic analysis.

Figure 2.2. Article selection flow chart.



Secondary thematic analysis revealed a geographical distinction between female empowerment in the Global South and the Global North. These describe groupings of countries along political and socioeconomic lines (Braff & Nelson, 2022). Often the countries in the Global

South are newly industrialized or in the process of industrialization. Regions comprising the Global South include Africa, Central and Latin America, East Asia and the Pacific, and South and Central Asia (Royal Geographical Society, 2013), while the westernized or industrialized regions of the Global North include North America, Europe, Australia, New Zealand, Russia, Israel, Japan, Singapore, South Korea, and Taiwan. Certainly, categorizing women's empowerment based on geography may mask regional similarities and differences in how empowerment is manifested. Nonetheless, for the sake of this review, the Global South and Global North designations offer insights that were not only based on geography but also on a country's developmental status and socioeconomic conditions. Moreover, given the lack of unifying article characteristics, the Global South and Global North distinctions offered a systematic approach to article examination.

Global South empowerment was described as a means to exercise agency and advance equality (Samie et al., 2015; Simangunsong et al., 2017; Stronach et al., 2019), while Global North empowerment themes typically leaned on feminist theory and embodied experiences through sport (Clark, 2019; Liechty et al., 2016; Mayoh et al., 2020). These results support Zimmerman's theory that empowerment is individual and context-specific (Zimmerman, 2000). Moreover, these results are also supported by the notion that women's empowerment is separate from empowerment, especially in the Global South, where women's empowerment is viewed as a means to exercise agency over life and familial decisions (Kabeer, 1999, 2005; Nikkhah et al., 2012).

Table 2.1. Overview of the articles selected for full review.

Author	Global South or Global North	Empowerment or Women's Empowerment	Theoretical Underpinnings	Study Methods
Fernandez-Lasa et al. (2020)	Global North	Empowerment	Liberal and post-structural feminism perspectives	Interviews

Haiachi et al. (2018)	Global South	Empowerment	N/A	Interviews
Harkness et al. (2018)	Global South	Women's Empowerment	N/A	Narrative Review
Lim & Dixon (2017)	Global North and South	Empowerment (specifically psychological empowerment)	Empowerment Theory	Narrative Review
Liechty et al. (2016)	Global North	Empowerment	Physical feminism	Interviews
Lowen et al. (2016)	Global North and South	Women's Empowerment	None, N/A	Quantitative regression models
Malnati et al. (2016)	Global North	Empowerment	Nikkhah/Zimmerman	Semi-structured interviews
Mayoh et al. (2020)	Global North	Empowerment	Dwelling-mobility theory	Literature review and one interview
Miller & France (2020)	Global North	Empowerment	Rogers's science of unitary human beings (SUHB) and Smith's theory of unitary caring guided this study	Survey design
Nanayakkara, S. (2012)	Global South	Women's Empowerment	Bronfenbrenner's 'social ecological' theory' and Stuart Mill's 'Liberal Feminist' theory'	Qualitative methods and documentary analysis
Parry D. C. (2016)	Global North	Empowerment	Third-wave feminism (guided research)	Interviews, direct observation
Samie et al. (2015)	Global South	Women's Empowerment	The authors rely on development-centric empowerment ideas, but a specific theory is not described	Pre- and mid-program video, phone, and in-person (mid-program only) interviews. These data were coded for thematic elements
Seal & Sherry (2018)	Global South	Women's Empowerment	Critical Pragmatism	Participatory action research, interviews, observation, reflective journaling
Simangunsong et al. (2017)	Global South	Women's Empowerment	Premenopausal Empowerment Model	Exercise intervention
Stevenson, P. (2018)	Global South	Empowerment	Neoliberal feminism	Review

Stronach et al. (2019)	Global North	Women's Empowerment	The authors rely on Emirbayer and Mishe (1998) and others. A specific theory does not drive this study	Dadirri, a specific type of interview technique appropriate for this population
---------------------------	--------------	------------------------	--	---

2.4.1 Empowerment in the Global South

Despite the emerging association between sports participation and empowerment, access to sports participation is a critical challenge for women in the Global South. Traditional stereotypes and gender roles often limit sports access to a select group of elite athletes (Nanayakkara, 2012). A recent literature and documentary review exploring how South Asian women interact with sports describes a tenuous relationship spanning history (Nanayakkara, 2012). For example, evidence from early societies in the Indus Valley suggests that women participated in swimming and dance (Nanayakkara, 2012). Female soldiers were commonplace during the Vedic period. However, as colonialism took root in South Asia, women's access to sports decreased (Nanayakkara, 2012). In the wake of colonialism, South Asian countries recognize the importance of having substantial representation in international sporting competitions (Lowen et al., 2016; Nanayakkara, 2012; Stevenson, 2018), and elite athletes demonstrate the possibility of sporting success. Still, South Asian women, according to Nanayakkara (2012), are hesitant about sports participation. Social, political, and economic barriers hinder sports participation despite the known physical, psychological, and community benefits. However, assuming that this population knows the empowering benefits of sports participation would be presumptive. Nanayakkara (2012) issues a call to action to increase sports participation at all levels through widespread policy change. However, empowerment is not explicitly defined, and the measurement of empowerment is not addressed. Nonetheless, the idea of crossing boundaries, defying gender norms, and gaining agency (becoming empowered) through sports participation is emphasized.

Governmental organizations and NGOs' development work often aims to increase women's access to sports in the Global South. Indeed, sport-for-development (S4D) programs aim to encourage empowerment through sports participation for women and girls in this region (UNICEF, 2019). For example, in 2012, the US Department of State launched a global effort to engage and empower women through sports (Samie et al., 2015). The Empowering Women and Girls Through Sports (EWGTS) initiative included an exchange program offering emerging female leaders (within the Global South) the opportunity for mentorship by an international female sports leader. The primary objectives of the program include 1) increasing female access to sport; 2) learning life skills that foster the personal and professional development of women; 3) broadening understanding across diverse cultures; 4) encouraging equality and inclusive thought; and 5) encouraging females to become active, positive change agents within their communities. The educational components of the EWGTS "expose, equip, empower, and entrust" emerging female leaders with the knowledge and abilities to rethink their social environment and roles within that environment (Samie et al., 2015, p. 923). While participants in the EWGTS initiative gained a broader understanding of oppression's presence and power dynamics, applying this understanding is not explicitly precise. It is unclear how sports participation is facilitated through the initiative; thus, the authors question the program's long-term efficacy (Samie et al., 2015). Moreover, the EWGST initiative's educational empowerment component does not appear to be grounded in theory.

Similarly, a S4D program in Papua New Guinea relied on sport to increase empowerment among girls and young women in the Global South (Seal & Sherry, 2018). The S4D program aimed to produce non-sport outcomes positively affecting health, education, gender equality, and community involvement by combining cricket instruction and educational components. Program

participants reported being surprised that women can play sports, thus challenging gendered social norms. A spillover effect into other domains demonstrates the impact of recognizing agency as a critical component of women's empowerment (Kabeer, 1999). Results of the program suggest increased consciousness-raising and community engagement among participants lead to feeling empowered (Seal & Sherry, 2018). The multidimensional theoretical empowerment model is undoubtedly addressed in this context; however, similar to many S4D programs, measuring empowerment is hindered by the lack of clear metrics (Gram et al., 2018; Richardson, 2018).

S4D program participants and elite female athletes face similar challenges in the Global South despite evidence that international sporting success is linked with women's empowerment (Lowen et al., 2016; Stevenson, 2018). When Saudi Arabia sent its first female representatives to the 2012 London Olympics, the Global North cheered as the empowered female sportsperson discourse emerged (Stevenson, 2018). Sarah Attar and Wojdan Ali Seraj Abdulrahim Shahrkhani did not meet the qualifying standards in their respective sports. However, the International Olympic Committee (IOC), under the convention that "sport is a human right" (International Olympic Committee, 2020a), allowed both women to compete. They became more than athletes; they became spokeswomen for equality and accessibility to sports. Furthermore, Attar gained corporate sponsorship from Oiselle as she continued to perpetuate the empowered female discourse, but in time Attar's representation of diversity and empowerment waned (Stevenson, 2018). Moreover, neither the process nor the outcomes of Attar's empowerment were analysed. This is problematic because it perpetuates the definitional dilution of empowerment through sport, whereby empowerment is not clearly defined or measured (Gram et al., 2018; Richardson, 2018; Stevenson, 2018)

While women's empowerment is widely recognized as a critical global policy objective (UN Assembly, 2015) and an essential element in promoting health and well-being while increasing economic stability and combatting poverty (Every Woman Every Child, 2017), encouraging women's empowerment through sport in the Global South is challenging (Nanayakkara, 2012; Samie et al., 2015; Seal & Sherry, 2018; Stevenson, 2018). Governmental organizations and NGOs combat social, cultural, political, and economic barriers to empowerment (Nanayakkara, 2012). Empowerment is both a process (empowering) and an outcome (empowered) (Wallerstein, 2006; Zimmerman, 2000). Many scholars conclude that empowerment is essentially a contested concept (Gram et al., 2018). It is not easy to measure (Richardson, 2018). Nevertheless, several studies conclude that sports empowerment is possible even in the Global South (Samie et al., 2015; Seal & Sherry, 2018).

2.4.2 Empowerment in the Global North

Empowerment research that focuses on women in the Global North centres around feminist and empowerment theories, embodied experiences and pushing social boundaries (Ashton-Shaeffer et al., 2001; Kotarba & Held, 2016; Liechty et al., 2016; Mayoh et al., 2020; Parry, 2016; Seal & Sherry, 2018). While some Global North empowerment research focuses on marginalized populations such as Indigenous Peoples and those with disabilities (Ashton-Shaeffer et al., 2001; Haiachi et al., 2018; Stronach et al., 2019), the bulk of research conducted in this region describes empowerment encouraged through sporting experiences in traditionally male-dominated venues such as ice hockey, powerlifting, and tackle football (Doğusan & Koçak, 2021; Kotarba & Held, 2016; Liechty et al., 2016; Mayoh et al., 2020). Other empowerment interventions to decrease risky behaviours focus on elite female athletes like those who play Division I sports in the United States (Malnati et al., 2016; Miller & France, 2020).

Geographical considerations are critical to accurately describe women's empowerment in sports because empowerment in the Global North differs from the Global South. For example, Lim and Dixon's (2017) conceptual framework for sports participation and women's empowerment offers insight into the inconsistent effects of women's sports participation in the Global North. While not implicitly targeting the Global North perspective, the framework idolizes individual empowerment and agency in a manner that may be less archetypical in the Global South.

Studies in marginalized populations such as Indigenous Peoples or those with disabilities demonstrate how empowerment can look similar in the Global South and the Global North. A meaningful illustration of this premise is explored in Indigenous Australian women's perceptions of agency and sports participation. Several governmental organizations and NGOs partnered to bring sporting opportunities to Indigenous women to promote health in Australia, and a recent study explored how these opportunities increased agency and empowerment (Stronach et al., 2019). Using Dadirri (a specific type of interview technique appropriate for Indigenous women), agency, and by extension, empowerment through sports participation was explored. Thematic analysis revealed that empowerment theory constructs, including individual, community, and policy empowerment, described participation in sporting programs among participants (Stronach et al., 2019). Women identified their power to create new possibilities through their involvement in sports. For example, they identified sports participation as a means to unite their communities toward a common goal, gain strength, and resist manipulation. Moreover, sports participation provided a safe space for Indigenous women to seek cultural safety while enhancing self-respect and self-acceptance (Stronach et al., 2019). Interestingly, agency and empowerment through sport were directed toward the present and the future, suggesting that empowerment might be a timeless construct for Indigenous Australian women. These findings

build on evidence that empowerment through teamwork, leadership, and community building may be a feasible solution to close gaps in health disparities among traditionally marginalized populations.

Similarly, several studies explore sport as a mechanism to gain empowerment in other marginalized groups, like women with disabilities, using a poststructuralist feminist framework and the life course theory (Ashton-Shaeffer et al., 2001; Haiachi et al., 2018). Involvement in sports allows women with disabilities in Brazil to shift their focus from disability to functional capacity as an athlete (Haiachi et al., 2018). Not surprisingly, and consistent with empowerment theory constructs, women with disabilities describe empowerment in personal and community dimensions (Ashton-Shaeffer et al., 2001; Haiachi et al., 2018). For elite wheelchair basketball players in the US, personal empowerment stems from increased self-confidence, perceptions of accomplishment, motivation, travel, and friendship (Ashton-Shaeffer et al., 2001). Community empowerment is drawn from belonging to a team, working toward a common goal, and being able to lead others to resist the social stereotypes of their disability. Moreover, sport is described as a facilitating element to achieve empowerment, especially in constructing a new identity of an athlete in women with disabilities (Ashton-Shaeffer et al., 2001; Haiachi et al., 2018). Finally, women with disabilities describe sports participation as a mechanism leading to both physical and mental empowerment outcomes (Ashton-Shaeffer et al., 2001). While empowerment through sport is illustrated, sports empowerment is not defined or measured.

In the Global North, the literature shifts focus from gaining agency over daily decision-making and health promotion to describing empowerment through sporting experiences (usually performed in leisure time) in traditionally male-dominated venues. Research from Canada, Turkey, Spain, the UK, and the US demonstrates this shift (Doğusan & Koçak, 2021; Fernandez-Lasa et

al., 2020; Kotarba & Held, 2016; Liechty et al., 2016; Mayoh et al., 2020; Parry, 2016). For example, women's participation in ice hockey, powerlifting, and tackle football has recently increased in popularity (Ball & Weidman, 2018; Doğusan & Koçak, 2021; Kotarba & Held, 2016; Liechty et al., 2016; Mayoh et al., 2020). Women who participate in these sports describe their experiences as empowering, and their experiences typically align with empowerment theory principles (i.e., psychological, community, and organizational empowerment) (Perkins & Zimmerman, 1995). Still, much research is guided by variations of feminist theory, including third-wave feminism (Parry, 2016), poststructuralist feminism (Ashton-Shaeffer et al., 2001), and liberal feminism (Fernandez-Lasa et al., 2020). Women commonly describe their participation in male-dominated sports as pushing back on societal norms, breaking boundaries, and obtaining physical and mental strength (Doğusan & Koçak, 2021; Fernandez-Lasa et al., 2020; Liechty et al., 2016; Mayoh et al., 2020). Interestingly, while some research focuses on team sports, like tackle football and hockey, belonging to a team is not a prerequisite for community empowerment through sport. Powerlifting is an individual sport; however, Mayoh et al. (2020) describe how a female powerlifter gained community empowerment simply by participating in powerlifting with other women, despite not being teammates per se. The implications of sport-based empowerment in team and individual sports in the Global North certainly may lead to improved long-term health outcomes since empowerment, and self-efficacy skills can facilitate physical activity (Bandura, 1977; Locke & Latham, 2006; Zimmerman, 1995).

Lastly, some research explores the empowerment process in US Division I athletes (Malnati et al., 2016; Miller & France, 2020). Indeed, the seminal work of Blinde et al. (1993) was some of the first to explore the concepts of female empowerment through sports in US Division I college athletes. The authors posit that sport supports and encourages three empowerment qualities

women traditionally lack: bodily competence, perceptions of a competent self, and a proactive approach to life (Blinde et al., 1993). More recent work within this population includes educational interventions that address empowerment and resilience (Malnati et al., 2016; Miller & France, 2020). Student-athletes encounter high stress levels and are expected to demonstrate leadership on and off the playing field. Moreover, high-risk behaviours such as binge drinking and unprotected sex are well-documented among female student-athletes (Malnati et al., 2016). Therefore, while sports participation can be inherently empowering (Blinde et al., 1993), it is essential to consider how stressors from competitive experiences at a high level may lead to unwanted behaviours (Malnati et al., 2016; Miller & France, 2020).

Interventions with empowerment theory (i.e., individual and community empowerment) underpinnings that attempt to measure empowerment seem more efficacious than other interventions that are not grounded in theory and lack empowerment measures (Richardson, 2018). A holistic understanding of the mechanisms of sport-centric educational empowerment programs may help elucidate best practices and encourage their broader adoption (Malnati et al., 2016).

2.5 Discussion

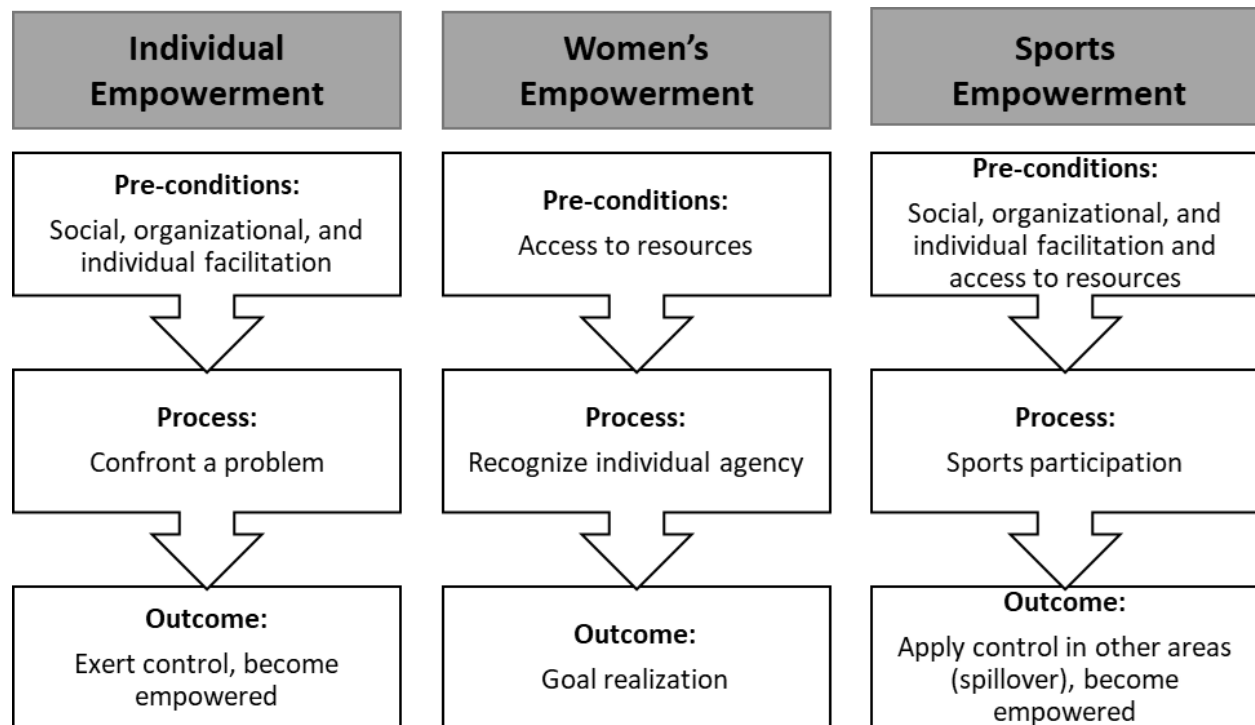
This narrative review describes empowerment and women's empowerment in two distinct geographical regions, the Global South and the Global North. It underscores the need for operationally defining sports-specific empowerment as its own term. While empowerment interventions in the Global South were aligned with constructs specific to women's empowerment, empowerment through sport in the Global North was associated with empowerment theory constructs. Considering this, it seems logical to assume that the empowerment outcomes might be expressed differently in these two regions. Nevertheless, this review highlights the fundamental similarities in desired empowerment outcomes in the Global North and the Global South. We draw

from empowerment theory constructs and the definition of women's empowerment, and it becomes clear that both empowerment and women's empowerment are concerned with increasing agency despite environmental challenges (Kabeer, 1999; Mayoh et al., 2020; Perkins & Zimmerman, 1995; Zimmerman, 1995). Given the evidence, it is clear there are differences in research performed in the Global South and Global North; however, the researchers share the same goal: increasing agency among women.

Our narrative review adds to the body of research that describes challenges in empowerment research, but our findings are most applicable to sports contexts. Defining and measuring empowerment is a critical deficit in the current literature and was frequently noted throughout this review (Harkness et al., 2018; Miller & France, 2020; Nanayakkara, 2012; Richardson, 2018; Simangunsong et al., 2017). Some studies (Miller & France, 2020; Simangunsong et al., 2017) referenced empowerment without defining it. Without a clear definition of empowerment, the research implications become murky. This is problematic since it is difficult to understand how theory guided the research without an operational definition of empowerment, especially since we found variation in theoretical underpinnings in our review. Many studies of empowerment in the Global North were grounded in feminist theory, including third-wave feminism (Parry, 2016), poststructuralist feminism (Ashton-Shaeffer et al., 2001), liberal feminism (Fernandez-Lasa et al., 2020), and neoliberal feminism (Stevenson, 2018). Other studies were grounded in empowerment theory constructs (Lim & Dixon, 2017; Malnati et al., 2016; Zimmerman, 1995). We found empowerment was inconsistently measured regardless of geography. Some studies (Lowen et al., 2016; Samie et al., 2015; Stevenson, 2018) defined empowerment but did not measure it as an intervention or program outcome. Again, this lack of

measurement is problematic because testing an invention's effectiveness in increasing empowerment is impossible.

Figure 2.3. Comparison between individual empowerment, women's empowerment, and sports empowerment. Adopted partially from Kabeer (1999), Richardson (2018), and Zimmerman (1995).



2.5.1 Key Implications

Sports empowerment should be considered a separate term from empowerment or women's empowerment because sports empowerment explicitly relies on sports participation to facilitate empowerment. It is critical to create a framework that specifically describes the processes and outcomes of empowerment through sports to further empowerment research. Empowerment is more than self-efficacy or an individual's belief in their ability to attain a performance outcome in a specific situation (Bandura, 1977). Empowerment is overcoming adversity and taking control of personal circumstances (Kabeer, 1999; Mayoh et al., 2020; Zimmerman, 1995).

How should empowerment be operationally defined and measured in sports research? We propose that empowerment through sport must describe the spillover effect in which self-efficacy in sport is present, but empowerment is facilitated beyond the sporting context (Figure 2.3). Sports empowerment helps defy gender stereotypes, boost self-esteem, encourage inclusion, and promote leadership among women and girls through participation in sports. The lack of measurement tools is a clear gap in the current empowerment literature, especially as empowerment in one domain may transfer into others. Therefore, sports empowerment measurements must account for the spillover effects from the sporting domain into everyday life. We acknowledge that measuring empowerment poses some challenges to researchers, yet assessing the empowering spillover effect of sports participation does not have to be overly complicated. Integrating theory into measurement models may lead to a greater understanding of the empowerment spillover effect facilitated through sports participation. For instance, questions like, “How much does your sports participation affect your behaviour in other domains?” may adequately describe and measure sports empowerment. Perhaps the best example of such a sport-specific definition of empowerment is described by elite wheelchair athletes (Ashton-Shaeffer et al., 2001). When these elite wheelchair women athletes challenged social norms, they also became empowered and encouraged others to think beyond the limits of their wheelchairs. Sports empowerment is more than self-efficacy; it allows individuals and communities the opportunity, through sport-based processes, to directly challenge social or cultural norms outside of the sporting world (Seal & Sherry, 2018).

2.5.2 Methodological Considerations

This narrative review explored the conceptual framework of female empowerment in sporting contexts; however, several limitations must be noted. First, despite a broad search strategy across multiple databases, it is possible that some relevant articles were missed especially given

that the results of this review were limited to publications in the English language, and we did not search for articles by specific sport type (i.e., basketball, volleyball, etc.). Second, quality was not assessed due to the limited number of articles that met the search criteria. Although every article included was peer-reviewed, the academic rigor of each article was not directly assessed.

2.6 Conclusion

Empowerment is a multidimensional construct that is both process- and outcome-based. However, current literature uses varying definitions of empowerment, making understanding female empowerment experiences through sports challenging. A complete understanding of empowerment's processes and outcomes may lead women to more positive body experiences, specifically in sports and, more broadly, in life. While measuring empowerment is difficult, women at varying levels of competition report their feelings of empowerment due to sports spillover into other areas of their lives. Therefore, sports empowerment should be considered a separate term because it aims to accurately describe how women's sports participation affects how they approach their everyday lives. Furthermore, future research should investigate sports empowerment guided by intersectional theory since what empowers a middle-aged, middle-income white female with a history of sports participation may be completely different than what is empowering for a young, low-income Asian female who has never participated in sports.

2.7 References

- Ashton-Shaeffer, C., Gibson, H., Holt, M., & Willming, C. (2001). Women's resistance and empowerment through wheelchair sport. *World Leisure Journal*, 43(4), 11–21. <https://doi.org/10.1080/04419057.2001.9674245>
- Baethge, C., Goldbeck-Wood, S., & Mertens, S. (2019). SANRA—a scale for the quality assessment of narrative review articles. *Research Integrity and Peer Review*, 4(1), 2–8. <https://doi.org/10.1186/s41073-019-0064-8>
- Ball, R., & Weidman, D. (2018). Analysis of USA Powerlifting Federation data from January 1, 2012–June 11, 2016. *Journal of Strength and Conditioning Research*, 32(7), 1843–1851.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191–215. <https://doi.org/10.1037/0033-295X.84.2.191>
- Blinde, E. M., Taub, D. E., & Han, L. (1993). Sport participation and women's personal empowerment: Experiences of the college athlete. *Journal of Sport & Social Issues*, 17(1), 47–60.
- Braff, L., and K. Nelson. 2022. “The Global North: Introducing the Region.” In *Gendered Lives*, edited by N. T. Fernandez & K. Nelson. New York, NW, USA: SUNY Press.
- Clark, A. (2019). Exploring women's experiences: Embodied pathways and influences for exercise participation. *Societies*, 9(1), 199–200. <https://doi.org/10.3390/soc9010016>
- Doğusan, S. N., & Koçak, F. (2021). Standing on the ice: Experiences of women national ice hockey players in Turkey. *Physical Culture and Sport, Studies and Research*, 89(1), 45–54. <https://doi.org/10.2478/pcssr-2021-0005>
- Emirbayer, M., & Mische, A. (1998). What is agency? *American Journal of Sociology*, 103(4), 962–1023. <https://doi.org/10.1086/231294>
- Every Women Every Child. (2017). Global strategy for women's children's and adolescents' health 2016–2030.
- Fernandez-Lasa, U., Usabiaga Arruabarrena, O., & Soler Prat, S. (2020). Juggling on the court: Exploring female Basque pelota players' experiences and empowerment strategies. *Journal of Gender Studies*, 29(5), 496–507. <https://doi.org/10.1080/09589236.2019.1618703>
- Gram, L., Morrison, J., & Skordis-Worrall, J. (2018). Organising concepts of ‘women's empowerment’ for measurement: A typology. *Social Indicators Research* 143(3), 1349–1376. <https://doi.org/10.1007/s11205-018-2012-2>

- Gressel, C. M., Rashed, T., Maciuika, L. A., Sheshadri, S., Coley, C., Kongeseri, S., & Bhavani, R. R. (2020). Vulnerability mapping: A conceptual framework towards a context-based approach to women's empowerment. *World Development Perspectives*, 20(January). <https://doi.org/10.1016/j.wdp.2020.100245>
- Haiachi, M. de C., Cardoso, V. D., Kumakura, R. S., Mello, J. B., Filho, A. R. R., & Gaya, A. C. A. (2018). Different views of (dis)ability: Sport and its impact on the lives of women athletes with disabilities. *Journal of Physical Education and Sport*, 18(1), 55–61. <https://doi.org/10.7752/jpes.2018.01007>
- Harkness, G., Quiroz, E., & Gomez, K. (2018). Sports and Qatar's empowered woman narrative. *Sociology Compass*, 12(11). <https://doi.org/10.1111/soc4.12631>
- International Olympic Committee. (2020a). Olympic Charter. Olympic Charter, August 1–110. www.olympic.org
- International Olympic Committee. (2020b). Promotion of women in sport through time. <https://www.olympic.org/women-in-sport/background>
- Kabeer, N. (1999). Resources, agency, achievements: Reflections on the measurement of women's empowerment. *Development and Change*, 30(May), 435–464.
- Kabeer, N. (2005). Gender equality and women's empowerment: A critical analysis of the third millennium development goal. *Gender and Development*, 13(1), 13–24.
- Kotarba, J., and M. Held. 2016. "Professional Female Football Players: Tackling like a Girl?." In *Body/Embodiment: Symbolic Interaction and the Sociology of the Body*, edited by D. Waskul & P. Vanninni, 1st ed. London, UK: Routledge. <https://doi.org/10.4324/9781315569635>
- Levermore, R. (2011). Evaluating sport-for-development: Approaches and critical issues. *Progress in Development Studies*, 11(4), 339–353. <https://doi.org/10.1177/146499341001100405>
- Liechty, T., Willfong, F., & Sveinson, K. (2016). Embodied experiences of empowerment among female tackle football players. *Sociology of Sport Journal*, 33(4), 305–316. <https://doi.org/10.1123/ssj.2015-0149>
- Lim, S. Y., & Dixon, M. A. (2017). A conceptual framework of sport participation and women's empowerment. *Managing Sport and Leisure*, 22(5), 400–413. <https://doi.org/10.1080/23750472.2018.1499437>
- Locke, E. A., & Latham, G. P. (2006). New directions in goal setting theory. *Association for Psychological Science*, 15(5), 265–268. <https://doi.org/10.1111/j.1467-8721.2006.00449.x>

- Lowen, A., Deaner, R. O., & Schmitt, E. (2016). Guys and gals going for gold: The role of women's empowerment in Olympic success. *Journal of Sports Economics*, 17(3), 260–285. <https://doi.org/10.1177/1527002514531791>
- Malnati, A. H., Fisher, L. A., Zakrajsek, R. A., Larsen, L. K., Bejar, M. P., Raabe, J. J., & Fynes, J. M. (2016). U.S. NCAA Division I female student-athletes' perceptions of an empowerment and social responsibility program. *The Sport Psychologist*, 30(1), 40–54. <https://doi.org/10.1123/tsp.2014-0165>
- Mayoh, J., Jones, I., & Prince, S. (2020). Women's experiences of embodied identity through active leisure. *Leisure Sciences*, 42(2), 170–184. <https://doi.org/10.1080/01490400.2018.1458668>
- Miguel, M. C., Ornelas, J. H., & Maroco, J. P. (2015). Defining psychological empowerment construct: Analysis of three empowerment scales. *Journal of Community Psychology*, 43(7), 900–919. <https://doi.org/10.1002/jcop.21721>
- Miller, A., & France, N. E. M. (2020). The influence of HeartMath® on resilience and empowerment in female college athletes. *Journal of Holistic Nursing*. 39(4), 382–392. <https://doi.org/10.1177/0898010120981176>
- Mosedale, S. (2005). Assessing women's empowerment: Towards a conceptual framework. *Journal of International Development*, 17(2), 243–257. <https://doi.org/10.1002/jid.1212>
- Nanayakkara, S. (2012). Crossing boundaries and changing identities: Empowering South Asian women through sport and physical activities. *The International Journal of the History of Sport*, 29(13), 1885–1906.
- Nikkhah, H. A., Redzuan, M., & Abu-Samah, A. (2012). Development of “power within” among the women: A road to empowerment. *Asian Social Science*, 8(1), 39–46. <https://doi.org/10.5539/ass.v8n1p39>
- Parry, D. C. (2016). “Skankalicious”: Erotic capital in women's flat track roller derby. *Leisure Sciences*, 38(4), 295–314. <https://doi.org/10.1080/01490400.2015.1113149>
- Perkins, D. D., & Zimmerman, M. A. (1995). Empowerment theory, research, and application. *American Journal of Community Psychology*, 23(5), 569–579. <https://doi.org/10.1007/BF02506982>
- Richardson, R. A. (2018). Measuring women's empowerment: A critical review of current practices and recommendations for researchers. *Social Indicators Research*, 137(2), 539–557. <https://doi.org/10.1007/s11205-017-1622-4>
- Royal Geographical Society. (2013). The Global North/South divide. 400. <https://www.rgs.org/CMSPages/GetFile.aspx?nodeguid=9c1ce781-9117-4741-af0a-a6a8b75f32b4&lang=en-GB>

- Samie, S. F., Johnson, A. J., Huffman, A. M., & Hillyer, S. J. (2015). Voices of empowerment: Women from the Global South re/negotiating empowerment and the global sports mentoring programme. *Sport in Society*, 18(8), 923–937. <https://doi.org/10.1080/17430437.2014.997582>
- Seal, E., & Sherry, E. (2018). Exploring empowerment and gender relations in a sport for development program in Papua New Guinea. *Sociology of Sport Journal*, 35(3), 247–257. <https://doi.org/10.1123/ssj.2017-0166>
- Simangunsong, D. E., Siregar, M. F. ., Triyoga, R. S., & Lubis, R. (2017). The impact of premenopausal empowerment model based health belief model to changes in physical activity levels in controlling complaints of perimenopausal women in Pematangsiantar City, Indonesia, 2017. *Giornale Italiano Di Ostetricia e Ginecologia*, 39(4–5), 181. <https://doi.org/10.11138/giog/2017.39.4.181>
- Stevenson, P. (2018). Empowerment discourses in transnational sporting contexts: The case of Sarah Attar, the first female Saudi Olympian. *Sociology of Sport Journal*, 35(3), 238–246. <https://doi.org/10.1123/ssj.2017-0129>
- Stronach, M., Maxwell, H., & Pearce, S. (2019). Indigenous Australian women promoting health through sport. *Sport Management Review*, 22(1), 5–20. <https://doi.org/10.1016/j.smr.2018.04.007>
- UNICEF. (2019). Sport for development. <https://www.unicef-irc.org/research/sport-for-development>
- United Nations General Assembly. (2015). Transforming our world: The 2030 Agenda for Sustainable Development. <https://www.un.org/sustainabledevelopment/>
- Velija, P. (2021). Women's empowerment. In G. Ritzer (Ed.), *Wiley Blackwell Encyclopaedia of Sociology*. Wiley-Blackwell.
- Wallerstein, D. (2006). What is the evidence on effectiveness of empowerment to improve health (Issue February). <http://www.euro.who.int/Document/E88086.pdf>
- Zimmerman, M. A. (1995). Psychological empowerment: Issues and illustrations. *American Journal of Community Psychology*, 23(5), 581–599. <https://doi.org/10.1007/BF02506983>
- Zimmerman, M. A. (2000). Empowerment theory: Psychological, organizational, and community levels of analysis. In J. Rappaport & E. Seidman (Eds.), *Handbook of Community Psychology* (pp. 43–63). Springer Science & Business Media.

Chapter 3 - A Mixed-Methods Study of Women's Empowerment Through Physical Activities: Relationships with Self-Efficacy and Physical Activity Levels

Aspen E. Streetman^{1*}, Madiera M. Lister¹, Averie Brown¹, Halle N. Brin¹, Katie M. Heinrich¹

¹*Department of Kinesiology, Kansas State University, Manhattan, KS 66506 USA*

*Correspondence: aestreetman@ksu.edu; Tel.: +1 (785) 706-8315

3.1 Abstract

Participation in empowering physical activities may increase self-efficacy and facilitate long-term engagement. This explanatory sequential mixed-methods study examined the relationship between physical activity empowerment, exercise self-efficacy, and engagement. Mid-western women (N=147) aged 18-65, 90% white, completed an online cross-sectional survey that captured exercise engagement and self-efficacy for exercise. Participants entered up to five types of physical activities and ranked them from most-to-least empowering. Physical activities were coded by training type for statistical comparisons using independent t-tests. After survey completion, seventeen women completed a 30-minute, 8-question semi-structured interview. Women ranked resistance training as the most empowering physical activity type (38%), followed by running (14%). Total and moderate-to-vigorous physical activity and self-efficacy for exercise scores did not vary between women empowered by cardiorespiratory or resistance training [i.e., total physical activity $t(136)=1.13$, $p=0.11$; moderate-to-vigorous physical activity $t(136)=2.42$, $p=0.06$; and self-efficacy for exercise $t(136)=0.66$, $p=0.07$]. Themes identified from the interviews included: 1) women's physical activity participation barriers are gender-centric, 2) physical activity participation benefits extend beyond physical health, 3) some exercise types are more empowering than others, and 4) empowerment and enjoyment are closely related. Exploring empowerment in exercise may reveal mechanisms to facilitate exercise self-efficacy and engagement in physical activity.

Keywords: exercise, resistance training, cardiorespiratory training, gym access, women's health

3.2 Introduction

Increasing women's empowerment and facilitating gender equality are critical global priorities. The United Nations General Assembly's top five sustainable development goals include: "Goal 5: Achieve gender equality and empower all women and girls" (United Nations General Assembly, 2015). According to empowerment theory, empowerment is a multidimensional construct that involves the individual, their friends and family, and the community in which they live (Perkins & Zimmerman, 1995; Zimmerman, 2000). Individual empowerment describes how people gain autonomy and control (Perkins & Zimmerman, 1995; Zimmerman, 2000). Empowerment theory dictates that empowerment varies between individuals as the value orientation of empowerment is influenced by individual goals, aims, and strategies for implementing change (Perkins & Zimmerman, 1995). Thus, empowerment theory serves as a model explaining the processes and outcomes of empowerment. For example, supportive friends and family may aid in the empowerment process, while an empowerment theory outcome could be having power and control over personal circumstances in the face of obstacles (Perkins & Zimmerman, 1995; Zimmerman, 2000). Moreover, previous research suggests that feelings of empowerment in one setting may transfer to another (Streetman & Heinrich, 2023; United Nations General Assembly, 2015). Therefore, fostering and promoting empowerment in exercise may be a powerful mechanism to increase women's empowerment in other areas of life.

Increasing empowerment among women through physical activity is critical since women are less likely than men to meet the physical activity guidelines. Globally, 17.4% of women and 23.5% of men meet the guidelines. In the United States, the gender gap is more pronounced (i.e., 20.9% of women vs. 27.2% of men)) (Coen et al., 2018; Garcia-Hermoso et al., 2023; National Center for Health Statistics, 2019). The World Health Organization guidelines exactly mirror those

of the US Department of Health and Human Services for adults and include doing at least 150 minutes of moderate-intensity aerobic activity, or 75 minutes of vigorous-intensity aerobic activity, or an equivalent combination of both, and doing at least two days of muscle-strengthening activity involving all major muscle groups weekly (Garcia-Hermoso et al., 2023; Piercy et al., 2018). Epidemiological evidence suggests that meeting both the aerobic and muscle-strengthening guidelines prospectively decreases all-cause mortality in adults since each type of activity has unique and cumulative benefits (Bennie et al., 2019; Garber et al., 2011). However, women are more likely to complete the aerobic portion of the guidelines. Over 50% of US adult women report meeting the aerobic guidelines only, while 24.3% meet the muscle-strengthening guidelines only (National Center for Health Statistics, 2019). Given that women are more likely to meet the aerobic but not the muscle-strengthening portion of the guidelines despite strong evidence that participating in both activities decreases all-cause mortality and improves quality of life, it is critical to examine women's perceptions of and adherence to physical activity and exercise.

While physical activity and exercise are often used interchangeably, they are not the same (American College of Sports Medicine, 2014; Booth et al., 2012). Physical activity is any bodily movement produced by skeletal muscle that increases energy expenditure above resting metabolic levels (American College of Sports Medicine, 2014; Booth et al., 2012). Physical activity includes any active action or task due to daily life activities, active transportation, or leisure time physical activity (Piercy et al., 2018). Physical activities include but are not limited to walking to work, grocery shopping, and exercising. Exercise is a subset of physical activity that is planned, structured, and repetitive (American College of Sports Medicine, 2014; Booth et al., 2012). Exercise can be referred to as leisure-time physical activity since it is usually performed in an individual's spare time. Therefore, it can be noted that increasing the amount of exercise a person

does also increase their physical activity. Exercise includes sports, workout classes, recreational walking, running, and lifting weights (American College of Sports Medicine, 2014). Exercise is often categorized by domain. There are four primary exercise domains: 1) cardiorespiratory training, 2) resistance training, 3) neuromotor training, and 4) flexibility training (American College of Sports Medicine, 2014). To place exercise within the physical activity guidelines, aerobic exercise, and cardiorespiratory training are often used interchangeably, while resistance training and muscle-strengthening activities are very similar (Piercy et al., 2018). For the sake of brevity, for the remainder of this manuscript, we will use physical activity as a blanket term to indicate physical activity, leisure-time physical activity, and exercise.

Research suggests that self-efficacy is closely related to empowerment (Cattaneo & Chapman, 2010; Fernandez-Lasa et al., 2020; Kabeer, 1999; Samie et al., 2015), yet empowerment accounts for the influence of friends and family, the community, and even society (Cattaneo & Chapman, 2010). Therefore, an empowered woman may participate in physical activity simply because she believes she can rather than conform to societal standards, even when barriers arise (Cattaneo & Chapman, 2010). Self-efficacy is the belief in one's capabilities to organize and execute specific behaviors (Bandura, 1977). It is a key construct of empowerment theory, social cognitive theory, and the theory of planned behavior (S. L. Williams & French, 2011) and has been linked to enjoyment (Lewis et al., 2016) as well as engagement in physical activity (Mailey & McAuley, 2014; Röger et al., 2011; S. L. Williams & French, 2011). However, research suggests that exercise adoption is more successful when an activity is enjoyable but that self-efficacy is a driving factor for exercise adherence (Lewis et al., 2016). Nonetheless, self-efficacy is positively linked to the direction, intensity, and persistence with which actions are performed (Lindgren et

al., 2011). Along with enjoyment, it predicts physical activity initiation and maintenance over time (Lewis et al., 2016).

Women's reasons for exercise participation differ and could be related to self-efficacy and empowerment (Clark, 2019). In fact, different types of physical activity have been identified as more empowering than others; thus, the mechanisms of empowerment likely vary (Fernandez-Lasa et al., 2020; Liechty et al., 2016; Liimakka, 2011; Lim & Dixon, 2017; Mayoh et al., 2020). For example, some argue that engagement in traditionally masculine activities, such as resistance training, team sports, or martial arts, empowers women to resist gender norms (Fernandez-Lasa et al., 2020; Liimakka, 2011; Mayoh et al., 2020; Meân & Kassing, 2008). Women also describe increased empowerment from unique activities like pole dancing, roller derby, and powerlifting (Mayoh et al., 2020; Parry, 2016; Walters & Hefferon, 2020). Overall, research suggests physical activities that shift focus from how the body looks to how it performs, such as resistance training (McGlashan et al., 2020), can be more empowering than others (Walters & Hefferon, 2020). For women, resistance training engagement is an under-studied and promising avenue for further exploration (Walters & Hefferon, 2020). Moreover, resistance training requires more skill development, and developing skills over time to participate in resistance training may increase self-efficacy (Rhodes et al., 2017).

Women participating in physical activity have increased physical competence, self-perception, and physical connectedness (Liechty et al., 2016; Lim & Dixon, 2017; Mayoh et al., 2020). Studies that examine how these feelings relate to exercise empowerment are limited in part because a standardized measurement of exercise empowerment does not exist (Rissel et al., 1996). To our knowledge, no other study has asked women to rank physical activities and exercises they participate in from most to least empowering. Therefore, this study aims to describe which types

of physical activities are ranked most empowering by women and explore the relationships between self-rated empowering exercise types, exercise engagement, and self-efficacy. We hypothesized that women would rank muscle-strengthening activities (e.g., resistance training) more empowering than aerobic activities (e.g., cardiorespiratory training). We also hypothesized that women empowered by muscle-strengthening activities would have more self-efficacy and, thus, do more physical activity. The secondary study purpose was to qualitatively understand why women rank certain types of physical activity as more or less empowering and to elucidate the relationship between empowerment and enjoyment in physical activity.

3.3 Materials and Methods

3.3.1 Study Design and Participants

An explanatory sequential mixed-methods study was conducted online and in person, where in-person interviews followed a cross-sectional survey. The cross-sectional survey was designed to explore how empowerment rankings varied between exercise types and to explore relationships between self-efficacy for exercise, physical activity engagement, and empowerment. The online survey allowed for a broader range of participants while minimizing participant burden. Survey participation was voluntary, and participants were not incentivized. Semi-structured interviews were conducted in person to help elucidate how different forms of physical activity foster empowerment. Participants who completed the interview were given a \$20 gift card for their time.

Study participants were recruited using flyers displaying a QR code and a bit-link linked to the survey, distributed via email through the university's daily newsletter and the Department of Kinesiology's weekly newsletter. The flyer was also shared on social media platforms and by word of mouth. The survey was distributed online through Qualtrics (Qualtrics Labs Inc., Provo,

UT, USA). Of the 306 people who clicked on the survey, 147 (48%) met the inclusion criteria and completed the survey entirely. To be eligible for the study, participants had to identify as female, be 18-65 years old, and live in the Midwest (i.e., Illinois, Indiana, Iowa, Kansas, Michigan, Missouri, Montana, Nebraska, North Dakota, Ohio, South Dakota, or Wisconsin, USA). The study received approval from the university's Institutional Review Board, approval #IRB-11315, on October 7, 2022.

3.3.2 Survey Procedures

Upon meeting the inclusion criteria, the online survey described the study's purpose and the confidentiality of responses before obtaining informed consent for the quantitative portion of the study, thus beginning the study. Following this, women entered basic demographic information, answered questions about their height and weight, completed the Godin-Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ), the Self-Efficacy for Exercise Questionnaire, and ranked up to five types of physical activity from most to least empowering (i.e., 1 = most empowering, 5 = least empowering). An optional open-ended question allowed participants to elaborate on their feelings of empowerment and physical activity. At the end of the survey, participants could enter their name and email in a separate secure URL if they were interested in completing an individual interview.

3.3.2.1 Weight and Height.

Participants self-reported their weight and height, as self-reported anthropometric measurements accurately calculate BMI for classification purposes (Olfert et al., 2018). Weight was reported in pounds as a whole number. Height was reported in feet and inches to the nearest quarter of an inch, then converted to a number in inches. Imperial measurements were retained for statistical analysis.

3.3.2.2 Body Mass Index (BMI).

BMI was calculated using standard procedures (Centers for Disease Control and Prevention (CDC), 2022) where $BMI = \text{weight (lbs.)} / [\text{height (in.)}]^2 \times 703$. BMI was categorized into four categories: 1) underweight ($< 18.5 \text{ kg/m}^2$), 2) normal weight ($18.5 \text{ to } < 25 \text{ kg/m}^2$), 3) overweight ($25.0 \text{ to } < 30 \text{ kg/m}^2$), and 4) obese ($\geq 30.0 \text{ kg/m}^2$) (Weir & Jan, 2022).

3.3.2.3 Godin-Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ).

The GSLTPAQ is a short, widely used self-report measure commonly used to examine individuals' current leisure-time physical activity levels. We asked participants, “During a typical 7-day period (one week), how many times on average do you do the following kinds of exercise for more than 15 minutes during your free time?” (Godin, 2011). Their physical activity was classified as strenuous (heart beats rapidly), moderate (not exhausting), and light (minimal effort). The GSLTPAQ was scored according to standard procedures where exercise frequency was calculated from arbitrary units to metabolic equivalents. Participants were grouped into three categories: 1) insufficiently active (< 14 units), 2) moderately active ($14 \text{ to } 23$ units), and 3) active (≥ 24 units) (Godin, 2011).

3.3.2.4 Self-Efficacy for Exercise Questionnaire.

The nine-question Self-Efficacy for Exercise questionnaire helps to determine an individual's self-efficacy to participate in physical activity despite facing nine common barriers (Resnick & Jenkins, 2000). This questionnaire is a valid and reliable measure (Cronbach's α 0.90) that asked participants: “How confident are you right now that you could exercise three times per week for 20 minutes if:” followed by nine different scenarios (e.g., they were experiencing pain during exercise, were not enjoying the exercise, and felt tired or stressed) (Resnick & Jenkins, 2000). Participants were asked to rate their confidence to still participate in physical activity when

they faced each of the nine scenarios on a scale from 0-10, where 0 corresponded to not confident and 10 was very confident. The questionnaire was scored according to standard procedures (Resnick & Jenkins, 2000). Total scores could range from 0 to 90, with scores of 50 or higher indicating high self-efficacy for exercise.

3.3.2.5 Open-Ended Empowerment Ranking Question.

The open-ended empowerment ranking question allowed participants to enter up to five different leisure-time physical activities in which they currently or had participated. First, the Oxford Languages definition was provided, then participants ranked their physical activities by dragging and dropping each into a rank order from one to five. One indicated the most empowering activity, and five was the least empowering. The question was worded as follows:

According to Oxford Languages, the definition of empowerment is “the process of becoming stronger and more confident, especially in controlling one's life and claiming one's rights.”

List up to five leisure-time physical activities in which you participate(d). Rank these activities based on the level of empowerment you experience(d) by dragging and dropping them into the corresponding order: 1 being the most empowering activity and 5 being the least empowering activity. Examples of leisure-time physical activities include but are not limited to running, playing basketball, taking fitness classes, riding a bike, and lifting weights.

Two researchers (AS and ML) categorized each physical activity by primary exercise type as defined by the American College of Sports Medicine (i.e., cardiorespiratory training, resistance training, neuromotor training, and flexibility training) (Reibe et al., 2018). Given the wide variety of responses, this approach was utilized to make meaningful comparisons between groups. One

researcher (ML) was the primary coder and categorized all 682 responses. The secondary coder (AS) analyzed 20% of the sample (n = 135). Coding agreement was very high (i.e., Cohen's K = 94.5%). CrossFit® was consistently categorized differently between the two researchers, but upon discussion, a consensus was reached, and CrossFit® was re-categorized as neuromuscular training (Garber et al., 2011).

3.3.3 Individual Interview Procedures

A research team member contacted interested individuals to schedule an in-person interview at a convenient time for the participant. Interviews (n = 17) were held at the institution. All participants signed a separate informed consent before their interview began, each acknowledging that the interview would be recorded but that no identifying information would be retained. Two researchers conducted each interview using the same set of eight base and probing questions. Participants were asked to describe their leisure time physical activity habits and how participation made them feel, especially related to empowerment constructs and enjoyment. The questions are provided below:

1. Leisure-time physical activities are not essential activities of daily living (work, transportation) and include sports, exercise, and recreational walking. Tell me about your current involvement in leisure-time physical activity.
2. Explain why you engage in that type or those types of physical activity.
3. Do you prefer to participate in physical activity alone or with other people?
4. Please tell me how participating in physical activity makes you feel.
5. How does your participation in physical activity affect the rest of your day?
6. What keeps you motivated to participate in physical activity?

7. According to Perkins and Zimmerman (1995), “Empowerment at the individual level is defined as a process by which individuals 1) perceive and gain control over personal issues, 2) understand their environment critically, and 3) take actions to influence the issues in their lives or communities.”

- a. What do you think about this statement?
- b. Explain whether or not PA is empowering for you.
- c. What type of PA is most empowering for you?

8. How does physical activity enjoyment relate to empowerment?

Researchers met throughout the study’s interviews to assess whether data saturation occurred (i.e., no new themes emerged) (Fusch & Ness, 2015). After interviewing the 17 participants, the research team felt data saturation was achieved. Each interview was transcribed verbatim and lasted approximately 30 minutes. Each transcription was sent to the corresponding participant for member checking to ensure accuracy and that the recorded responses resonated with their experiences.

3.3.4 Statistical Analysis

An a priori power analysis was not completed for this study because no standardized physical activity empowerment measurement exists (Rissel et al., 1996) though it could be used as a benchmark in the future. Data were analyzed in SPSS version 27 (IBM, Armonk, NY, USA). Means $\pm$ standard deviation ($M \pm SD$) were calculated for all data. All data were screened for normality using the Shapiro-Wilk test. Independent samples t-tests were used to explore differences in BMI, physical activity engagement, and self-efficacy for exercise among women empowered by cardiorespiratory and resistance training, as sample sizes were too small among neuromotor and flexibility training-empowered women.

3.3.5 Qualitative Analysis

Three members of the research team analyzed interview transcriptions with Dedoose version 9.0.17 (SocioCultural Research Consultants, LLC, Los Angeles, CA, USA). The primary researcher (AS) led coding efforts, while two secondary researchers (ML, HB) assisted. To some extent, all three researchers participated in the interview process, though the primary researcher participated in all interviews. An inductive, iterative thematic analysis was employed (Clarke & Braun, 2015; Creswell & Creswell, 2017; Timmermans & Tavory, 2012). Thematic analysis is frequently used to help understand individual experiences in qualitative studies (Clarke & Braun, 2015; Creswell & Creswell, 2017; Timmermans & Tavory, 2012). Each researcher independently coded the transcripts by highlighting words and phrases that could lead to understanding the study's purpose. As new codes emerged, researchers routinely returned to the raw data (i.e., transcripts) analyzed earlier in the process and applied relevant new codes. After every transcript had been coded, all three researchers met to ensure individual code meaning was clear and duplicative codes were combined, resulting in 151 unique codes. These codes were organized into ten categories based on commonalities (Clarke & Braun, 2015; M. Williams & Moser, 2019). After forming categories, researchers returned to literature to aid in theme development (Braun & Clarke, 2006). Four themes were developed that represented the ten categories. These themes were consistent with and built upon previous research. This process was iterative and involved moving back and forth between the raw data, codes, and categories multiple times to capture participants' experiences accurately. Lastly, a negative case analysis was completed to check for conflicting viewpoints across the identified themes (Katz, 2001).

3.4 Results

Of the 147 participants who answered the survey completely, most respondents (86.4%) resided in Kansas, while 3.4% resided in Michigan and Missouri. Most respondents were white (91.2%), though six (4.1%) indicated being American Indian or Alaskan Native. Many participants had at least some college education (37.4%), while more had a bachelor's degree or higher (44.2%).

3.4.1 Survey Findings

Survey findings are summarized in Table 3.1. While on average, participants were overweight by BMI, the largest percentage were normal weight, the sample was sufficiently active (i.e., scores were greater than 24 units), and had high self-efficacy for exercise (i.e., scores were greater than 50).

Table 3.1. Survey participant characteristics (N = 147).

Variable	M $\pm$ (SD)	N (%)
Height (in)	65.5 $\pm$ (2.7)	
Weight (lbs.)	156.2 $\pm$ (35.7)	
Body Mass Index (kg/m ²)	25.1 $\pm$ (6.6)	
Underweight (<18.5 kg/m ²)		3 (2.0)
Normal Weight (18.5-24.9 kg/m ²)		77 (53.5)
Overweight (25-29.9 kg/m ²)		38 (26.4)
Obese ($\geq$ 30 kg/m ²)		26 (18.1)
Missing		3 (2.0)
Total Physical Activity	53.5 $\pm$ (27.2)	
Moderate-to-Vigorous Physical Activity	40.1 $\pm$ (23.9)	
Self-Efficacy for Exercise	50.7 $\pm$ (19.6)	

3.4.2 Open-Ended Empowerment Question Analysis

When categorized by exercise type, cardiorespiratory training included running, walking, swimming, rowing, etc.; resistance training included lifting weights, powerlifting, and

weightlifting, etc.; neuromuscular training included CrossFit®; flexibility training included yoga, yardwork; and other included reading, etc. Descriptive statistics were coded by exercise type and are shown in Table 2. The highest-ranked empowering exercise was resistance training (n = 56, 38%), followed by running (n = 21, 14%), walking (n = 19, 12%), high-intensity interval training (n = 9, 6%), and both dance and hiking (n = 4 each, 3% each).

Table 3.2. Descriptive statistics for categories of most empowering activity by exercise types (presented as Mean $\pm$ SD).

Variable	Cardio-respiratory Training Empowered (n = 81)	Resistance Training Empowered (n = 57)	Neuromotor Training Empowered (n = 3)	Flexibility Training Empowered (n = 3)	Other Activity Empowered (n = 3)
BMI	25.2 $\pm$ (7.2)	24.7 $\pm$ (6.0)	24.9 $\pm$ (2.1)	26.5 $\pm$ (1.3)	29.0 $\pm$ (9.3)
Total Physical Activity	51.7 $\pm$ (27.0)	59.2 $\pm$ (25.9)	53.3 $\pm$ (31.9)	24.7 $\pm$ (16.2)	14.3 $\pm$ (9.2)
Moderate-to-Vigorous Physical Activity	37.9 $\pm$ (25.4)	45.5 $\pm$ (21.3)	49.3 $\pm$ (31.3)	17.7 $\pm$ (15.5)	8.3 $\pm$ (14.4)
Self-Efficacy for Exercise	48.5 $\pm$ (20.7)	54.8 $\pm$ (18.2)	52.7 $\pm$ (7.6)	33.7 $\pm$ (8.0)	48.7 $\pm$ (18.1)

Independent t-tests were conducted to compare the cardiorespiratory and resistance training-empowered groups, as the sample sizes of the other groups were too small to make statistical comparisons. There were no significant differences between groups for any variables [i.e., for BMI $t(136) = 1.13, p = 0.65$, for total physical activity $t(136) = 1.13, p = 0.11$, for moderate-to-vigorous physical activity $t(136) = 2.42, p = 0.06$, and for self-efficacy for exercise $t(136) = 0.66, p = 0.07$].

3.4.3 Individual Interview Findings

Thematic analysis of interviews (n = 17) resulted in four prominent themes, including 1) many barriers to female participation in physical activity are gender-centric, 2) the benefits of physical activity participation extend beyond physical health, 3) some types of exercise are more

empowering than others, and 4) empowerment and enjoyment are closely related. Excerpts are quoted verbatim, except when brackets are used to provide clarity.

3.4.3.1 Many Barriers to Women's Participation in Physical Activity are Gender-Centric

Most identified barriers to women's participation in physical activity were directly related to being a woman. However, some, including a lack of knowledge and losing motivation, were cited by participants, as well. For example, one woman reported feeling frustrated due to her lack of knowledge about using the equipment. She said, "Actually, a reason I didn't join a gym [was] because I wasn't comfortable to go into a place where there's just stuff, like no one leading you and [telling you] what to do." Another remarked, "I used to go with my friend, but then she kind of got hurt, so she hasn't been going as much, so I've been trying to keep going. Sometimes I've been losing the motivation to go since I'm by myself." When probed, this participant stated that she did not like going to the gym alone because the environment was intimidating. Another participant echoed this feeling, "it is intimidating to walk into a gym, and you're the only girl there."

Analysis revealed that barriers to physical activity participation, especially at a gym, were mainly related to being a woman. Participants felt judged for being a woman, not lifting heavy, or being made to feel uncomfortable. One participant reported that working out in the gym is "super intimidating." She said,

I'm a female, so a lot of times I felt [they] just stare[d] at me, or I've had people come up to me and go, "You're not doing the right technique to lift weights." And I'm like, "I've been lifting weights since I was 14. I know what I'm doing."

One participant described her experience with the bench press exercise: "I've been doing a lot more benching recently, and that's also nerve-wracking 'cause I know I'm not lifting that much."

Another participant described her experience of feeling like she was not lifting enough weight, "I feel like I get a lot of eyes sometimes if I'm not lifting a lot of weight. Or I'm just doing like ten pounds or whatever." She said she felt like a "little crab" in the corner of the gym, avoiding certain areas because they were male-dominant. Many participants felt the same way, noting certain areas they avoid. "Yeah, I would say I try to stay away from certain parts of the gym... OK, I can do it here 'cause there aren't going to be a lot of guys." Several discussed male entitlement as a significant barrier to using specific machines in the gym. One said, "You're not a male. It's like, don't expect to get the machines you want because you aren't going to!" Still, another relayed an experience with a male gym-goer that escalated to stalking and required a restraining order. She said,

They reviewed footage and were like, "Yeah, he's definitely following you. Like, we believe you." So, that's why I get so afraid when someone stares at me. I'm like, "I don't like you staring at me because I've had [a] previous experience that was bad." And so, I'm just like, please don't stare at me. Please don't. Don't even come to me, don't talk to me.

3.4.3.2 The Benefits of Physical Activity Participation Extend Beyond Physical Health

Participants could easily describe the physical, mental, and social health benefits of physical activity participation. For example, several participants discussed how physical activity made them feel strong, built their endurance, and was critical to maintaining health across the lifespan. Several participants stated that they "like feeling strong." Others highlighted the benefits of building endurance, saying, "[Physical activity] allows me just to enjoy different outdoor activities and just not be winded." Maintaining lifelong health was an essential benefit of physical activity among participants. One said, "As I grow older, I want to continue to have all the

movements and like function that I have now," while another echoed similar thoughts, saying, "I know long-term health is important," and "I don't want to age poorly and be at risk for more things."

Mental health benefits included improvements in mood, confidence, and stress levels. One participant commented, "It always boosts my mood and helps clear my head, especially when I'm stressed." Several participants conveyed similar experiences, "It's a good mental break," and "It just clears my head and boosts my mood." Physical activity consistently contributed to an improvement in confidence among participants. One said, "I feel a lot more confident in myself and what I can do." Another commented,

I struggled with body image issues when I was younger because probably because I wasn't doing anything for myself. Like I was doing things like playing volleyball. That was for fun and not for my body['s] health, but now that I participate in things that are good for my health and good for my body, I view my body in a more positive way.

Participants also cited the importance of physical activity to help destress and keep stress at bay. One said, "I feel like, if I had any stresses in the morning, [after working out] all of that's like, gone." Yet another commented, "I have a lot of stress from my classes right now, so I think [by] going to the gym, I can really escape my mind." Still, another said, "[Physical activity] has been clinically proven to reduce stress," and "lifting gives me a lot of destress time."

3.4.3.3 Some Types of Physical Activity Are More Empowering Than Others

Interview data corresponded with survey data in that most participants found lifting weights more empowering than participating in cardiorespiratory training. Central to feeling empowered were the feelings of accomplishment fostered by lifting weights. One participant said, "When I do strength training after[wards], it just makes you feel really strong, and like, I don't know, I feel like I can conquer anything." Similarly, another participant said,

After I do a strength training workout or something like that, and I feel, like, super strong, and like, I don't know, I feel like I could really do just about anything after I finish that. And that makes me feel, like, very empowered.

Feeling accomplished fostered empowerment. One participant said, "I would say it's it is empowering. Actually, I feel I like feeling stronger. I like getting to, like, lift heavier each time. It gives me a sense of accomplishment." Similarly, another participant described how lifting heavier leads to feeling empowered. She said, "Like going up in weight, and being able to not ask for help, because I don't want to ask for help 'cause it's all guys, so it's, I've been very proud of myself." It is important to note that feeling empowered by physical activity was not limited to resistance training.

Cardiorespiratory training activities like running were empowering to some participants, but again, feeling a sense of accomplishment was critical to feeling empowered. For example, one participant said, "My favorite feeling ever is when you get towards the end of a race, and you're dead tired, but like, you get a sudden burst of energy and feel like you can just keep going forever." However, activities like walking did not elicit the same feelings of empowerment. One participant commented,

I think like walking or stuff like that is enjoyable, and like, it's fun to do with someone, but I don't get done with that, and I'm like, "Man, I just accomplished so much," and like, I'm not super empowered by that type of activity.

Others felt similarly, "'Even if I [did] choose to go on a walk for like exercise, I won't say that's super empowering 'cause it doesn't feel difficult," and" Leisurely walking isn't, like, super empowering because a lot of people can do it, but it's still enjoyable."

3.4.3.4 Empowerment and Enjoyment are Closely Related

Empowerment was described as a multidimensional construct that affected participants at the individual, interpersonal, and community levels and was closely related to physical activity enjoyment. At the individual level, many participants expressed how setting aside time to exercise was something they did to take care of themselves. For example, one woman said, "I do it [resistance training] kind of for myself, I guess. It makes me feel good." Another commented,

Being physically active gives me time to, like, recognize things I want to, like, change about myself or, like, my environment. It's like a place for the growth for me basically, and it allows me to like think deeply on those 'cause that's like my thinking time. I'm walking, and I'm like, hmm, I gotta do this, and I want to do this, so I think it gives me time just to do a lot of, like, thinking about different things going on my life and how to handle those.

When talking about lifting weights, one participant commented, "I'm doing something to make my life better, which, like, in turn, makes everything else kind of better." At the interpersonal level, participants discussed how exercising with other women friends could be empowering. For example, one participant said, "I feel a lot more confident in myself and what I can do. As well as, like, how I can, like, push myself to reach my goals 'cause I started going with friends to the gym to lift." On the other hand, some participants noted that the type of activity mattered. Several described enjoying time with friends but not feeling empowered by the physical activity type. "I enjoy the community aspect of hanging out with friends and playing whatever sport, but it doesn't...You don't leave being like, yes, I accomplished something." Feeling a sense of community also contributed to enjoyment and empowerment. One participant commented,

I think the community aspect was really important to the gym I belonged in, and that definitely made me more comfortable working out. And now when I'm around certain people, I feel like there is a community in the gym, and sometimes people don't really talk

to each other, but today a lot of people were, like, talking and communicating, and I was like, this is weird, but it was kind of nice because everyone was, like, sharing equipment.

Enjoyment was critical to feeling empowered. One woman said, "The more you love something and the more you're enjoying it, the more empowered you're going to feel at the end of it. At least for me." Another echoed this sentiment stating, "So I think with me enjoying the type of physical activity I do, it really helps me feel more empowered because if I'm not going to enjoy it, then I'm not going to do it."

3.5 Discussion

3.5.1 Overall Discussion

This study examined how women ranked different physical activities and exercises as empowering, their self-reported engagement in physical activity, and self-efficacy for exercise. The main findings reveal that the largest group of women ranked resistance training as the most empowering form of physical activity in which they participate. This finding supports the study's hypothesis that muscle-strengthening exercises like resistance training are more empowering than cardiorespiratory training. While resistance training-empowered women, on average, participated in more total and moderate-to-vigorous physical activity and had higher average self-efficacy for exercise than cardiorespiratory-empowered women, these differences were not statistically significant. Therefore, our second hypothesis was not supported as there were no statistically significant differences in physical activity participation or self-efficacy for exercise between resistance training-empowered women and cardiorespiratory-empowered women.

Furthermore, our qualitative examination of why women rank different activities as more or less empowering supported the multidimensional construction of empowerment theory as women described the contribution of the individual, interpersonal, and community level (Perkins

& Zimmerman, 1995; Zimmerman, 2000). At the individual level, they noted that physical activity positively affected their physical, mental, and social health. They felt empowered to do physical activity because they knew how beneficial it was. The women in our study discussed how working out with friends related to the interpersonal level. Some women noted that exercising with others held them back, especially during cardiorespiratory activities like walking and running. At the community level, participants discussed the importance of women role models and noted that male gym-goers were sometimes a barrier to doing resistance training. While some commented on being in the zone and doing their own thing, they acknowledged that seeing the same people at the gym contributed to a sense of community. While all three levels of empowerment were represented in our data, almost all participants described how feeling a sense of accomplishment was critical to feeling empowered. They remarked that feeling accomplished and thus empowered was fostered by resistance training more than other physical activities. Additionally, participants indicated that physical activity must be enjoyable to be empowering, but for some, activities like walking were enjoyable but not empowering.

Our results highlight how physical activity can be empowering. A small but growing body of literature aligns with this result (Lindgren et al., 2011; Röger et al., 2011). For example, one community-based participatory research study among disadvantaged women focused on empowerment outcomes (Röger et al., 2011). Researchers found that their program enhanced participants' empowerment by increasing their self-efficacy, competency development, and motivation to do physical activity (Röger et al., 2011). Another study evaluated a six-month empowerment-based exercise intervention program among sedentary Swedish girls (Lindgren et al., 2011). Girls who completed the intervention learned skills to help them effectively manage stressful situations and improve their physical fitness (Lindgren et al., 2011). Unsurprisingly,

empowerment-based physical activity interventions positively impact participants through various mechanisms, including increased self-efficacy (Lindgren et al., 2011; Röger et al., 2011).

The quantitative and qualitative portions of our results support the notion that specific types of physical activity are more empowering than others. Among women in our study, resistance training was ranked as the most empowering form of physical activity in which they participated in the quantitative portion of our study. Resistance training was also qualitatively discussed as more empowering than other forms of physical activity in the study's interviews. Interview data help clarify why the women in our study found resistance training empowering. We learned that feeling a sense of accomplishment is critical to feeling empowered. Resistance training fostered a sense of accomplishment rooted in feeling and looking strong. Notably, running faster or farther was empowering for some of our participants. These results align with previous research in some ways. Historically, resistance training has been classified as a male-dominant activity (Shurley et al., 2020). Previous research indicates that women who engage in traditionally masculine activities like resistance training are empowered to resist gender norms (Fernandez-Lasa et al., 2020; Liimakka, 2011; Mayoh et al., 2020; Meân & Kassing, 2008). However, while the women in our study described gender-based barriers to resistance training, they did not expressly state that they did resistance training to buck gender norms. Instead, feeling and looking strong was associated with feeling empowered. Similarly, one study that examined women's experiences found that resistance training contributed to the development of self-efficacy, positive body image, and psychological well-being (Walters & Hefferon, 2020). In addition, women described activities that contributed to a sense of accomplishment as more empowering than easy activities. Some of the most popular physical activity interventions for women rely upon easy activities like walking (Kassavou et al., 2013). However, our results suggest that activities that cultivate a sense of

accomplishment may increase self-efficacy and engagement in moderate-to-vigorous physical activity.

Self-efficacy is an essential facet of empowerment and physical activity engagement. To our knowledge, this is the first study that examined how empowerment from different types of physical activity contributes to self-efficacy and engagement in exercise and physical activity. On average, study participants scored above average self-efficacy for exercise. Resistance and neuromotor training-empowered women scored over 50 (i.e., the threshold for high exercise self-efficacy). These findings may be partly due to the skill specialization required for these types of exercises (Rhodes et al., 2017). Yet, cardiorespiratory-empowered women also scored high on average (i.e., 48.5) on the self-efficacy for exercise scale. Therefore, it is worth considering that individuals who respond to a survey about exercise and empowerment are more likely to feel knowledgeable about and have high self-efficacy for exercise.

Our findings align with previous research that describes the positive relationship between self-efficacy and physical activity initiation and maintenance among women. For example, research suggests improvements in physical activity were mediated by self-efficacy among working mothers who engaged in a brief physical activity intervention (Mailey & McAuley, 2014). Self-efficacy improved among disadvantaged women and Swedish girls who participated in empowerment-based interventions (Lindgren et al., 2011; Röger et al., 2011). The relationship between self-efficacy and empowerment seems to be bidirectional, where improvements in self-efficacy led to feeling empowered and vice versa. Self-efficacy facilitates the initiation and maintenance of physical activity and is closely related to empowerment.

3.5.2 Suggestions for Practice

Since empowerment accounts for the individual, their friends and family, and the community in which they live, all three levels must be targeted to increase women's empowerment through physical activity. In particular, teaching women how to do resistance training may be impactful. Creating supportive groups of women who lift will also increase women's resistance training participation. Lastly, inclusive gym spaces are required so women feel comfortable doing resistance training and other physical activities. Given the well-documented physical, mental, and social benefits of physical activity, it is time for a renaissance that promotes all types of physical activity for women, especially resistance training.

3.5.3 Strengths and Limitations

Study strengths include implementing a sequential mixed-methods design where survey data were explored in greater depth through 17 semi-structured qualitative interviews. The survey used two validated and reliable questionnaires to assess physical activity engagement and self-efficacy for exercise. The open-ended empowerment ranking question allowed participants to freely type in any physical activity or exercise they participated in; thus, they were not limited to certain types of physical activity. Two researchers classified all physical activity into five categories based on training adaptation and had a very high (i.e., 94.5%) agreement. Our iterative and inductive approach to analyzing the interview data was considered valid and reliable, and we achieved data saturation through our interviews.

However, several study limitations should be addressed. Our study sample is not representative as it was predominantly white and well-educated. As with any cross-sectional design, the data we captured from our survey are simply a snapshot of participants' experiences and preclude causality. Some participants were more active than others, and we did not measure

the type of physical activity they participated in, only the intensity. Therefore, it is possible, for example, that someone who ranked resistance training as the most empowering form of physical activity they participated in was doing low-intensity physical activity like walking. Longitudinal studies may better capture the empowerment process through physical activity and better elucidate how physical activity type impacts feelings of empowerment, self-efficacy, and adherence to physical activity. Moreover, differences in total and moderate-to-vigorous physical activity and self-efficacy for exercise were not statistically significant between cardiorespiratory- and resistance training-empowered women, which may indicate that our study was not adequately powered. Future research should include a larger, more diverse sample and account for cultural and religious barriers among minority groups.

3.6 Conclusions

This explanatory sequential mixed-methods study adds insight into which types of physical activities women see as empowering. The women in our study ranked resistance training as more empowering than other physical activity types. This is notable since epidemiological evidence suggests women are less likely than men to do muscle-strengthening activities like resistance training. Running, walking, HIIT, dancing, and hiking were among the top five most empowering physical activities identified as empowering by women in our study. We also found that women understand the benefits of physical activity but face gender-specific barriers like feeling judged by male gym-goers or not knowing how to use the equipment. In our study, feeling accomplished after a workout was related to feeling empowered. Many women described how being able to do hard things like lifting heavy weights or running long distances was empowering.

3.7 References

- American College of Sports Medicine. (2014). *ACSM's guidelines for exercise testing and prescription* (L. S. Pescatello, R. Arena, D. Riebe, & P. D. Thompson (Eds.); 9th ed.). Lippincott Williams & Wilkens. <https://doi.org/10.1249/00005768-199110000-00024>
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191–215. <https://doi.org/10.1037/0033-295X.84.2.191>
- Bennie, J. A., De Cocker, K., Teychenne, M. J., Brown, W. J., & Biddle, S. J. H. (2019). The epidemiology of aerobic physical activity and muscle-strengthening activity guideline adherence among 383,928 U.S. adults. *International Journal of Behavioral Nutrition and Physical Activity*, 16(1), 1–12. <https://doi.org/10.1186/s12966-019-0797-2>
- Booth, F. W., Roberts, C. K., & Laye, M. J. (2012). Lack of exercise is a major cause of chronic diseases. *Comprehensive Physiology*, 2(2), 1143–1211. <https://doi.org/10.1002/cphy.c110025>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Cattaneo, L. B., & Chapman, A. R. (2010). The process of empowerment: A model for use in research and practice. *American Psychologist*, 65(7), 646–659. <https://doi.org/10.1037/a0018854>
- Centers for Disease Control and Prevention (CDC). (2022). Calculating BMI using the English System. Growth Chart Training. [https://www.cdc.gov/nccdphp/dnpao/growthcharts/training/bmiage/page5_2.html#:~:text=Formula%3A weight \(lb\) %2F,a conversion factor of 703.](https://www.cdc.gov/nccdphp/dnpao/growthcharts/training/bmiage/page5_2.html#:~:text=Formula%3A weight (lb) %2F,a conversion factor of 703.)
- Clark, A. (2019). Exploring women's experiences: Embodied pathways and influences for exercise participation. *Societies*, 9(1), 199–200. <https://doi.org/10.3390/soc9010016>
- Clarke, V., & Braun, V. (2015). Thematic analysis. *Positive Psychology*, 151, 10–17.
- Coen, S. E., Rosenberg, M. W., & Davidson, J. (2018). “It’s gym, like g-y-m not J-i-m”: Exploring the role of place in the gendering of physical activity. *Social Science and Medicine*, 196(October 2017), 29–36. <https://doi.org/10.1016/j.socscimed.2017.10.036>
- Creswell, J. W., & Creswell, J. D. (2017). Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.). SAGE Publications.
- Fernandez-Lasa, U., Usabiaga Arruabarrena, O., & Soler Prat, S. (2020). Juggling on the court: Exploring female Basque pelota players' experiences and empowerment strategies. *Journal of Gender Studies*, 29(5), 496–507. <https://doi.org/10.1080/09589236.2019.1618703>

- Fusch, P. I., & Ness, L. R. (2015). Are we there yet? Data saturation in qualitative research. *Qualitative Report*, 20(9), 1408–1416. <https://doi.org/10.46743/2160-3715/2015.2281>
- Garber, C. E., Blissmer, B., Deschenes, M. R., Franklin, B. A., Lamonte, M. J., Lee, I.-M. M., Nieman, D. C., & Swain, D. P. (2011). Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: Guidance for prescribing exercise. *Medicine and Science in Sports and Exercise*, 43(7), 1334–1359. <https://doi.org/10.1249/MSS.0b013e318213fefb>
- Garcia-Hermoso, A., López-Gil, J. F., Ramírez-Vélez, R., Alonso-Martínez, A. M., Izquierdo, M., & Ezzatvar, Y. (2023). Adherence to aerobic and muscle-strengthening activities guidelines: A systematic review and meta-analysis of 3.3 million participants across 32 countries. *British Journal of Sports Medicine*, 57(4), 225–229. <https://doi.org/10.1136/bjsports-2022-106189>
- Godin, G. (2011). Godin Leisure-Time Exercise Questionnaire (GLTE). *Oncology Nursing Society*, 4, 2011. 10.14288/hfjc.v4i1.82
- Kabeer, N. (1999). Resources, agency, achievements: Reflections on the measurement of women's empowerment. *Development and Change*, 30(May), 435–464.
- Kassavou, A., Turner, A., & French, D. P. (2013). Do interventions to promote walking in groups increase physical activity? A meta-analysis. *International Journal of Behavioral Nutrition and Physical Activity*, 10(1), 1. <https://doi.org/10.1186/1479-5868-10-18>
- Katz, J. (2001). A theory of qualitative methodology: The social system of analytic fieldwork. In R. Emerson (Ed.), *Contemporary Field Research: A Collection of Readings* (2nd ed., pp. 127–148). Waveland Press, Incorporated. <https://doi.org/10.1080/23754745.2015.1017282>
- Lewis, B. A., Williams, D. M., Frayeh, A., & Marcus, B. H. (2016). Self-efficacy versus perceived enjoyment as predictors of physical activity behaviour. *Psychology and Health*, 31(4), 456–469. <https://doi.org/10.1080/08870446.2015.1111372>
- Liechty, T., Willfong, F., & Sveinson, K. (2016). Embodied experiences of empowerment among female tackle football players. *Sociology of Sport Journal*, 33(4), 305–316. <https://doi.org/10.1123/ssj.2015-0149>
- Liimakka, S. (2011). I am my body: Objectification, empowering embodiment, and physical activity in women's studies students' accounts. *Sociology of Sport Journal*, 28(4), 441–460. <https://doi.org/10.1123/ssj.28.4.441>
- Liechty, T., Willfong, F., & Sveinson, K. (2016). Embodied experiences of empowerment among female tackle football players. *Sociology of Sport Journal*, 33(4), 305–316. <https://doi.org/10.1123/ssj.2015-0149>

- Lindgren, E. C., Baigi, A., Apitzsch, E., & Bergh, H. (2011). Impact of a six-month empowerment-based exercise intervention programme in non-physically active adolescent Swedish girls. *Health Education Journal*, 70(1), 9–20. <https://doi.org/10.1177/0017896910379366>
- Mailey, E. L., & McAuley, E. (2014). Impact of a brief intervention on physical activity and social cognitive determinants among working mothers: A randomized trial. *Journal of Behavioral Medicine*, 37(2), 343–355. <https://doi.org/10.1007/s10865-013-9492-y>
- Mayoh, J., Jones, I., & Prince, S. (2020). Women’s experiences of embodied identity through active leisure. *Leisure Sciences*, 42(2), 170–184. <https://doi.org/10.1080/01490400.2018.1458668>
- McGlashan, A., Capp, D., & Anderson, K. (2020). Older adults’ experiences and perspectives of a powerlifting program ‘ Never Too Late ’ in regional Victoria and the associated impacts on biopsychosocial outcomes. *Gerontology & Geriatrics: Research*, 6(2), 1–11.
- Meân, L. J., & Kassing, J. W. (2008). “I would just like to be known as an athlete”: Managing hegemony, femininity, and heterosexuality in female sport. *Western Journal of Communication*, 72(2), 126–144. <https://doi.org/10.1080/10570310802038564>
- National Center for Health Statistics. (2019). Table 25, Participation in leisure-time aerobic and muscle-strengthening activities that meet the federal 2008 Physical Activity Guidelines for Americans among adults aged 18 and over, by selected characteristics: United States, selected years 1998–2018. United States Health, 2019. <https://www.ncbi.nlm.nih.gov/books/NBK569311/table/ch3.tab25/>
- Olfert, M. D., Barr, M. L., Charlier, C. M., Famodu, O. A., Zhou, W., Mathews, A. E., Byrd-Bredbenner, C., & Colby, S. E. (2018). Self-reported vs. measured height, weight, and BMI in young adults. *International Journal of Environmental Research and Public Health*, 15(10), 1–9. <https://doi.org/10.3390/ijerph15102216>
- Parry, D. C. (2016). “Skankalicious”: Erotic capital in women’s flat track roller derby. *Leisure Sciences*, 38(4), 295–314. <https://doi.org/10.1080/01490400.2015.1113149>
- Perkins, D. D., & Zimmerman, M. A. (1995). Empowerment theory, research, and application. *American Journal of Community Psychology*, 23(5), 569–579. <https://doi.org/10.1007/BF02506982>
- Piercy, K. L., Troiano, R. P., Ballard, R. M., Carlson, S. A., Fulton, J. E., Galuska, D. A., George, S. M., & Olson, R. D. (2018). The physical activity guidelines for Americans. *JAMA - Journal of the American Medical Association*, 320(19), 2020–2028. <https://doi.org/10.1001/jama.2018.14854>

- Reibe, D., Ehrman, J. K., Liguori, G., & Magal, M. (Eds.). (2018). Exercise preparticipation health screening. In *ACSM's Guidelines for Exercise Testing and Prescription* (10th Edition), pp. 22–44. Wolters Kluwer Health.
- Resnick, B., & Jenkins, L. S. (2000). Testing the reliability and validity of the Self-Efficacy for Exercise scale. *Nursing Research*, 49(3), 154–159.
- Rhodes, R. E., Lubans, D. R., Karunamuni, N., Kennedy, S., & Plotnikoff, R. (2017). Factors associated with participation in resistance training: A systematic review. *British Journal of Sports Medicine*, 51(20), 1466–1472. <https://doi.org/10.1136/bjsports-2016-096950>
- Rissel, C., Perry, C., & Finnegan, J. (1996). Toward the assessment of psychological empowerment in health promotion: Initial tests of validity and reliability. *Journal of the Royal Society of Health*, 116(4), 211–218.
- Röger, U., Rütten, A., Frahsa, A., Abu-Omar, K., & Morgan, A. (2011). Differences in individual empowerment outcomes of socially disadvantaged women: Effects of mode of participation and structural changes in a physical activity promotion program. *International Journal of Public Health*, 56(5), 465–473. <https://doi.org/10.1007/s00038-010-0214-8>
- Samie, S. F., Johnson, A. J., Huffman, A. M., & Hillyer, S. J. (2015). Voices of empowerment: Women from the Global South re/negotiating empowerment and the global sports mentoring programme. *Sport in Society*, 18(8), 923–937. <https://doi.org/10.1080/17430437.2014.997582>
- Shurley, J., Felkar, V., Greviskes, L., & Todd, J. (2020). Historical and social considerations of strength training for female athletes. *Strength and Conditioning Journal*, 00(00), 1–14.
- Streetman, A. E., & Heinrich, K. M. (2023). Female empowerment through sport: An exploratory narrative review. *Sport in Society*, 0(0), 1–16. <https://doi.org/10.1080/17430437.2023.2270443>
- Timmermans, S., & Tavory, I. (2012). Theory construction in qualitative research: From grounded theory to abductive analysis. *Sociological Theory*, 30(3), 167–186. <https://doi.org/10.1177/0735275112457914>
- United Nations General Assembly. (2015). Transforming our world: The 2030 Agenda for Sustainable Development. <https://www.un.org/sustainabledevelopment/>
- Walters, R., & Hefferon, K. (2020). ‘Strength becomes her’ – resistance training as a route to positive body image in women. *Qualitative Research in Sport, Exercise and Health*, 12(3), 446–464. <https://doi.org/10.1080/2159676X.2019.1634127>
- Weir, C., & Jan, A. (2022). BMI classification percentile and cut-off points. StatPearls. <https://www.ncbi.nlm.nih.gov/books/NBK541070/>

Williams, M., & Moser, T. (2019). The art of coding and thematic exploration in qualitative research. *International Management Review*, 15(1), 45–55.

Williams, S. L., & French, D. P. (2011). What are the most effective intervention techniques for changing physical activity self-efficacy and physical activity behaviour - And are they the same? *Health Education Research*, 26(2), 308–322. <https://doi.org/10.1093/her/cyr005>

Zimmerman, M. A. (2000). Empowerment theory: Psychological, organizational, and community levels of analysis. In J. Rappaport & E. Seidman (Eds.), *Handbook of Community Psychology* (pp. 43–63). Springer Science & Business Media.

Chapter 4 – A Pilot Study to Increase Physical Activity and Strength Through Powerbuilding

Aspen E. Streetman^{1*}, Murry T. Streetman², Halle N. Brin¹, Emily L. Mailey¹ and
Katie M. Heinrich¹

¹*Department of Kinesiology, Kansas State University, Manhattan, KS 66506 USA*

²*Staley School of Leadership, Kansas State University, Manhattan, KS 66506 USA*

*Correspondence: aestreetman@ksu.edu; Tel.: +1 (785) 706-8315

4.1 Abstract

Engaging in empowering exercise that enhances strength and movement competency is fundamental for overall physical health, mental well-being, and quality of life. Powerbuilding combines powerlifting and bodybuilding to increase physical activity, strength, and movement skills. Despite its popularity in gym settings, to our knowledge, powerbuilding has not been explored as an exercise intervention. **Purpose:** This pilot study investigated the impact of an eight-week powerbuilding intervention on women's physical activity, movement competency, strength, and empowerment. **Methods:** Eighteen women aged 25.1 ± 9.8 with no powerbuilding experience participated in the intervention, meeting three times weekly for one hour. Physical activity and movement competency were assessed pre- and post-intervention. Three-repetition maximum (3-RM) tests in the squat, bench press, and deadlift were completed in weeks one and eight of the intervention. Data were checked for normality; Wilcoxon signed-rank test was used for non-normally distributed data. **Results:** Total physical activity ($[t(17)=3.52, p=0.003, d=0.83]$) and participants meeting the physical activity guidelines ($Z=-3.32, p=0.001$) increased significantly from pre- to post-intervention. Participants' basic human movement scores improved significantly from pre- (24.3 ± 3.5) to post-intervention (29.5 ± 2.5 ; $[t(17)=10.04, p<0.001; d=2.37]$). Significant increases in strength were observed (squat $[Z=-3.73, p<0.001]$, bench press $[Z=-3.73, p<0.001]$, and deadlift $[t(17)=16.41, p<0.001; d=3.87]$). Empowerment in exercise scores ranged from 40 to 65 (on a scale of 5-65), averaging 56.3 ± 6.6 . **Conclusions:** The intervention significantly increased total physical activity, improved movement competency, increased strength among participants, and facilitated feelings of empowerment. Women's participation in powerbuilding may enhance their overall quality of life.

Keywords: resistance training, empowerment theory, movement competency, powerlifting

4.2 Introduction

Empowering women and girls to achieve gender equality is a global priority that can be promoted through exercise (United Nations General Assembly, 2015). Empowerment is a multidimensional construct that describes how individuals gain influence over outcomes and events of importance (Fawcett et al., 1995; Perkins & Zimmerman, 1995). Empowerment occurs at the individual, interpersonal, and community levels and varies between individuals (Fawcett et al., 1995; Perkins & Zimmerman, 1995). Individual-level empowerment is fostered through skill acquisition, leading to self-efficacy, autonomy, and motivation (Liechty et al., 2016; Mayoh et al., 2020). Increasing accountability, competition, and a sense of community at the interpersonal level may also increase feelings of empowerment (Rundio et al., 2020). Community-level empowerment can be facilitated through shared values and common goals (Perkins & Zimmerman, 1995).

In recent years, many have looked to physical activity and sport as a means of enabling women's empowerment through community building, skill acquisition, increased independence, and resisting traditional gender stereotypes (Doğusan & Koçak, 2021; Liechty et al., 2016; Mayoh et al., 2020). To our knowledge, empowerment theory constructs have not been applied to exercise interventions. Participation in empowering exercise may have implications that extend beyond exercise into other areas of life (blinded for review). For example, an individual who feels strong in the gym might feel more capable at work. Thus, applying empowerment theory constructs to an exercise intervention could improve intervention and post-intervention adherence to exercise through increased self-efficacy, autonomy, motivation, competition, sense of community, shared goals, and values.

As a subset of physical activity, exercise is a planned, structured, and repetitive effort to improve physical fitness (American College of Sports Medicine, 2014). Exercise is typically

performed in an individual's spare time and includes sports, group fitness classes, recreational walking, running, and resistance training. Exercise and physical activity can improve physical literacy (i.e., the understanding to assume accountability to engage in lifelong physical activity and exercise) and movement competencies (i.e., the ability to perform basic human movements such as the squat, hinge, row, etc.) (Tompsett et al., 2014, 2015). The current United States (US) physical activity guidelines include 150 minutes of moderate-intensity (75 minutes of vigorous-intensity) aerobic activity and at least two days of muscle-strengthening exercises involving all major muscle groups weekly (Piercy et al., 2018).

Women are less likely than men to meet the physical activity guidelines (Garcia-Hermoso et al., 2023; Piercy et al., 2018). Over 50% of women report meeting the aerobic guidelines only, while 24.3% meet the muscle-strengthening guidelines only (National Center for Health Statistics, 2019). Yet, only 20.9% of women in the United States meet the aerobic and muscle-strengthening portions of the physical activity guidelines (National Center for Health Statistics, 2019). Barriers to meeting the muscle-strengthening guidelines among women include gender role expectations, low self-efficacy to perform resistance training, and fears of excess muscularity (Aasa et al., 2016; Rhodes et al., 2017; Shurley et al., 2020). At the same time, muscle-strengthening activities like resistance training are particularly beneficial for women (Kitsuda et al., 2021; Westcott, 2012).

Resistance training is positively linked to improved physical performance, movement control, walking speed, functional independence, cognitive abilities, and self-esteem (Westcott, 2012). Resistance training may also benefit chronic pathologies, decrease bone loss, and mitigate age-related sarcopenia (Gorzelitz et al., 2022; Kitsuda et al., 2021). Moreover, evidence from our research suggests that resistance training is more empowering than other types of physical activity (reference blinded for review, 2023). While women's reasons for exercise participation vary,

empowering exercise may increase overall physical activity participation since empowerment can improve self-efficacy, develop competence, and increase motivation (reference blinded for review, 2023).

Exercises that are traditionally regarded as male-dominant, including resistance training, ice hockey, powerlifting, and martial arts, are often categorized as more empowering than traditionally female-dominant exercises like dance and aerobic exercise (Doğusan & Koçak, 2021; Fernandez-Lasa et al., 2020; Walters & Hefferon, 2020). Similarly, exercise that increases body functionality (i.e., everything the body is capable of doing, including physical capacity) facilitates women's physical activity participation (Alleva & Tylka, 2021; Walters & Hefferon, 2020). Activities that require physical strength have also been shown to facilitate feelings of empowerment (Doğusan & Koçak, 2021; reference blinded for review, 2023; Walters & Hefferon, 2020). Resistance training-based exercise, like powerbuilding, increases physical strength and promotes muscular development; yet powerbuilding's effects on strength and empowerment have not yet been explored.

Powerbuilding is a hybrid form of resistance training performed in a gym setting that combines powerlifting and bodybuilding elements to increase strength and promote a muscular physique (Cusano & Di Palma, 2019). Powerlifting's three primary lifts are the barbell back squat, bench press, and deadlift (Ferland & Comtois, 2019). These movements, often called "the big three," are complex, multi-joint exercises that are performed to increase strength by performing a low number of repetitions (Ferland & Comtois, 2019). On the other hand, bodybuilding utilizes single-joint movements to increase muscular size and definition, usually by performing a higher number of repetitions (Hackett, 2022). Powerbuilding training is structured around each of the big three movements. Thus, a powerbuilding protocol has a squat day, bench press day, and deadlift

day. Bodybuilding exercises are integrated into each day, focusing on the same muscle groups (i.e., on squat day, lunges are performed; on bench press day, triceps exercises are performed, etc.) (Cusano & Di Palma, 2019). Despite powerbuilding's popularity among gym-goers (Barbell Medicine, 2023; Bumgardner, 2021; Irizarry, 2023), there is a dearth of scientific literature describing its benefits, especially among women.

Given that powerbuilding builds strength and body functionality, it seems logical that powerbuilding might also increase women's and girls' empowerment in exercise. Therefore, this pilot study examined the effects of an eight-week powerbuilding intervention on women and girls' physical activity engagement and empowerment. The intervention was hypothesized to increase participants' physical activity and strength relative to baseline. The secondary study aims were to examine the intervention's effects on participants' empowerment in exercise, health, fitness, physical literacy, and ability to perform basic human movements. Similarly, these metrics were hypothesized to improve relative to baseline.

4.3 Methods

4.3.1 Experimental Approach to the Problem

This pilot study used a single-group repeated measures (pre/post) design to examine changes in physical activity, health (i.e., cardiovascular function, body composition, and waist circumference), fitness (i.e., three-repetition maximum [3-RM] attempts in the squat, bench press, and deadlift), basic human movement competencies (i.e., squat, lunge, hinge, push, pull, brace, and rotate), physical literacy, and empowerment in exercise. The intervention lasted eight weeks, including 24 one-hour workouts and an online educational component. All intervention workouts were structured similarly, including a standardized warm-up, workout instruction, and a

powerbuilding-based workout. The optional educational component was delivered online to reinforce concepts related to participants' feelings of empowerment in exercise.

4.3.2 Participants

Twenty women and girls aged 13-46 volunteered to participate in the study, which was approved by the (institute name blinded for review) institutional review board IRB#11380. Eighteen participants completed 80% of the study sessions and were included in the analysis. Informed assent/consent was obtained from all participants and their parents or guardians if they were under 18. Participants identified as female, were at least 13 years old, had no powerbuilding experience, were free from injury, passed the physical activity readiness screener (PAR-Q) (Warburton et al., 2020), and indicated availability for at least 19 (>80%) of the 24 study sessions. Participants were encouraged to enroll with an eligible friend or family member (i.e., in a dyad). However, participants who enrolled independently were placed into a dyad for the study's duration. Pairing individuals was deliberate and designed to encourage interpersonal-level empowerment constructs (e.g., accountability, competition, sense of community).

4.3.3 Procedures

Participants attended pre- and post-intervention testing sessions and exercise sessions supervised by trained professionals, with most coaches having one or more certifications: Certified Personal Trainer, CrossFit® Level 1 and 2 Coaches, and Certified Strength and Conditioning Specialist. Exercise sessions were held on Mondays, Wednesdays, and Fridays and focused on the squat, bench press, and deadlift. The first three sessions were familiarization sessions where participants completed each lift's initial 3-RM. The 3-RM attempts were completed on different days after comprehensive instruction for each movement (i.e., squat instruction and testing on the first day of the intervention, bench press on the second day, and deadlift on the third day). The

following 18 sessions were structured similarly and included a standardized warm-up, workout instruction, and a powerbuilding-based workout where primary lifts (i.e., squat, bench press, and deadlift) were followed by accessory lifts (i.e., lunge, push-up, ring row, side plank, etc.). Progressive overload, a fundamental resistance training principle shown to increase strength, was implemented following an undulating pattern where the primary lifts' tonnage varied from 1,080 to 2,080 (Colquhoun et al., 2017; Kraemer & Ratamess, 2004). An "as many reps as possible"-style repetition scheme for time was implemented for accessory lifts (e.g., one minute of push-ups followed by one minute of rest, repeated three times). Additional accessory exercises were added to the program in week four to ensure all participants exercised for the prescribed one-hour period.

Coaches and participants worked collaboratively to create an empowering, supportive environment. Coaches focused on helping participants improve their exercise technique and performance using positive and constructive feedback. Exercise execution with proper form was prioritized over lifting as heavy as possible, empowering participants to push beyond their comfort zones. At the same time, participants paired up at the intervention's onset and remained in the same pair throughout the intervention, creating trust and accountability. Participants worked together. One participant in the pair would spot the other, and then they would switch. The study's design was deliberate in this way, as we hoped working in pairs would provide encouragement and create a sense of community.

Additionally, the researchers created an educational component to complement the exercise intervention. The online educational component was available to participants via Canvas (Instructure, Salt Lake City, UT). It was designed by researchers trained in empowerment, and educational frameworks provide information about the physical and psychological benefits of resistance training. Topics included growth mindset, self-regulation, creating tiny habits, goal

setting, and more. A weekly discussion post allowed participants to reflect on each week's lessons in and outside the gym. Participants completed a knowledge check at the intervention's midpoint to gauge their interaction with the content. Content is summarized in Table 4.1.

Table 4.1. Overview of the optional educational component.

Intervention Week	Lesson 1	Lesson 2	Discussion Board Topic
Week 1	Overview and welcome.	Tracking your workouts.	While we have gotten to know each other briefly this week in the gym today, please tell us a little more about you. What is your name? Where are you from? What is your favorite food? Why did you sign up for the intervention? Anything else you want to share? Please share a time when you were scared or nervous to do something but did it in any way. It could be something involving an audience, sports, school, etc. It could be something small or big. What was it that made you nervous, and how were you able to go through with it?
Week 2	Why resistance training?	What is a growth mindset?	Reflecting on this week's topics, reflect on how you can change a specific physical activity behavior from negative to positive. For example, you may recall that increasing physical activity through active transport is beneficial, but maybe you don't like walking to and from class. You can change your mindset from "I don't like walking to class" to "Walking to class is good for me, and by walking, I am increasing my overall physical activity."
Week 3	Vacuuming is physical activity?	Why you should care about your mindset.	This week, we learned about how Tiny Habits can have a big impact on behavior change. If you are comfortable sharing, please tell us about a Tiny Habit you plan to implement. If not, please share your overall impression of Tiny Habits.
Week 4	Creating tiny habits.	Knowledge check.	This week, I want you to think about SMART goals and self-regulation to create two SMART goals: one for the end of the intervention and one for eight weeks later.
Week 5	Why SMART goals are so smart!	What is self-regulation?	This week, you learned about the importance of eating well. You also had the opportunity to focus on the mind-muscle connection in the gym. What do you think about the mind-muscle connection? When you focused your attention on the muscles as they fired, did you feel stronger? The same? Will you continue to use the mind-muscle connection throughout the intervention?
Week 6	Why nutrition matters.	The mind-muscle connection.	

Week 7	What is relapse?	Relapse prevention.	This week, we learned all about relapses and relapse prevention. I want you to think about the high-risk situations you are likely to encounter in the coming weeks or months. What are they? What plans can you have in place to deal with those situations? Please take a moment to reflect on the following: 1) What was your greatest success since starting the intervention? 2) What challenges have you faced that have been difficult to overcome? If you want to congratulate each other or have any suggestions for overcoming your peers' challenges, feel free to comment on each other's posts.
Week 8	Reconnecting with long-term goals.	Take home messages.	

4.3.3.1 Familiarization

The first week of the intervention was dedicated to familiarization and 3-RM testing for each primary lift. Three to five coaches were present at each session to facilitate the goal of having novice participants complete the 3-RM protocol. Each familiarization session included complete and thorough demonstrations of each lift and verbal instruction to ensure participants were comfortable performing the movement. On the squat testing day, five coaches worked with groups of four participants. Four performance points were emphasized (Glassman, 2016; Haff & Triplett, 2016), but as participants had never performed powerlifting, repetitions were counted even if the participant could not achieve all four performance points. They were: 1) the entire foot maintains contact with the ground, 2) the lumbar curve is maintained, 3) the knees track with or slightly in front of the toes, and 4) the hips descend below parallel. Three coaches worked with groups of six or seven on the bench press day. Five points of performance were emphasized, and most participants achieved them. The five performance points were: 1) the hands are placed slightly wider than shoulder width, 2) the head, shoulder blades, and buttocks maintain contact with the bench, and the feet maintain contact with the floor, 3) the elbows track closely to the body, 4) the bar contacts the chest, and 5) the bar is pressed straight back into the starting position (Glassman, 2016; Haff & Triplett, 2016). On the deadlift day, participants were divided into five groups and

worked with four coaches. Six performance points were emphasized: 1) the lumbar curve of the spine is maintained, 2) weight is placed in the heels, 3) the shoulders are slightly in front of the bar in the set-up, 4) the bar maintains contact with the legs during the movement, 5) the hips and shoulders rise at the same rate until the bar clears the knees, and 6) the hips are open, legs straight, and the chest is up at the top of the movement (Glassman, 2016; Haff & Triplett, 2016),.

4.3.4 Measures

Before the intervention began, all participants met with researchers to sign an informed consent/assent and complete the pre-intervention physical activity, health, physical literacy, and basic human movement competency measures. The intervention began approximately one week later, and 3-RM data were collected for the squat, bench press, and deadlift. During the last week of the intervention, final 3-RM data were collected. All participants were invited back to the lab the following week, where they completed the same measures from pre-intervention and the Empowerment in Exercise Scale.

4.3.4.1 Physical Activity

The Modifiable Activity Questionnaire (MAQ) is a self-reported assessment that records the frequency and duration of any physical activity participants engaged during the past seven days. Thirty-eight activities and an “other” activity space are listed. Each activity’s corresponding MET value is multiplied by weekly activity duration in hours. A total physical activity score is calculated by summing MET hours per week across all activities. To determine if an individual met the physical activity guidelines, the number of days the participant did muscle-strengthening activities (e.g., calisthenics/toning exercises, strength/weight training) was tallied, and then corresponding MET hours were subtracted from the total physical activity score. Activities with a corresponding value less than 3.0 were also subtracted from the total since light-intensity physical

activity does not count toward meeting the guidelines. The resulting value represented MET hours spent performing aerobic activity. Since 7.5 MET hours per week corresponds with 150 minutes of moderate to vigorous aerobic activity, individuals with scores ≥ 7.5 MET hours met the aerobic portion of the guidelines (Lee et al., 2010). If an individual indicated they participated in muscle-strengthening activities at least twice weekly, they met the muscle-strengthening portion. Participants who did ≥ 7.5 MET hours of aerobic activity and two more days of muscle-strengthening activities fully met the physical activity guidelines. The past week's MAQ is a valid and reliable measure of leisure time physical activity among women and adolescents (Petee Gabriel et al., 2011).

4.3.4.2 Health

Researchers recorded each participant's age, height, and body mass in the initial meeting. After participants removed their shoes, height was measured to the nearest centimeter using a Charder stadiometer (model H.M. 200P). Body mass, body fat percentage (BF%), fat mass (FM), and fat-free mass (FFM) were measured using a Tanita (TBE310) bioelectric impedance analysis (BIA) scale. Mass was measured in kilograms. The BIA equipment used in this study demonstrates strong concurrent validity when compared to DEXA (Rubiano et al., 2000), the gold standard (DEXA; $r = 0.94$; $p < 0.001$). Body mass index (BMI) was calculated according to standard procedures (Weir & Jan, 2022). Waist circumference was measured three times according to standard procedures (Heinrich et al., 2008) with a flexible tape to the nearest tenth of a centimeter and averaged. Cardiovascular function was assessed using an Omron BP78510 series monitor. Resting heart rate and blood pressure were measured after the participant had been seated comfortably for at least five minutes; the measurement was repeated three times, with one minute

between each according to standard procedures. The three measurements were averaged and recorded.

4.3.4.3 Physical Literacy

Researchers also administered the PLAYself questionnaire during the initial assessment. The PLAYself questionnaire is designed to evaluate self-perceptions of physical literacy in four sub-sections: environment, physical literacy self-description, relative ranking of literacies, and fitness (Canadian Sport for Life, 2018). The PLAYself was designed to measure physical literacy in children seven and older and is valid and reliable in children and adolescents. The physical literacy self-description subsection aims to determine self-efficacy related to participation in physical activity. It consists of 12 questions, scored on a four-point Likert scale (i.e., not at all true = 0, not usually true = 33, true = 67, and very true = 100); one question was reversed scored. The total score was out of 1200. Since no measure of physical literacy exists for adults, the 12-question physical literacy self-description subsection of the PLAYself questionnaire was adopted and scored according to standard procedures (Canadian Sport for Life, 2018). The physical literacy self-description subsection has been shown to have good reliability with moderate-to-strong item-total correlation among young adults (Kleis et al., 2022) and acceptable internal consistency in this study (pre-intervention $\alpha = 0.89$, post-intervention $\alpha = 0.71$). An additional question, “My level of fitness enables me to do all the activities I choose,” was piloted in the physical literacy questionnaire section as a stand-alone question, which was scored independently of the PLAYself questions but on the same scale (i.e., out of 100).

4.3.4.4 Basic Human Movement Competency

Movement competency was measured at both time points by assessing participants’ ability to complete a bodyweight squat, forward lunge, push-up (or modified push-up), suspended

bodyweight row, hinge, plank/brace, and standing rotation (Tompsett et al., 2014). Each movement was demonstrated before the participant was instructed to perform ten repetitions at both time points. The first five repetitions were video recorded from the front view, and the subsequent five were recorded from the side view with an Apple iPad. For the plank/brace movement, participants were instructed to hold the plank for as long as they could, and the time was recorded in seconds. Approximately 30 seconds of plank footage was recorded, and the front and side views were captured. An Apple iPad was used to record all participants. Three researchers with physiology and biomechanics expertise independently scored each movement from one (poor) to five (ideal), and all scores were added together to obtain a total score. The agreement among raters' pre-intervention scores was good, 0.85 (95% CI: 0.68-0.94). Post-intervention agreement was acceptable, 0.70 (95% CI: 0.34-0.88) (Koo & Li, 2016). The total scores were averaged to obtain each participant's total score. Assessment protocols and scoring criteria were conducted according to recommendations from previous research (Tompsett et al., 2015).

4.3.4.5 Empowerment in Exercise Scale

The Empowerment in Exercise Scale (EES) is a 13-item self-assessment used to assess physical education class outcomes (Moore & Fry, 2017). The EES aims to capture aspects of empowerment, such as individuals' perceptions of their ability to control and change their physical and psychological well-being and contextual transference (Moore & Fry, 2017). This scale has demonstrated strong internal consistency ($\alpha = 0.89$) in previous research (Moore & Fry, 2017) and in this study ($\alpha = 0.87$). The EES wording was modified slightly for our study. Originally, the EES asked, "As a result of participating in this physical education class," then asked 13 questions such as "...my confidence to do physical activities/exercises on my own has increased," and "...my knowledge of this activity has increased." For our study, we changed "physical education class"

to “exercise intervention” in the directions. The subsequent questions remained the same. The EES was answered on a five-point Likert scale ranging from 1 (does not describe my feelings) to 5 (clearly describes my feelings). The total score ranges from 5 to 65, where higher scores indicate more empowerment in exercise.

4.3.4.6 Strength Testing

Strength was tested using a 3-RM in the squat, bench press, and deadlift. All participants adhered to the following protocol after they became familiar with each lift at the familiarization session and again at the end of the intervention (week eight). A light warm-up weight was estimated (i.e., a weight the participant felt they could easily lift for 6-8 repetitions) and lifted for 6-8 repetitions. The participant rested for 2-4 minutes. A warm-up weight was estimated by adding 5-10% of the light warm-up weight and lifted for 5-7 repetitions. Participants rested for 3-5 minutes. A near maximum weight was estimated, again by adding 5-10% of the warm-up weight and lifted for 4-6 repetitions followed by 3-5 minutes of rest. Weight was increased again in the same fashion and lifted for 3 repetitions. If the attempt was successful, 5-10% of the previous attempt’s weight was added, and after 3-5 minutes, another 3-RM was attempted. If the attempt was unsuccessful, the weight was decreased by 2.5-5%, and after 3-5 minutes of rest, another 3-RM was attempted. The procedure continued until the participant could no longer lift the weight with proper form for three repetitions. This protocol was adapted from previous literature (Haff & Triplett, 2016).

4.3.4.7 Educational Component

Data were extracted from Canvas to gauge participants’ overall engagement with the online course content, including discussion board posts and knowledge check completion. Though

participation in the educational component was not required, 15 participants engaged with the educational content during the intervention.

4.3.5 Statistical Analysis

Data were analyzed in SPSS Version 27 (IBM, Armonk, NY). Means $\pm$ standard deviations were calculated for complete data. All data were screened for normality using the Shapiro-Wilk test (Mohd Razali & Bee Wah, 2011). Non-normally distributed data were analyzed with the Wilcoxon signed rank test, and normally distributed data were analyzed with paired-sample t-tests. The effect size was calculated, when possible (i.e., data were normally distributed) using Cohen's d according to the following: small ($d = 0.2$), medium ($d = 0.5$), and large ($d = 0.8$) (Lakens, 2013). Statistical significance was set at $p \leq 0.05$.

4.4 Results

Eighteen participants completed the intervention. Participants' average age was 25.1 ± 9.8 . Eleven participants indicated white ethnicity, three were multi-racial, two were Hispanic, Latina, or Spanish origin, one was black or African American, and one was American Indian. Education varied widely among participants. Twenty-two percent ($n = 4$) had less than a high school diploma, 11.1% ($n = 2$) had a high school degree or equivalent, 27.8% ($n = 5$) had some college but no degree, 5.6% ($n = 1$) had an associate degree, 16.7% ($n = 3$) had a bachelor's degree, 5.6% ($n = 1$) had a master's degree, 11.1% ($n = 2$) had a doctorate or professional degree. The majority (72.2%) of participants were single. Seven participants (38.9%) were students, one was self-employed, five (27.8%) were employed part-time (i.e., working up to 39 hours per week), and five (27.8%) were employed full-time (i.e., working 40+ hours per week).

4.4.1 Physical Activity

Participants' physical activity is shown in Table 4.2. Total physical activity increased significantly from pre- to post-intervention ($[t(17) = 3.52, p = 0.003, d = 0.83]$). Aerobic physical activity did not change significantly from pre- to post-intervention ($[Z = -0.23, p = 0.83]$). The percentage of participants who met the physical activity guidelines' aerobic and muscle-strengthening portions increased significantly from pre- to post-intervention ($Z = -3.32, p = 0.001$).

Table 4.2. Changes in physical activity (Mean $\pm$ SD).

Variable	Pre-Intervention (n = 18)	Post-Intervention (n = 18)	Effect Size (Cohen's <i>d</i>)
Total Physical Activity (MET Hours)	16.5 (10.3)	24.5 (8.0)**	0.83
Aerobic Activity (MET Hours)	11.8 (11.8)	10.7 (8.5)	--
Muscle-Strengthening Activity (Days)	0.83 (1.8)	3.0 (0.0)**	--
Meets Aerobic Portion Only (%)	50.0%	44.4%	--
Meets Muscle- Strengthening Only (%)	22.2%	100%	--
Meets Both	0%	44.4%**	--

** Significantly different from pre-intervention ($p < 0.01$).

4.4.2 Health Measures

Cardiovascular function (i.e., blood pressure and resting heart rate) did not change significantly from pre- to post-intervention (see Table 4.3). Paired-samples t-tests showed that participants' waist circumference significantly decreased from pre- to post-intervention ($[t(17) = 3.03, p = 0.008]$), where the intervention's effect size was large ($d = 0.72$). However, there were no other significant changes in height, weight, body fat percentage, or body mass index (see Table 4.3). Weight and BMI may have increased due to increased muscle mass among participants.

Table 4.3. Changes in health measures (Mean $\pm$ SD).

Variable	Pre-Intervention (n = 18)	Post-Intervention (n = 18)	Effect Size (Cohen's <i>d</i>)
Systolic Blood Pressure (mmHg)	110.7 (11.1)	109.6 (9.8)	0.13
Diastolic Blood Pressure (mmHg)	76.3 (9.4)	75.0 (8.5)	0.16
Resting Heart Rate (bpm)	82.4 (9.0)	79.7 (8.0)	0.36
Height (cm)	159.9 (6.4)	160.0 (6.1)	0.15
Weight (kg)	65.0 (16.8)	65.6 (16.8)	0.33
Body Fat (%)	29.4 (11.3)	29.4 (11.0)	0.01
Body Mass Index (kg/m ²)	25.3 (5.7)	25.5 (5.7)	0.33
Waist Circumference (cm)	78.3 (14.3)	75.5 (14.4) **	0.72

** Significantly different from pre-intervention ($p < 0.01$).

4.4.3 Physical Literacy

Physical literacy composite scores did not change significantly from pre- (741.8 ± 165.2) to post-intervention [784.5 ± 117.7 ; $t(17) = 1.85$, $p = 0.08$], but the intervention did elicit a small effect on physical literacy ($d = 0.44$). When questions were analyzed individually, a statistically significant change ($Z = -1.89$, $p = 0.05$) was observed for “Being active is important for my well-being,” thus demonstrating the intervention’s effect on participants’ perceptions of physical activity for well-being. Significant differences in participants’ pre- (53.4 ± 29.6) to post-intervention (61.2 ± 23.8) scores were not observed for the stand-alone question, “My level of fitness enables me to do all the activities I choose.” However, on average, this score increased ($Z = -1.50$, $p = 0.14$).

4.4.4 Basic Human Movements

Participants' basic human movement score improved significantly from pre- (24.3 ± 3.5) to post-intervention (29.5 ± 2.5 ; [$t(17) = 10.04$, $p < 0.001$; $d = 2.37$]), where participants' movement competence improved. Additionally, all participants significantly improved their plank hold time (measured in seconds) from pre- (67.3 ± 21.2) to post-intervention (82.4 ± 25.5 ; [$t(17) = 3.74$, $p = 0.002$; $d = 0.88$])

4.4.5 Empowerment in Exercise

On average, participants reported high exercise empowerment resulting from the intervention (56.3 ± 6.6). Scores on the EES ranged from 40 to 65, and six scores were over 60.

4.4.6 Strength Measures

Three-repetition maximums increased significantly for the squat ($Z = -3.73$, $p < 0.001$), bench press ($Z = -3.73$, $p < 0.001$), deadlift [$t(17) = 7.31$, $p < 0.001$; $d = 1.72$]), and three lift 3-RM total ($Z = -3.72$, $p < 0.001$) (see Table 4.4).

Table 4.4. Changes in 3-RM (Mean $\pm$ SD).

Variable	Pre-Intervention (n = 18)	Post-Intervention (n = 18)
Squat 3-RM (kg)	40.4 (22.6)	66.9 (16.9)***
Bench press 3-RM (kg)	29.8 (9.5)	36.2 (9.3)***
Deadlift 3-RM (kg)	55.7 (17.8)	75.9 (18.6)***
Three lift 3-RM total (kg)	125.9 (49.9)	179.0 (44.8)***

*** Significantly different from pre-intervention ($p < 0.001$).

4.4.7 Educational Component

Fifteen (83.3%) participants accepted the course invitation for the intervention's educational component. Three participants did not accept the course invitation despite completing the

intervention. Among the 15 who accepted the course invitation, the average time spent interacting with the course content across the eight weeks was 79.3 ± 307 minutes. Of the eight weekly discussion boards, week one was completed by 11 participants (61.1%), weeks two, three and four were completed by nine (50%), week five was completed by six (33.3%), weeks six and seven were completed by four (22.2%), and week eight was completed by five (27.8%). The average posting rate on discussion boards was 39.6%. The week four knowledge check was completed by eight participants (44.4%).

4.5 Discussion

This pilot study examined the effects of an eight-week powerbuilding intervention on women and girls' physical activity engagement and empowerment. The main findings reveal that participants significantly increased physical activity and 3-RM in the squat, bench press, deadlift, and the three lift 3-RM total, supporting our primary hypothesis. Notably, our powerbuilding intervention increased participants' muscle-strengthening days and the number of participants fully meeting the physical activity guidelines. Moreover, increasing the number of muscle-strengthening days did not significantly decrease participants' engagement in aerobic activity. Some elements of our second hypothesis were also supported. Participants reported high levels of empowerment in exercise, significantly improved movement competence, and an increased appreciation for the importance of being active in relation to well-being.

Physical activity increased, meeting the physical activity guidelines increased, and strength improved significantly in our study. While our structured program was designed to increase strength and physical activity, it is critical to note that the efficacy of physical activity interventions to increase physical activity is mixed (Plotnikoff et al., 2015). A recent meta-analysis revealed that total and vigorous physical activity did not increase significantly between intervention and control

groups post-intervention (Plotnikoff et al., 2015). Similarly, research examining a walking intervention's ability to increase physical activity found that only light-intensity physical activity behavior increased due to the intervention (Carlin et al., 2018). Given the evidence, we believe exercise modality, especially empowering exercise, is essential in increasing physical activity. Our participants signed up for a powerbuilding training program and were motivated to complete it despite having no experience. Our carefully constructed program addressed barriers to resistance training participation, such as powerbuilding. For example, we provided equipment and specific knowledge about powerbuilding, both factors that influence participation (Aasa et al., 2016; Fischer, 2005; Rhodes et al., 2017; Shurley et al., 2020). We addressed topics such as developing a growth mindset and self-efficacy in our educational component since both have been shown to influence resistance training and physical activity participation (Fischer, 2005; Shurley et al., 2020). While we cannot pinpoint with certainty why total physical activity increased in our study, our intervention supported participants to complete the muscle-strengthening portion of the guidelines. It seems likely that the empowering nature of powerbuilding participation combined with the educational component and a supportive intervention community promoted physical activity participation.

Participants in our study significantly increased the amount of weight they lifted and improved their basic human movement competency from pre- to post-intervention. We relied on evidence-based principles of resistance training to elicit training adaptations to increase strength (Colquhoun et al., 2017). Our results align with previous resistance training research aimed at increasing strength in untrained individuals (Colquhoun et al., 2017; Ratamess et al., 2009). For example, previous research in untrained individuals demonstrates improvements in the squat, bench press, deadlift, and three lifts total following nine weeks of traditional and flexible daily

undulating periodization (Colquhoun et al., 2017). Basic human movement competency and plank hold time improved significantly from pre- to post-intervention since the powerbuilding movement patterns practiced during the intervention are similar to the movements performed in the basic human movement tests (i.e., performing squats reinforces the movements pattern of the bodyweight squat, performing deadlifts reinforcing movement patterns of the hinge, etc.). These results suggest that powerbuilding improves overall movement competency. It should be noted that previous research describes basic human movement competency improvements following high-intensity functional training and weight training classes (Heinrich et al., 2023).

Previous research suggests that some forms of exercise are more empowering than others (reference blinded for review, 2023). Certainly, powerbuilding defies gender norms by promoting physical strength and muscular development. Similarly, previous research has shown that women's participation in exercise that is typically considered male-dominant is more empowering than exercise that is traditionally female-dominant (Doğusan & Koçak, 2021; Fernandez-Lasa et al., 2020; reference blinded for review, 2023; Walters & Hefferon, 2020). Although some work has explored the relationship between women's participation in strength-based sports and physical activity participation, this study adds insight into how powerbuilding and empowerment increase women and girls' physical activity and strength (Alleva & Tylka, 2021; Walters & Hefferon, 2020). Previous research has highlighted empowerment's multidimensional nature, noting that empowerment occurs at the individual, interpersonal, and community levels (Fawcett et al., 1995; Perkins & Zimmerman, 1995). The current study endeavored to foster empowerment among participants by providing personalized exercise training (based on pre-intervention 3-RM testing) to increase self-efficacy, autonomy, and motivation. The intervention's deliberate pairing of participants created accountability, competition, and a sense of community in a supportive

environment. Indeed, participants shared the common goal of increasing their physical activity through powerbuilding.

At the study's conclusion, participants reported high levels of empowerment in exercise. All participants improved their 3-RMs in the squat, bench press, and deadlift. These individual-level improvements in strength may be closely related to high levels of empowerment in exercise. Notably, the EES was completed after post-intervention strength testing. Therefore, we postulate that individual feelings of strength are related to empowerment in exercise. This line of thinking aligns with previous research that suggests that women's physical strength is closely related to feelings of empowerment (reference blinded for review., 2023; Walters & Hefferon, 2020). Moreover, we worked to create a sense of community through supportive coaching, dyadic and group training; a sense of community increases physical activity engagement (Warner et al., 2013).

4.5.1 Strengths and Limitations

Several strengths and limitations should be considered. To our knowledge, this is one of the first studies to rely on powerbuilding training to increase physical activity among women and girls. Study participants engaged in muscle-strengthening activities three times per week, which helped them meet the physical activity guidelines. We provided an educational component to help reinforce the benefits of physical activity while providing tools to overcome common barriers to physical activity. While engagement with the educational component could have been higher, the modules can be tested in future studies to promote empowerment and physical activity-related outcomes. Empowerment theory constructs guided the intervention, and participants shared that they appreciated our efforts to foster empowerment individually, among partners, and within the intervention community in the educational component's discussion boards. Our sample, encompassing women aged 13 to 46 from diverse demographic backgrounds, participated in the

study, making it relatively representative. We also had a low attrition rate (10%) and no reported injuries, which is notable for an applied exercise intervention. Lastly, our well-trained research team meticulously supervised and verified each workout session.

There were several limitations to the study. Our sample size, while representative, was small; only 18 women and girls completed the study. As a pilot study, a control group was not utilized. Physical activity was self-reported, which may have led to over- or under-reported physical activity behaviors. However, our data align with national-level data. Future studies should include objective measurements of physical activity. The empowerment in exercise scale is only designed to be used after an intervention. Thus, we were unable to measure changes in empowerment. Considerations to reduce participant burden may be considered study limitations. For example, the length of the intervention was limited to eight weeks, which may not have been long enough to elicit physiological exercise adaptations. We did not control participants' dietary and sleep habits, which could have affected our results. Lastly, we did not control for hormone fluctuations due to participants' menstrual cycles, which could have affected exercise capacity and performance. Future studies should explore strategies for minimizing participant burden while maximizing results.

4.5.2 Conclusion

This pilot study is the first to use powerbuilding to increase physical activity among women and girls. Our findings are significant considering how few women and girls meet the physical activity guidelines, especially the muscle-strengthening portion (Garcia-Hermoso et al., 2023; National Center for Health Statistics, 2019). It provides preliminary evidence demonstrating how involvement in powerbuilding improves health movement competencies and increases

empowerment. This study represents a first step toward developing powerbuilding exercise interventions grounded in theory to increase physical activity among women and girls.

4.6 References

- Aasa, U., Paulin, J., & Madison, G. (2016). Correspondence between physical self-concept and participation in, and fitness change after, biweekly body conditioning classes in sedentary women. *Journal of Strength and Conditioning Research*, 31(2), 451–461.
- Alleva, J. M., & Tylka, T. L. (2021). Body functionality: A review of the literature. *Body Image*, 36, 149–171. <https://doi.org/10.1016/j.bodyim.2020.11.006>
- American College of Sports Medicine. (2014). ACSM's guidelines for exercise testing and prescription (L. S. Pescatello, R. Arena, D. Riebe, & P. D. Thompson (eds.); 9th ed.). Lippincott Williams & Wilkens. <https://doi.org/10.1249/00005768-199110000-00024>
- Barbell Medicine. (2023). 3 best powerbuilding programs. <https://www.barbellmedicine.com/blog/best-powerbuilding-programs/>
- Bumgardner, T. (2021). Powerbuilding: Strength and size in one program. the ultimate 10-week powerbuilding workout routine for mass and strength. <https://www.bodybuilding.com/content/build-strength-and-size-with-powerbuilding.html>
- Canadian Sport for Life. (2018). PLAYself. Canadian Sport Institute. <https://play.physicalliteracy.ca/play-tools/playself/>
- Carlin, A., Murphy, M. H., Nevill, A., & Gallagher, A. M. (2018). Effects of a peer-led Walking In ScHools intervention (the WISH study) on physical activity levels of adolescent girls: A cluster randomised pilot study. *Trials*, 19(31), 1–12. <https://doi.org/10.1186/s13063-017-2415-4>
- Colquhoun, R. J., Gai, C. M., Walters, J., Brannon, A. R., Kilpatrick, M. W., D'Agostino, D. P., & Campbell, W. I. (2017). Comparison of powerlifting and performance in trained men using traditional and flexible daily undulating periodization. *Journal of Strength and Conditioning Research*, 31(2), 283–291.
- Cusano, P., & Di Palma, D. (2019). Training methodology in powerbuilding. *Sport Science*, 12(1), 31–35.
- Doğusan, S. N., & Koçak, F. (2021). Standing on the ice: Experiences of women national ice hockey players in Turkey. *Physical Culture and Sport, Studies and Research*, 89(1), 45–54. <https://doi.org/10.2478/pcssr-2021-0005>
- Fawcett, S. B., Paine-Andrews, A., Francisco, V. T., Schultz, J. A., Richter, K. P., Lewis, R. K., Williams, E. L., Harris, K. J., Berkley, J. Y., Fisher, J. L., & Lopez, C. M. (1995). Using empowerment theory in collaborative partnerships for community health and development. *American Journal of Community Psychology*, 23(5), 677–697. <https://doi.org/10.1007/BF02506987>

- Ferland, P.-M. M., & Comtois, A. S. (2019). Classic powerlifting performance: A systematic review. *Journal of Strength and Conditioning Research*, 33(7S), S194–S201.
<https://doi.org/10.1519/JSC.0000000000003099>
- Fernandez-Lasa, U., Usabiaga Arruabarrena, O., & Soler Prat, S. (2020). Juggling on the court: Exploring female Basque pelota players' experiences and empowerment strategies. *Journal of Gender Studies*, 29(5), 496–507.
<https://doi.org/10.1080/09589236.2019.1618703>
- Fischer, D. V. (2005). Strategies for improving resistance training adherence in female athletes. *Strength and Conditioning Journal*, 27(2), 62–67.
- Garcia-Hermoso, A., López-Gil, J. F., Ramírez-Vélez, R., Alonso-Martínez, A. M., Izquierdo, M., & Ezzatvar, Y. (2023). Adherence to aerobic and muscle-strengthening activities guidelines: A systematic review and meta-analysis of 3.3 million participants across 32 countries. *British Journal of Sports Medicine*, 57(4), 225–229.
<https://doi.org/10.1136/bjsports-2022-106189>
- Glassman, G. (2016). The CrossFit Level 1 training guide. *CrossFit Journal*, 3, 15–25.
http://library.crossfit.com/free/pdf/%0A%0ACFJ_English_Level1_TrainingGuide.pdf
- Gorzelitz, J., Trabert, B., Katki, H. A., Moore, S. C., Watts, E. L., & Matthews, C. E. (2022). Independent and joint associations of weightlifting and aerobic activity with all-cause, cardiovascular disease and cancer mortality in the Prostate, Lung, Colorectal and Ovarian Cancer Screening Trial. *British Journal of Sports Medicine*, bjsports-2021-105315.
<https://doi.org/10.1136/bjsports-2021-105315>
- Hackett, D. A. (2022). Training, supplementation, and pharmacological practices of competitive male bodybuilders across training phases. *Journal of Strength and Conditioning Research*, 36(4), 963–970. <https://doi.org/10.1519/JSC.0000000000003989>
- Haff, G. G., & Triplett, N. T. (2016). *Essentials of strength training and conditioning* (4th ed.). Human Kinetics Publishers, Inc.
- Heinrich, K. M., Beattie, C. M., Crawford, D. A., Stoecker, P., & George, J. (2023). Non-traditional physical education classes improve high school students' movement competency and fitness: A mixed-methods program evaluation study. *International Journal of Environmental Research and Public Health*, 20(10).
<https://doi.org/10.3390/ijerph20105914>
- Heinrich, K. M., Jitnarin, N., Suminski, R. R., Berkel, L. V., Hunter, C. M., Alvarez, L., Brundige, A. R., Peterson, A. L., Foreyt, J. P., Haddock, C. K., & Poston, W. S. C. (2008). Obesity classification in military personnel: A comparison of body fat, waist circumference, and body mass index measurements. *Military Medicine*, 173(1), 67–73.
<https://doi.org/10.7205/MILMED.173.1.67>

- Irizarry, J. (2023). Powerbuilding: The training method for size and strength. <https://breakingmuscle.com/powerbuilding/>
- Kitsuda, Y., Wada, T., Noma, H., Osaki, M., & Hagino, H. (2021). Impact of high-load resistance training on bone mineral density in osteoporosis and osteopenia: a meta-analysis. *Journal of Bone and Mineral Metabolism*, 39(5), 787–803. <https://doi.org/10.1007/s00774-021-01218-1>
- Kleis, R. R., Dlugonski, D., Baker, C. S., Hoch, J. M., & Hoch, M. C. (2022). Examining physical literacy in young adults: Psychometric properties of the PLAYself. *Applied Physiology, Nutrition and Metabolism*, 47(9), 926–932. <https://doi.org/10.1139/apnm-2022-0062>
- Koo, T. K., & Li, M. Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of Chiropractic Medicine*, 15(2), 155–163. <https://doi.org/10.1016/j.jcm.2016.02.012>
- Kraemer, W. J., & Ratamess, N. A. (2004). Fundamentals of resistance training: Progression and exercise prescription. *Medicine and Science in Sports and Exercise*, 36(4), 674–688. <https://doi.org/10.1249/01.MSS.0000121945.36635.61>
- Lakens, D. (2013). Calculating and reporting effect sizes to facilitate cumulative science: A practical primer for t-tests and ANOVAs. *Frontiers in Psychology*, 4(NOV), 1–12. <https://doi.org/10.3389/fpsyg.2013.00863>
- Lee, I. M., Djoussé, L., Sesso, H. D., Wang, L., & Buring, J. E. (2010). Physical activity and weight gain prevention. *Jama*, 303(12), 1173–1179. <https://doi.org/10.1001/jama.2010.312>
- Liechty, T., Willfong, F., & Sveinson, K. (2016). Embodied experiences of empowerment among female tackle football players. *Sociology of Sport Journal*, 33(4), 305–316. <https://doi.org/10.1123/ssj.2015-0149>
- Mayoh, J., Jones, I., & Prince, S. (2020). Women’s experiences of embodied identity through active leisure. *Leisure Sciences*, 42(2), 170–184. <https://doi.org/10.1080/01490400.2018.1458668>
- Mohd Razali, N., & Bee Wah, Y. (2011). Power comparisons of Shapiro-Wilk, Kolmogorov-Smirnov, Lilliefors and Anderson-Darling tests. *Journal of Statistical Modeling and Analytics*, 2(1), 13–14.
- Moore, E. W. G., & Fry, M. D. (2017). Physical education students’ ownership, empowerment, and satisfaction with PE and physical activity. *Research Quarterly for Exercise and Sport*, 88(4), 468–478. <https://doi.org/10.1080/02701367.2017.1372557>
- National Center for Health Statistics. (2019). Table 25, Participation in leisure-time aerobic and muscle-strengthening activities that meet the federal 2008 Physical Activity Guidelines

- for Americans among adults aged 18 and over, by selected characteristics: United States, selected years 1998–2018. United States Health, 2019.
<https://www.ncbi.nlm.nih.gov/books/NBK569311/table/ch3.tab25/>
- Perkins, D. D., & Zimmerman, M. A. (1995). Empowerment theory, research, and application. *American Journal of Community Psychology*, 23(5), 569–579.
<https://doi.org/10.1007/BF02506982>
- Pettee Gabriel, K., McClain, J. J., Schmid, K. K., Storti, K. L., & Ainsworth, B. E. (2011). Reliability and convergent validity of the past-week Modifiable Activity Questionnaire. *Public Health Nutrition*, 14(3), 435–442. <https://doi.org/10.1017/S1368980010002612>
- Piercy, K. L., Troiano, R. P., Ballard, R. M., Carlson, S. A., Fulton, J. E., Galuska, D. A., George, S. M., & Olson, R. D. (2018). The physical activity guidelines for Americans. *JAMA - Journal of the American Medical Association*, 320(19), 2020–2028.
<https://doi.org/10.1001/jama.2018.14854>
- Plotnikoff, R. C., Costigan, S. A., Williams, R. L., Hutchesson, M. J., Kennedy, S. G., Robards, S. L., Allen, J., Collins, C. E., Callister, R., & Germov, J. (2015). Effectiveness of interventions targeting physical activity, nutrition and healthy weight for university and college students: A systematic review and meta-analysis. *International Journal of Behavioral Nutrition and Physical Activity*, 12(1), 1–10. <https://doi.org/10.1186/s12966-015-0203-7>
- Ratamess, N. A., Alvar, B. A., Evetoch, T. K., Housh, T. J., Kibler, W. Ben, Kraemer, W. J., & Triplett, N. T. (2009). American College of Sports Medicine position stand: Progression models in resistance training for healthy adults. *Medicine and Science in Sports and Exercise*, 41(3), 687–708. <https://doi.org/10.1249/MSS.0b013e3181915670>
- Rhodes, R. E., Lubans, D. R., Karunamuni, N., Kennedy, S., & Plotnikoff, R. (2017). Factors associated with participation in resistance training: A systematic review. *British Journal of Sports Medicine*, 51(20), 1466–1472. <https://doi.org/10.1136/bjsports-2016-096950>
- Rubiano, F., Nuñez, C., & Heymsfield, S. B. (2000). A comparison of body composition techniques. *Annals of the New York Academy of Sciences*, 904, 335–338.
<https://doi.org/10.1111/j.1749-6632.2000.tb06477.x>
- Rundio, A., Dixon, M. A., & Heere, B. (2020). “I’m a completely different person now”: Extraordinary experiences and personal transformations in sport. *Sport Management Review*, 23(4), 704–718. <https://doi.org/10.1016/j.smr.2019.09.004>
- Shurley, J., Felkar, V., Greviskes, L., & Todd, J. (2020). Historical and social considerations of strength training for female athletes. *Strength and Conditioning Journal*, 00(00), 1–14.
- Tompsett, C., Burkett, B., & McKean, M. R. (2014). Development of physical literacy and movement competency: A literature review. *Journal of Fitness Research*, 3(2), 53–79.

- Tompsett, C., Burkett, B., & McKean, M. R. (2015). Comparing performances of fundamental movement skills and basic human movements: A pilot study. *Journal of Fitness Research*, 4(3), 13–26.
- United Nations General Assembly. (2015). Transforming our world: The 2030 Agenda for Sustainable Development. <https://www.un.org/sustainabledevelopment/>
- Walters, R., & Hefferon, K. (2020). ‘Strength becomes her’—resistance training as a route to positive body image in women. *Qualitative Research in Sport, Exercise and Health*, 12(3), 446–464. <https://doi.org/10.1080/2159676X.2019.1634127>
- Warburton, D., Jamnik, V., Bredin, S., & Gledhill, N. (2020). 2020 Par-Q +. *Health & Fitness Journal of Canada*, 2(38), 4–7. http://eparmedx.com/?page_id=79
- Warner, S., Kerwin, S., & Walker, M. (2013). Examining sense of community in sport: Developing the multidimensional “SCS” scale. *Journal of Sport Management*, 27, 349–362. <https://doi.org/10.1123/jsm.27.5.349>
- Weir, C., & Jan, A. (2022). BMI classification percentile and cut-off points. StatPearls. <https://www.ncbi.nlm.nih.gov/books/NBK541070/>
- Westcott, W. L. (2012). Resistance training is medicine: Effects of strength training on health. *Current Sports Medicine Reports*, 11(4), 209–216. <https://doi.org/10.1249/JSR.0b013e31825dabb8>

Chapter 5 – Conclusion

5.1 Summary of Findings

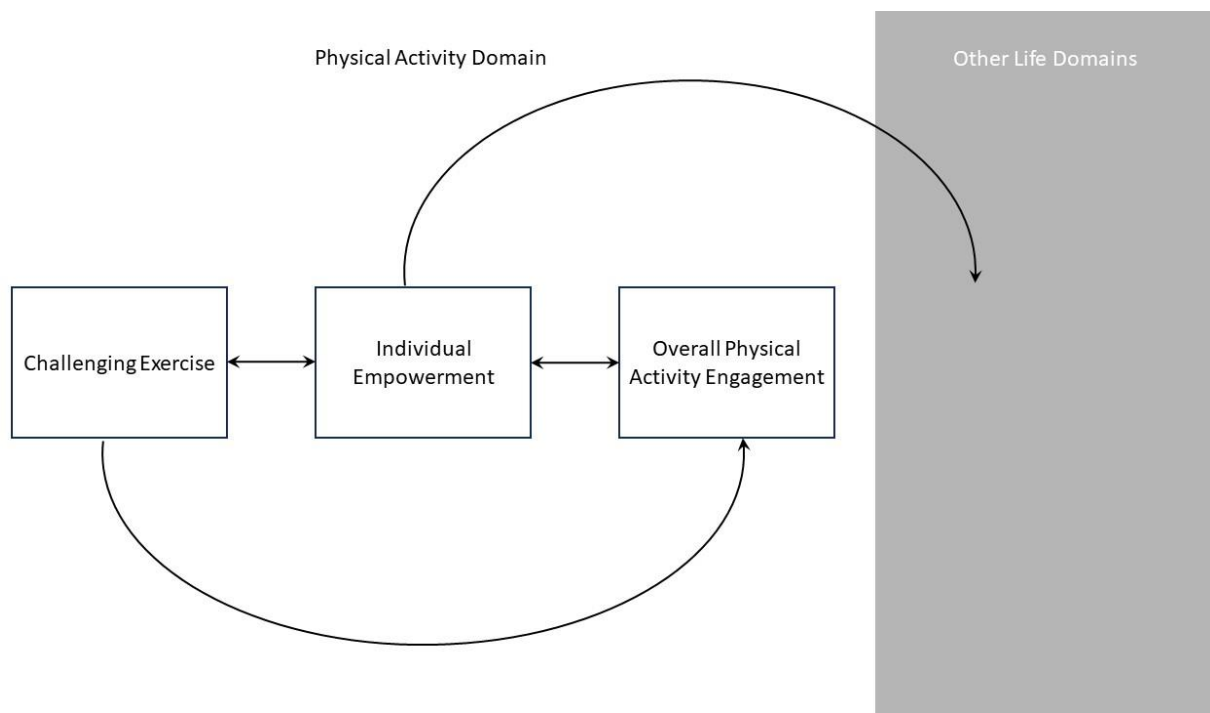
The studies presented in this dissertation aimed to 1) understand how women's empowerment is defined and measured in physical activity and exercise, 2) determine if some forms of exercise are more empowering than others, 3) explore the relationship between self-rated empowering exercise types, exercise engagement, and exercise self-efficacy, and 4) explore the effects of an eight-week powerbuilding intervention on women's physical activity engagement, strength, and empowerment. Overall, empowerment is critical in fostering gender equality by providing individuals, particularly women, with the tools, resources, and opportunities to fully participate in social, economic and political life. Sport has been shown to develop feelings of empowerment, but defining and measuring it remains difficult. However, by clearly operationalizing empowerment's definition, it is possible to determine the characteristics of empowering physical activity and exercise. Physical activity and exercise that creates a sense of accomplishment and promote self-efficacy are more empowering than physical activity and exercise that does not. Feeling strong is also linked to feelings of empowerment. Resistance training-related activities tend to increase women's feelings of empowerment. Participation in powerbuilding, a form of resistance training, for eight weeks significantly increased women's strength and physical activity engagement resulting in feelings of empowerment.

5.2 Explanation of Results

Figure 5.1 visually represents this dissertation's primary findings. The bidirectional arrows indicate a dynamic and ongoing interaction between challenging exercise and individual empowerment, and individual empowerment and overall physical activity engagement.

Participation in challenging exercise is related to overall physical activity engagement. Lastly, individual empowerment nurtured through physical activity spills over into other domains. For example, one participant in this dissertation's second study described how her participation in resistance training gave her the confidence to live alone. Past studies align with this perspective. Indeed, previous research has demonstrated that participation in physical activity, exercise, and sports traditionally regarded as male-dominant increases women's feelings of empowerment (Doğusan & Koçak, 2021; Fernandez-Lasa et al., 2020; Streetman et al., 2023; Walters & Hefferon, 2020b). However, this dissertation expands on previous research by exploring the relationship between empowering physical activity and exercise and subsequent engagement in physical activity. It also describes how empowering physical activity and exercise elicit empowerment in other life domains.

Figure 5.1. Conceptual model depicting the relationships between individual empowerment and physical activity engagement.



5.3 Strengths and Limitations

There are several strengths of this dissertation research. Various methodological strategies were implemented to encourage a nuanced understanding of empowerment, physical activity, and women's engagement in physical activity. This dissertation's first study was a comprehensive narrative review that employed a broad search strategy and complied with SANRA standards (Baethge et al., 2019). An explanatory sequential mixed-methods strategy was deployed in the second study. The study's survey portion utilized validated tools and had 147 participants. The interview portion of the study achieved data saturation with 17 participants and provided rich details that complemented the survey data. Lastly, the final study presented in this dissertation was an applied exercise intervention using a novel and empowering exercise modality: powerbuilding. It was a comprehensive intervention, including an educational component, and was carried out by trained exercise professionals who validated exercise session results. Empowerment was nurtured by coaches and participants alike. Coaches ensured participants exercised safely but with a focus on performance ensuring exercise was challenging, and participants were paired from the study's onset to create trust and accountability. This collaborative, task-based approach fostered individual and community empowerment.

However, this research has some limitations which should be noted. The narrative review was limited to English language publications and did not assess the quality of articles selected for review. The second study, with a relatively large sample size, was predominantly white and well-educated; thus, it was not representative. As a cross-sectional study, it is impossible to determine causality since only a snapshot of participants' experiences was captured. The final study's limitations include a small sample size and a lack of a control group. The intervention's length may not have been adequate to elicit changes in physiological metrics such as body composition and

blood pressure. We could not control for dietary and sleep habits or hormone fluctuations due to participants' menstrual cycles. Lastly, engagement with the intervention's online educational component could have been higher. This dissertation's second and third studies both relied on self-reported physical activity data, which is a limitation; however, using self-reported physical activity is commonplace in physical activity research (Loney et al., 2011).

5.4 Future Directions

This dissertation highlights several areas for future research. Developing a measurement tool that captures changes in empowerment facilitated by sport, physical activity, and exercise through expert consensus, pilot testing, and reliability testing is required. This tool should be deployable at multiple intervention time points for robust statistical testing. Powerbuilding is poorly defined in scientific literature despite being a popular form of resistance training-based exercise. A comprehensive literature review focused on contemporary training practices of regular gym-goers should be initiated to examine and understand how powerbuilding fits into the scientific literature while identifying gaps and contradictions. Clearly defining powerbuilding will help lend credibility to its application in exercise interventions. Refining the educational component implemented in this dissertation's final study to create an empowerment mindset training program combined within exercise sessions to increase physical activity engagement and adherence among women is another area for future research. Ultimately, randomized controlled trials must examine how to increase empowerment and subsequent physical activity engagement best.

References – Chapters 1 and 5

- Aasa, U., Paulin, J., & Madison, G. (2016). Correspondence between physical self-concept and participation in, and fitness change after, biweekly body conditioning classes in sedentary women. *Journal of Strength and Conditioning Research*, 31(2), 451–461.
- Atherton, P. J., & Smith, K. (2012). Muscle protein synthesis in response to nutrition and exercise. *Journal of Physiology*, 590(5), 1049–1057.
<https://doi.org/10.1113/jphysiol.2011.225003>
- Baethge, C., Goldbeck-Wood, S., & Mertens, S. (2019). SANRA—a scale for the quality assessment of narrative review articles. *Research Integrity and Peer Review*, 4(1), 2–8.
<https://doi.org/10.1186/s41073-019-0064-8>
- Ball, R., & Weidman, D. (2018). Analysis of USA Powerlifting Federation data from January 1, 2012–June 11, 2016. *Journal of Strength and Conditioning Research*, 32(7), 1843–1851.
- Barbell Medicine. (2023). *3 best powerbuilding programs*.
<https://www.barbellmedicine.com/blog/best-powerbuilding-programs/>
- Boly, J., & Dickson, J. (2023). *The ultimate 10-week powerbuilding workout routine for mass and strength*. <https://barbend.com/powerbuilding-workout-routine/>
- Bumgardner, T. (2021). *Powerbuilding: Strength and size in one program*.
<https://www.bodybuilding.com/content/build-strength-and-size-with-powerbuilding.html>
- Cattaneo, L. B., Calton, J. M., & Brodsky, A. E. (2014). Status quo versus status quake: Putting the power back in empowerment. *Journal of Community Psychology*, 42(4), 433–446.
<https://doi.org/10.1002/jcop.21619>
- Cattaneo, L. B., & Chapman, A. R. (2010). The process of empowerment: A model for use in research and practice. *American Psychologist*, 65(7), 646–659.
<https://doi.org/10.1037/a0018854>
- Christens, B. D. (2012). Toward relational empowerment. *American Journal of Community Psychology*, 50(1–2), 114–128. <https://doi.org/10.1007/s10464-011-9483-5>
- Coen, S. E., Rosenberg, M. W., & Davidson, J. (2018). “It’s gym, like g-y-m not J-i-m”: Exploring the role of place in the gendering of physical activity. *Social Science and Medicine*, 196(October 2017), 29–36. <https://doi.org/10.1016/j.socscimed.2017.10.036>
- Cole, A. N., & Ullrich-French, S. (2017). Exploring empowerment for sexual assault victims in women’s only group fitness. *Women in Sport and Physical Activity Journal*, 25(2), 96–104.
<https://doi.org/10.1123/wspaj.2016-0005>
- Cusano, P., & Di Palma, D. (2019). Training methodology in powerbuilding. *Sport Science*,

12(1), 31–35.

Deem, R., & Gilroy, S. (1998). Physical activity, life-long learning and empowerment - Situating sport in women's leisure. *Sport, Education and Society*, 3(1), 89–104.
<https://doi.org/10.1080/1357332980030106>

Doğusan, S. N., & Koçak, F. (2021). Standing on the ice: Experiences of women national ice hockey players in Turkey. *Physical Culture and Sport, Studies and Research*, 89(1), 45–54.
<https://doi.org/10.2478/pcssr-2021-0005>

Ferland, P.-M. M., & Comtois, A. S. (2019). Classic powerlifting performance: A systematic review. *Journal of Strength and Conditioning Research*, 33(7S), S194–S201.
<https://doi.org/10.1519/JSC.0000000000003099>

Fernandez-Lasa, U., Usabiaga Arruabarrena, O., & Soler Prat, S. (2020). Juggling on the court: Exploring female Basque pelota players' experiences and empowerment strategies. *Journal of Gender Studies*, 29(5), 496–507. <https://doi.org/10.1080/09589236.2019.1618703>

Fischer, D. V. (2005). Strategies for improving resistance training adherence in female athletes. *Strength and Conditioning Journal*, 27(2), 62–67.

Fletcher, G. F., Landolfo, C., Niebauer, J., Ozemek, C., Arena, R., & Lavie, C. J. (2018). Promoting physical activity and exercise. *Journal of the American College of Cardiology*, 72(14), 1622–1639. <https://doi.org/10.1016/j.jacc.2018.08.2141>

González-Ruíz, K., Correa-Bautista, J. E., Izquierdo, M., García-Hermoso, A., Dominguez-Sanchez, M. A., Bustos-Cruz, R. H., García-Prieto, J. C., Martínez-Vizcaíno, V., Lobelo, F., González-Jiménez, E., Prieto-Benavides, D. H., Tordecilla-Sanders, A., Schmidt-RioValle, J., Perez, G., & Ramírez-Vélez, R. (2018). Effects of an exercise program on hepatic metabolism, hepatic fat, and cardiovascular health in overweight/obese adolescents from Bogotá, Colombia (the HEPAFIT study): Study protocol for a randomized controlled trial. *Trials*, 19(330), 1–16. <https://doi.org/10.1186/s13063-018-2721-5>

Gorzelitz, J., Trabert, B., Katki, H. A., Moore, S. C., Watts, E. L., & Matthews, C. E. (2022). Independent and joint associations of weightlifting and aerobic activity with all-cause, cardiovascular disease and cancer mortality in the Prostate, Lung, Colorectal and Ovarian Cancer Screening Trial. *British Journal of Sports Medicine*, bjsports-2021-105315.
<https://doi.org/10.1136/bjsports-2021-105315>

Gram, L., Morrison, J., & Skordis-Worrall, J. (2018). Organising concepts of 'women's empowerment' for measurement: A typology. In *Social Indicators Research* (Vol. 143, Issue 3, pp. 1349–1376).

Hackett, D. A. (2022). Training, supplementation, and pharmacological practices of competitive male bodybuilders across training phases. *Journal of Strength and Conditioning Research*, 36(4), 963–970. <https://doi.org/10.1519/JSC.0000000000003989>

- Hagstrom, A. D., Marshall, P. W., Halaki, M., & Hackett, D. A. (2020). The effect of resistance training in women on dynamic strength and muscular hypertrophy: A systematic review with meta-analysis. *Sports Medicine*, 50(6), 1075–1093. <https://doi.org/10.1007/s40279-019-01247-x>
- Hruby, A., Manson, J. A. E., Qi, L., Malik, V. S., Rimm, E. B., Sun, Q., Willett, W. C., & Hu, F. B. (2016). Determinants and consequences of obesity. *American Journal of Public Health*, 106(9), 1656–1662. <https://doi.org/10.2105/AJPH.2016.303326>
- Hurley, K. S., Flippin, K. J., Blom, L. C., Bolin, J. E., Hoover, D. L., & Judge, L. W. (2018). Practices, perceived benefits, and barriers to resistance training among women enrolled in college. *International Journal of Exercise Science*, 11(5), 226–238. <http://www.ncbi.nlm.nih.gov/pubmed/29795737> <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC5955292>
- Irizarry, J. (2023). *Powerbuilding: The training method for size and strength*. <https://breakingmuscle.com/powerbuilding/>
- Kelley, C. P., Sbrocco, G., & Sbrocco, T. (2016). Behavioral modification for the management of obesity. *Primary Care - Clinics in Office Practice*, 43(1), 159–175. <https://doi.org/10.1016/j.pop.2015.10.004>
- Kitsuda, Y., Wada, T., Noma, H., Osaki, M., & Hagino, H. (2021). Impact of high-load resistance training on bone mineral density in osteoporosis and osteopenia: a meta-analysis. *Journal of Bone and Mineral Metabolism*, 39(5), 787–803. <https://doi.org/10.1007/s00774-021-01218-1>
- Kohl, H. W., Craig, C. L., Lambert, E. V., Inoue, S., Alkandari, J. R., Leetongin, G., Kahlmeier, S., Andersen, L. B., Bauman, A. E., Blair, S. N., Brownson, R. C., Bull, F. C., Ekelund, U., Goenka, S., Guthold, R., Hallal, P. C., Haskell, W. L., Heath, G. W., Katzmarzyk, P. T., ... Wells, J. C. (2012). The pandemic of physical inactivity: Global action for public health. *The Lancet*, 380(9838), 294–305. [https://doi.org/10.1016/S0140-6736\(12\)60898-8](https://doi.org/10.1016/S0140-6736(12)60898-8)
- Lee, I. M., Shiroma, E. J., Lobelo, F., Puska, P., Blair, S. N., Katzmarzyk, P. T., Alkandari, J. R., Andersen, L. B., Bauman, A. E., Brownson, R. C., Bull, F. C., Craig, C. L., Ekelund, U., Goenka, S., Guthold, R., Hallal, P. C., Haskell, W. L., Heath, G. W., Inoue, S., ... Wells, J. C. (2012). Effect of physical inactivity on major non-communicable diseases worldwide: An analysis of burden of disease and life expectancy. *The Lancet*, 380(9838), 219–229. [https://doi.org/10.1016/S0140-6736\(12\)61031-9](https://doi.org/10.1016/S0140-6736(12)61031-9)
- Lindqvist, A. K., Mikaelsson, K., Westerberg, M., Gard, G., & Kostenius, C. (2014). Moving from idea to action: Promoting physical activity by empowering adolescents. *Health Promotion Practice*, 15(6), 812–818. <https://doi.org/10.1177/1524839914535777>
- Lloyd, K., & Little, D. E. (2010). Self-determination theory as a framework for understanding

- women's psychological well-being outcomes from leisure-time physical activity. *Leisure Sciences*, 32(4), 369–385. <https://doi.org/10.1080/01490400.2010.488603>
- Loney, T., Standage, M., Thompson, D., Sebire, S. J., & Cumming, S. (2011). Self-report vs. objectively assessed physical activity: Which is right for public health? *Journal of Physical Activity and Health*, 8(1), 62–70. <https://doi.org/10.1123/jpah.8.1.62>
- Mailey, E. L., Huberty, J., Dinkel, D., & McAuley, E. (2014). Physical activity barriers and facilitators among working mothers and fathers. *BMC Public Health*, 14(1), 1–9. <https://doi.org/10.1186/1471-2458-14-657>
- Mansoubi, M., Pearson, N., Biddle, S. J. H., & Clemen, S. (2014). The relationship between sedentary behaviour and physical activity in adults: A systematic review. *Preventive Medicine*, 69, 28–35. <https://doi.org/10.1016/j.ypmed.2014.08.028>
- Maschi, T., Turner, S., & Kaye, A. (2021). Empowerment theory. In *Theoretical Perspectives for Direct Social Work: A Generalist-Eclectic Approach* (pp. 275–297). Springer International Publishing.
- McGlashan, A., Capp, D., & Anderson, K. (2020). Older adults' experiences and perspectives of a powerlifting program 'Never Too Late' in regional Victoria and the associated impacts on biopsychosocial outcomes. *Gerontology & Geriatrics: Research*, 6(2), 1–11.
- Moreno, J. P., & Johnston, C. A. (2014). Barriers to physical activity in women. *American Journal of Lifestyle Medicine*, 8(3), 164–166. <https://doi.org/10.1177/1559827614521954>
- Mosedale, S. (2005). Assessing women's empowerment: Towards a conceptual framework. *Journal of International Development*, 17(2), 243–257. <https://doi.org/10.1002/jid.1212>
- National Center for Health Statistics. (2019). *Table 25, Participation in leisure-time aerobic and muscle-strengthening activities that meet the federal 2008 Physical Activity Guidelines for Americans among adults aged 18 and over, by selected characteristics: United States, selected years 1998–2018*. United States Health, 2019. <https://www.ncbi.nlm.nih.gov/books/NBK569311/table/ch3.tab25/>
- Office of Disease Prevention and Health Promotion. (2020). *Physical activity*. Healthy People 2020. <https://www.healthypeople.gov/2020/topics-objectives/topic/physical-activity/objectives#5072>
- Pedersen, B. K., & Saltin, B. (2015). Exercise as medicine: Evidence for prescribing exercise as therapy in 26 different chronic diseases. *Scandinavian Journal of Medicine and Science in Sports*, 25(Suppl. 3), 1–72. <https://doi.org/10.1111/sms.12581>
- Pedersen, M. R. L., Hansen, A. F., & Elmoose-østerlund, K. (2021). Motives and barriers related to physical activity and sport across social backgrounds: Implications for health promotion. *International Journal of Environmental Research and Public Health*, 18(11).

<https://doi.org/10.3390/ijerph18115810>

- Perkins, D. D., & Zimmerman, M. A. (1995). Empowerment theory, research, and application. *American Journal of Community Psychology*, 23(5), 569–579. <https://doi.org/10.1007/BF02506982>
- Rawlett, K. (2014). Journey from self-efficacy to empowerment. *Health Care*, 2(1), 1. <https://doi.org/10.12966/hc.02.01.2014>
- Rhodes, R. E., Lubans, D. R., Karunamuni, N., Kennedy, S., & Plotnikoff, R. (2017). Factors associated with participation in resistance training: A systematic review. *British Journal of Sports Medicine*, 51(20), 1466–1472. <https://doi.org/10.1136/bjsports-2016-096950>
- Richardson, R. A. (2018). Measuring women’s empowerment: A critical review of current practices and recommendations for researchers. *Social Indicators Research*, 137(2), 539–557. <https://doi.org/10.1007/s11205-017-1622-4>
- Sauter, A., Herbert-Maul, A., Abu-Omar, K., Thiel, A., Ziemainz, H., Frahsa, A., Linder, S., & Herrmann-Johns, A. (2022). “For me, it’s just a piece of freedom”—Increased empowerment through physical activity promotion among socially disadvantaged women. *Frontiers in Public Health*, 10. <https://doi.org/10.3389/fpubh.2022.867626>
- Schuch, F. B., & Vancampfort, D. (2021). Physical activity, exercise, and mental disorders: It is time to move on. *Trends in Psychiatry and Psychotherapy*, 43(3), 177–184. <https://doi.org/10.47626/2237-6089-2021-0237>
- Shurley, J., Felkar, V., Greviskes, L., & Todd, J. (2020). Historical and social considerations of strength training for female athletes. *Strength and Conditioning Journal*, 00(00), 1–14.
- Sianipar, C. P. M., Yudoko, G., Adhiutama, A., & Dowaki, K. (2013). Community empowerment through appropriate rechnology: Sustaining the sustainable development. *Procedia Environmental Sciences*, 17, 1007–1016. <https://doi.org/10.1016/j.proenv.2013.02.120>
- Smith, G. S. E., Moyle, W., & Burton, N. W. (2023). The relationship between social support for physical activity and physical activity across nine years in adults aged 60–65 years at baseline. *International Journal of Environmental Research and Public Health*, 20(5). <https://doi.org/10.3390/ijerph20054531>
- Streetman, A. E., Lister, M. M., Brown, A., Brin, H. N., & Heinrich, K. M. (2023). A mixed-methods study of women’s empowerment through physical activities: Relationships with self-efficacy and physical activity levels. *Journal of Functional Morphology and Kinesiology*, 8(3), 118. <https://doi.org/10.3390/jfmk8030118>
- Stronach, M., Maxwell, H., & Pearce, S. (2019). Indigenous Australian women promoting health through sport. *Sport Management Review*, 22(1), 5–20.

<https://doi.org/10.1016/j.smr.2018.04.007>

- Subandi, M. A., Nihayah, M., Marchira, C. R., Tyas, T., Marastuti, A., Pratiwi, R., Mediola, F., Herdiyanto, Y. K., Sari, O. K., Good, M. J. D., & Good, B. J. (2023). The principles of recovery-oriented mental health services: A review of the guidelines from five different countries for developing a protocol to be implemented in Yogyakarta, Indonesia. *PLoS ONE*, 18(3 March), 1–16. <https://doi.org/10.1371/journal.pone.0276802>
- United Nations General Assembly. (2015). *Transforming our world: The 2030 Agenda for Sustainable Development*. <https://www.un.org/sustainabledevelopment/>
- Walters, R., & Hefferon, K. (2020a). ‘Strength becomes her’—resistance training as a route to positive body image in women. *Qualitative Research in Sport, Exercise and Health*, 12(3), 446–464. <https://doi.org/10.1080/2159676X.2019.1634127>
- Walters, R., & Hefferon, K. (2020b). ‘Strength becomes her’ – resistance training as a route to positive body image in women. *Qualitative Research in Sport, Exercise and Health*, 12(3), 446–464. <https://doi.org/10.1080/2159676X.2019.1634127>
- Warner, S., Kerwin, S., & Walker, M. (2013). Examining sense of community in sport: Developing the multidimensional “SCS” scale. *Journal of Sport Management*, 27(5), 349–362. <https://doi.org/10.1123/jsm.27.5.349>
- Washington, M. S., & Economides, M. (2016). Strong is the new sexy: Women, CrossFit, and the postfeminist ideal. *Journal of Sport and Social Issues*, 40(2), 143–161. <https://doi.org/10.1177/0193723515615181>
- Watson, S. L., Weeks, B. K., Weis, L. J., Harding, A. T., Horan, S. A., & Beck, B. R. (2018). High-intensity resistance and impact training improves bone mineral density and physical function in postmenopausal women with osteopenia and osteoporosis: The LIFTMOR randomized controlled trial. *Journal of Bone and Mineral Research*, 33(2), 211–220. <https://doi.org/10.1002/jbmr.3284>
- Westcott, W. L. (2012). Resistance training is medicine: Effects of strength training on health. *Current Sports Medicine Reports*, 11(4), 209–216. <https://doi.org/10.1249/JSR.0b013e31825dabb8>
- World Health Organization. (2010). *Global recommendations on physical activity for health*. <https://doi.org/10.1192/bjp.112.483.211-a>
- Zenko, Z., Willis, E. A., & White, D. A. (2019). Proportion of adults meeting the 2018 physical activity guidelines for Americans according to accelerometers. *Frontiers in Public Health*, 7(JUN). <https://doi.org/10.3389/fpubh.2019.00135>
- Zimmerman, M. A., Israel, B. A., Schulz, A., & Checkoway, B. (1992). Further explorations in empowerment theory: An empirical analysis of psychological empowerment. *American*

Journal of Community Psychology, 20(6), 707–727. <https://doi.org/10.1007/BF01312604>