

THE FEASIBILITY OF HIGH-INTENSITY TRAINING TO IMPROVE SELF-CONTROL
AND OCCUPATIONAL PARTICIPATION IN AT-RISK ADOLESCENTS
CAPSTONE PROJECT PROPOSAL

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Abstract

Purpose

Adolescence is a challenging time navigating self-control and decision-making, creating vulnerability to developing poor habits and unhealthy behaviors. This feasibility study aimed to determine if a high-intensity training program (HIT) would improve self-control, health-related behaviors, and healthy occupational participation in at-risk adolescents in the Real Talk Youth Impact Program (Real Talk), measured by the Occupational Experience Profile (OEP).

Methodology

Three at-risk adolescents were recruited via convenience sampling from Real Talk to participate in a twelve-session HIT intervention, one participant completed all sessions. Researchers used a quasi-experimental exploratory sequential mixed-methods design to examine self-control, health-related behaviors, and occupational participation measured before and after each exercise session using the OEP. Qualitative data informed quantitative data using the OEP.

Results

Results suggest that engaging in a five-week high-intensity exercise protocol may contribute to the participant's improved self-control and healthy decision-making choices when engaging in extracurricular activities. Additionally, the OEP captured participant's improved self-efficacy and insights into various environmental factors that contributed to or inhibited perception of healthy occupations through exercise intensity.

Conclusion

Results suggest that HIT may assist with improving self-control, healthy-related behaviors, and healthy occupational participation in at-risk adolescents in a community-based setting as measured by the OEP. Future research is needed with larger sample sizes to determine the validity of HIT's benefits for at-risk youth.

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Section I

Introduction

Adolescence is a pivotal stage in human development, representing a unique connection between physical maturation and cognitive growth, shaping an individual's body, mind, and the trajectory of their future health and well-being (Gupta et al., 2022; Moffitt et al., 2011; Mubarak et al., 2022). This critical phase in adolescence can be filled with challenges that affect their ability to navigate self-control and decision-making, thus making them exceptionally vulnerable to developing poor habits and unhealthy or maladaptive behaviors (Astolfi et al., 2021; Moffitt et al., 2011; Wijaya et al., 2020). The consequences of maladaptive behaviors, including substance use, criminal activity, gang affiliation, and limited physical activity, can have enduring implications for their overall physical and mental health and well-being (CDC, 2019). Additionally, unhealthy behaviors limit engagement in healthy social occupations with peers and family members and limit leisure activities, for example, sports and dance, often leading to poor academic involvement (AOTA, 2016; Clarkson et al., 2021; Gupta et al., 2022). In light of these complexities, occupational therapy is poised to address the multifaceted needs of at-risk adolescents, offering pathways for enhancing self-control, positive health-related behaviors, and meaningful occupational participation.

Notably, the prevalence of physical inactivity among adolescents, as evidenced by the Youth Risk Behavior Survey (2023) findings, highlights that less than 82% of children and adolescents meet the daily 60-minute requirements for moderate to vigorous physical activity. Physical inactivity has been linked to adverse health outcomes, including depression, anxiety, obesity, and increased risk of cardiovascular disease and diabetes, headlining the urgent need to address this issue (CDC, 2019). Additionally, adolescents with sedentary lifestyles are more likely to engage in unhealthy occupations, including substance and tobacco use, poor dietary

behaviors, criminal activity, and intentional and unintentional violence (Astolfi et al., 2021; Moffitt et al., 2011; Wijaya et al., 2020). In contrast, evidence demonstrates that physical activity improves both physical and mental health and cognition, leading individuals to engage in healthier occupations (Lubans et al., 2016). These findings implicate the need for occupational therapists to explore novel interventions promoting physical and psychological well-being in this population (Astolfi et al., 2021; CDC, 2019; Moffitt et al., 2011; Wijaya et al., 2020).

Occupational therapy's overarching goal is to facilitate the health and well-being of all individuals from infancy to older adulthood (AOTA, 2020). Occupational therapists play a vital role in the promotion of the health and well-being of adolescents struggling with self-control and engagement in maladaptive behaviors. Occupational therapy interventions have demonstrated efficacy in addressing cognitive and behavioral challenges, supporting adolescents in developing self-regulation skills, and facilitating their engagement in meaningful occupations (Clarkson et al., 2021; George-Paschal & Bowen, 2019). Occupational therapy interventions have also been instrumental in influencing self-regulation in juvenile offenders by helping them identify and manage emotions (Dowdy et al., 2022), assisting adolescent criminal offenders in recognizing the consequences of their delinquent behaviors, and establishing new functional skills (George-Paschal & Bowen, 2019). Occupational therapy has been recognized as an integral player in mental health promotion and prevention, highlighting the profession's role in promoting life satisfaction through meaningful activities (AOTA, 2017). Therefore, occupational therapy is positioned as a powerful tool to cater to the diverse needs of at-risk adolescents, presenting an array of possibilities for improving self-control and healthy behaviors and fostering purposeful engagement in meaningful occupations. Nonetheless, groundbreaking interventions are imperative to address these challenges.

The role of brain-derived neurotrophic factor (BDNF) has emerged as a critical component in the promotion of neuroplasticity and cognitive function (Cabral et al., 2018; Delisle et al., 2010; O'Brien, 2009). BDNF is a neuropeptide released in the brain that is involved in the growth, survival, and differentiation of neurons (O'Brian, 2009). The release of BDNF during physical activity, including high-intensity training (HIT), in which the heart rate is between 75%-85% of an individual's age-predicted heart rate maximum, has been associated with improvements in executive functions, including self-control, impulsivity, and decision-making in various populations including adolescents (Cabral et al., 2018; Delisle et al., 2010; Holleran et al., 2014; Nock et al., 2017; O'Brien, 2009). Furthermore, the potential impact of HIT on BDNF release and neuroplasticity presents a compelling avenue for exploring the use of HIT as an occupation as an ends to enhance self-control and positive health-related behaviors in at-risk adolescents.

The proposed study seeks to investigate the feasibility of integrating HIT and occupational therapy to address the multifaceted needs of at-risk adolescents. By examining HIT's potential impact on self-control, positive health-related behaviors, and occupational participation, this study aimed to contribute to developing targeted interventions that can support the holistic well-being of at-risk adolescents.

By addressing the vital needs of at-risk adolescents and exploring novel occupational therapy interventions, this study aimed to advance knowledge and develop interventions positively influencing adolescent participation in healthy occupations, furthering their health and well-being, thereby contributing to the promotion of positive health-related behaviors, meaningful occupational participation, and holistic well-being during this critical stage of development.

Section II

Statement of the Problem

According to the Centers for Disease Control and Prevention (CDC) (2023), adolescents often participate in unhealthy or maladaptive health-related behaviors, some of which are the leading causes of preventable death. Many of these behaviors are considered comorbid and contribute to adolescent incarceration, morbidity, and chronic diseases, including diabetes, hypertension, and cardiovascular disease (CDC, 2019). These unhealthy behaviors include substance use, tobacco use, lack of physical activity, poor dietary behaviors, behaviors contributing to violence and unintentional injuries, and sexual behaviors related to sexually transmitted diseases and unintended pregnancy, amongst others (CDC, 2019). Research suggests that participation in these behaviors may be due to deficits in executive functioning, contributing to poor self-control and decision-making skills (Pandey et al., 2018). Poor self-control and decision-making results in increased engagement in unhealthy occupations, including substance use, criminal activity, and poor dietary choices, and decreased engagement and participation in healthy occupations such as physical activity, positive peer relationships, and education, thus leading to decreased health and well-being (Astolfi et al., 2021; Moffitt et al., 2011; Wijaya et al., 2020).

The overarching goal of the occupational therapy profession is to use meaningful occupations to improve health and well-being in all populations (AOTA, 2016; Clarkson et al., 2021). Therefore, adolescents exhibiting poor self-control and engaging in these maladaptive behaviors and decision-making are prime candidates for successful occupational therapy interventions. Several things need to happen for occupational therapists to assist adolescents exhibiting unhealthy behaviors. First, occupational therapists need more valid and reliable tools to measure self-control. In addition, occupational therapists must improve their ability to

measure occupations and understand how engagement in certain occupations contributes to an individual's occupational engagement and participation in healthy activities. Moreover, occupational therapists need more valid and reliable tools to gain insight into this population's beliefs and experiences during both maladaptive and healthy occupations while helping them identify how these behaviors contribute to their health and well-being. Finally, there is a need for more evidence-based interventions to address adolescent maladaptive behaviors using various approaches.

Evidence tells us that moderate and intense exercise, including HIT, improves neuroplasticity, leading to improved self-control and health-related outcomes related to depression, anxiety, substance use, and stroke (Ashcroft et al., 2022; Cabral et al., 2018; Hornby et al., 2022; More et al., 2017; Nock et al., 2017)). Limited literature exists on HIT in occupational therapy sessions or to improve self-control, maladaptive health-related behaviors, or participation in healthy occupations, particularly in at-risk adolescents aged 13 to 18 years in community-based settings. Furthermore, there is limited research on at-risk adolescents' experiences of engaging in healthy and unhealthy occupations. Therefore, the primary outcome of this project was to determine the feasibility of HIT to improve self-control, healthy-related behaviors, and occupational participation in at-risk adolescents participating in Real Talk. See Appendix A for definition of terms.

Literature Review

Adolescents exhibiting poor self-control demonstrate various problematic outcomes, including participation in maladaptive behaviors (Astolfi et al., 2021; Moffitt et al., 2011; Wijaya et al., 2020). Evidence suggests that engaging in these behaviors significantly impacts participation in healthy occupations (Astolfi et al., 2021; Moffitt et al., 2011; Wijaya et al.,

2020). The benefits of exercise have been well-researched, demonstrating improvements in various physical and psychological outcomes, including improved executive functions, mood, self-esteem, and cognition (Moreau et al., 2017; Nock et al., 2017; Xue et al., 2019). More recently, literature has examined HIT as a therapeutic intervention to improve these and many other outcomes, finding equal, if not better, results (Cabral et al., 2018; Moreau et al., 2017). Despite these improvements, exercise may be underutilized as a therapeutic intervention for the project's target population, especially by occupational therapists.

While occupational therapists use physical activity as part of their intervention strategies in various populations, little evidence was found in the literature of occupational therapists using high-intensity exercise to address self-control and maladaptive behaviors in the target population. Literature from other disciplines has recently focused on the impact of exercise intensity on executive function and maladaptive behaviors in various groups, as well as the mechanisms through which HIT has contributed to enhanced outcomes (Cabral et al., 2018; Moreau et al., 2017). The subsequent literature review examines these areas, providing a deeper understanding of the complexity of adolescent behaviors, the many influences that may contribute to engagement in healthy and maladaptive behaviors, and how occupational therapists could employ HIT to improve outcomes in at-risk populations.

Adolescents Behaviors

The term adolescence represents individuals between the ages of 11-19 years and is a phase of development symbolized by changes in the physical, cognitive, emotional, and social domains (Mubarak et al., 2022; Wijaya et al., 2020). Additionally, adolescence is a time when young adults gain independence while exploring their identities. During this process, adolescents establish health-related behaviors and routines, many of which are carried out through adulthood,

impacting their quality of life and the risk of chronic diseases and death (Kang & You, 2018; Mubarak et al., 2022; Wijaya et al., 2020). Therefore, it is vital to encourage adolescents to engage in health-promoting behaviors, including daily physical activity, consuming a healthy diet including fruits and vegetables, maintaining healthy body weight, avoiding smoking cigarettes, developing sleep hygiene, maintaining positive relationships with friends and family, and engaging in school (Kang & You, 2018; Mubarak et al., 2022; Wijaya et al., 2020).

Evidence suggests that various risk factors contribute to engagement in health-related behaviors. Gupta and colleagues (2020), in a systematic review, examined adolescent populations and found that sexual abuse, low socioeconomic status, inadequate parental supervision, delinquent peers, and inadequate sleep led to increased criminal activity, gang affiliation, violence, and substance use, among others. Gupta and colleagues' (2020) results are consistent with other common literature, citing social support systems, psychological stressors, exposure to violence, low socioeconomic status, and physiological brain imbalances as risk factors contributing to healthy and unhealthy behaviors (Moffitt et al., 2011; Mubarak et al., 2022; Nock, 2017)

Additionally, Wijaya et al. (2020) suggested that these risk factors, combined with the adolescent brain early stages of maturation, may result in poor executive functions, leading to impulsivity, limited self-control, limited inhibition, and poor decision-making skills. Adolescents are known for partaking in riskier and reward-driven behaviors and increased participation in unhealthy occupations, including substance use, criminal activity, and violence (Gupta et al., 2020; Wijaya et al., 2020). These risk factors are significant, as they highlight the importance of psychological, physiological, and environmental stressors that either facilitate or inhibit the likelihood of adolescents engaging in maladaptive behaviors while demonstrating the importance

of encouraging these individuals to participate in exercise, social participation, and education from an early age.

Maladaptive Behaviors

Maladaptive behaviors are intentional or unintentional risk behaviors that contribute to an individual's propensity for acute or chronic disease, injury, or death (Cabral & Song, 2023; CDC, 2023). According to the CDC's Youth Risk Behavior Surveillance System (2019), common maladaptive behaviors in adolescents include substance, alcohol, and tobacco use, a sedentary lifestyle, poor dietary choices, unprotected sex, and unintentional and intentional violence (CDC, 2019). Certain maladaptive behaviors, comprising self-harm and violent behavior, have a direct impact on oneself or others. In contrast, other maladaptive behaviors involving poor dietary choices, sedentary behavior, unprotected sex, and tobacco use may contribute to circumstances that subsequently amplify the likelihood of disease or death, including obesity, eating disorders, lung cancer, and sexually transmitted diseases (Cabral & Song, 2023; CDC, 2023). Moreover, alcohol and substance use may lead to increased risk-taking and delinquent behavior, jeopardizing the lives of themselves and those around them, in addition to incarceration and increased risk of health-related diseases in the long term (Cabral & Song, 2023; Gupta et al., 2022). It is important to note that many of these behaviors are often comorbid, as adolescents who smoke are more likely to engage in alcohol consumption, substance use, and criminal activity (Gupta et al., 2022; Mubarak et al., 2022).

When examining maladaptive behaviors from an occupational therapy lens, one must consider that many of these behaviors are, in fact, occupations, albeit unhealthy occupations. Unfortunately, as unhealthy occupations become the new norm, this leads to a perpetual cycle of maladaptive behaviors, as seen when individuals stop playing with friends, engaging in sports,

and attending classes while increasing engagement in criminal activity, substance use, and poor dietary choices (Martin et al., 2008). Martin and colleagues (2008) found that engagement in substance abuse leads to poor motivation and structural and functional deficits, often inhibiting participation in activities of daily living and instrumental activities of daily living, promoting destitute social networks. Moreover, these individuals replace healthy habits and routines with their negative counterparts, ultimately disrupting their roles as students, friends, workers, and sons or daughters (Martin et al., 2008).

Finally, a longitudinal study by Moffitt et al. (2011) and a cross-sectional study by Mubarak et al. (2022) demonstrated that engaging in maladaptive behaviors as adolescents or youths increases the likelihood of continuing these behaviors through adulthood, thus inhibiting health and well-being, leading to chronic disease, death, or incarceration. These results are significant to this capstone project, as they further demonstrate the need to promote healthy occupational participation while assisting individuals in identifying how engaging in healthy and unhealthy occupations contributes to their overall mental and physical health.

Self-control

Evidence demonstrates components of executive functions in the prefrontal cortex, including self-control, emotional regulation, and impulsivity, driving decision-making skills, and reward-driven behaviors (Tonnaer et al., 2016). Furthermore, deficits in executive function may contribute to adolescents engaging in maladaptive health-related behaviors (Astolfi et al., 2021; Moffitt et al., 2011; Pandey et al., 2018). Self-control, defined as one's ability to self-regulate behavior and inhibit impulses, is a malleable attribute (Moffitt et al., 2011) and is responsive to neuroplasticity, which is vital for positive change. Individuals who demonstrate self-control are likelier to engage in healthier dietary choices and less likely to engage in maladaptive behaviors

than those exhibiting poor self-control (Astolfi et al., 2021; Moffitt et al., 2011; Wijaya et al., 2022).

Wijaya et al. (2020) confirmed these data, citing a significant correlation between adolescents' low self-control and high engagement in youth-risk behaviors, including substance use, intentional and unintentional violence, sexually transmitted diseases, and poor dietary choices, as stated in the Youth Risk Behavior Surveillance System (2019), and vice versa. These results are similar to those by Astolfi et al. (2021), who found a correlation between adolescents' decreased self-control and increased participation in maladaptive health-related behaviors, including smoking, binge drinking, marijuana use, high consumption of ultra-processed foods, and bullying. Interestingly, Wijaya et al. (2020) found that self-control was not correlated with sedentary behavior, which is consistent with the results of Wijaya et al. (2020). Astolfi and colleagues (2021) suggested a marked increase in adolescent propensity to engage in maladaptive behaviors when engaging in multiple health-related behaviors, suggesting that the co-occurrence of these behaviors plays a significant role in poorer outcomes.

Moffitt et al. (2011) followed one-thousand participants from birth through age thirty-two and found that poor self-control during early childhood contributed to poor self-control in adulthood. Moreover, the authors confirmed that poor self-control led to increased substance abuse, poor health outcomes, and criminal activity from adolescence to adulthood compared to individuals demonstrating good self-control. These results are pertinent because they support the understanding that self-control begins at a very young age and that one's propensity to engage in unhealthy and risky behaviors can be changed by intervening, allowing individuals to alter their mental and physical health toward a better quality of life involving health and well-being. Additionally, assisting adolescents in improving their behavioral outcomes may decrease

society's burden of increased healthcare costs and incarceration, further highlighting the need for research and interventions with this population.

The Role of Occupational Therapy

Occupational therapy is rooted in understanding how various contexts, environments, client factors, performance skills, and performance patterns contribute to or inhibit an individual's participation in healthy occupations. Moreover, the occupation of health management includes "activities related to developing, managing, and maintaining health and wellness routines, with the goal of improving or maintaining health to support participation in other occupations" (AOTA, 2020, p. 32). Furthermore, social and emotional health promotion and maintenance are part of this category, which includes "identifying personal strengths and assets, managing emotions, expressing needs effectively, seeking occupations and social engagement to support health and wellness, developing self-identity, and making choices to improve quality of life in participation" (AOTA, 2020 p. 32).

While there is seemingly limited evidence documenting occupational therapy and at-risk adolescents, literature does exist examining occupational therapy and adolescents diagnosed with mental health and substance use disorders, which contribute to the terminology of "at-risk adolescents." George-Paschal and Bowen (2019) and AOTA (2017) discuss a variety of occupational therapy interventions, including cognitive behavioral therapy, social skills training to assist in communication in various contexts, and life skills training to assist adolescents in navigating different aspects related to life situations. The authors discussed strategy training, which has demonstrated improvements in replacing maladaptive beliefs with positive beliefs in individuals with cognitive impairment. Finally, George-Paschal and Bowen (2019) examined the impact of an occupational adaptation mentoring program for adolescents involved in a juvenile

drug court program. George-Paschal and Bowen (2019) found improvements in participants' insights into their current performance levels, environmental barriers, self-identified occupational challenges, and relative mastery. However, these results may not be generalizable.

When examining occupational therapy and at-risk populations, common themes focus on identifying environmental and social support and barriers to occupational participation. In addition, research suggests that using an interdisciplinary approach to substance use and delinquent behavior yields improved outcomes in adolescent and adult populations (George-Paschal & Bowen, 2019; Martin et al., 2008). As with most occupational therapy interventions, occupational therapists utilize their therapeutic use of self to identify an individual's preferred meaningful occupations while providing coping strategies and behavioral interventions to address engagement in unhealthy and delinquent behaviors (George-Paschal & Bowen, 2019; Martin et al., 2008). This is an important component of this project, which intends to help individuals identify healthy and unhealthy occupations and how they contribute to their physical and mental health. The project also intends to determine whether HIT is a feasible means to improve their self-control, which can facilitate healthier habits and routines and improve their daily lives.

Exercise and Behaviors

A considerable body of literature links health-related behaviors to executive functions, including inhibition, impulsivity, self-control, self-regulation, and decision-making, which often lead to reward-driven behaviors (Delisle et al., 2010; Cabral et al., 2018; Peruyero et al., 2017; More et al., Nock et al., 2017). Moreover, substance use during childhood and adolescence have been linked to poor outcomes in brain structure and function, leading to increased impulsivity and reward-driven behaviors (Nock et al., 2017). Multiple studies have suggested that vigorous

or high-intensity exercise leads to improved executive function (Moreau et al., 2017; Peruyero et al., 2017) and delinquent behavior in adolescents (Delisle et al., 2010; Nock et al., 2017) and adults (Cabral et al., 2018).

For example, a cross-sectional study analyzing baseline data collected from two prevention intervention trials by Delisle et al. (2010) found that high school students engaging in a high frequency of vigorous physical activity engaged in significantly more health-promoting behaviors, including frequent use of stress management techniques and quality dietary and sleep patterns and reported less marijuana use than those engaging in low levels of physical activity. While the study suggests that increased frequency and intensity of exercise lead to improved health-promoting behaviors, researchers relied on self-reported data regarding health behaviors, and there were no precise measures for specific physical activities and sports participation, limiting the study's validity and reliability. However, the results still show promise for incorporating HIT to improve health-related behaviors, as they suggest that frequent and intense exercise may limit substance use and improve dietary and sleep behaviors (Delisle et al., 2010).

Several other studies have demonstrated improved outcomes in participants engaging in the HIT. For example, a randomized placebo-controlled trial by Moreau and colleagues (2017) on 318 children ages 7-13 found that a six-week HIT protocol performed for ten minutes per day increased cognitive control and working memory compared to controls. In addition, participants demonstrated a more significant decrease in resting heart rate than controls, which indicates superior cardiovascular health outcomes (Moreau et al., 2017). Similarly, a within-subject repeated-measures design by Peruyero et al. (2017) on Spanish adolescents

demonstrated improved cognitive inhibitory control when participating in vigorous activity compared to moderate or light activity.

While Moreau et al. (2017) and Peruyero et al. (2017) demonstrated the utility of HIT in improving executive functions, these studies have several limitations. In the study by Moreau et al. (2017), the control group participated in non-exercise activities, such as computer games, making it difficult to determine whether the HIT intervention would have been better than a moderate exercise intervention, thus limiting the study's validity. Additionally, the results may not be generalizable to the proposed study population, as participants in both studies did not engage in maladaptive behaviors.

Lastly, Cabral et al. (2010) of a 32-year-old severe substance abuser demonstrated statistically significant improvements in psychosocial metrics and prefrontal cortex functioning after completing a four-week high-intensity protocol including four 30-second bursts of intense exercise at an RPE of 15 and above for three weeks. These results are important to understand, as the prefrontal cortex plays an essential role in executive functions and reward-driven behaviors, contributing to self-control and engaging in maladaptive behaviors (Nock et al., 2017). Additionally, the exercise parameters of the protocol were similar to those of the proposed capstone projects. The study's limitations include a small sample size and limited generalizability owing to the participant's age demographics. However, the study demonstrates promise for incorporating HIT for at-risk adolescents, as the study's exercise protocol parameters are similar to those in the proposed capstone project, and the results indicate improved outcomes for substance abuse.

Brain-Derived Neurotrophic Factor

Neuroplasticity is the ability of the brain to adapt and learn from environmental changes by creating new neural connections. Research suggests these connections facilitate motor control, learning, skill acquisition, behavioral modifications, and emotional regulation (Knaepen, 2017; Nock, 2017; O'Brien, 2009; Tian et al., 2021). BDNF are neurotrophins that play a crucial role in brain development, executive functions, and neuroplasticity, assisting in energy metabolism and homeostasis (Walsh & Tschakovsky, 2018). Additionally, BDNF assists in increasing white matter, which plays a vital role in adolescent brain development and is essential for cognitive development and executive functions, contributing to cognitive flexibility, decision-making skills, learning, and memory (Nock et al., 2017; Walsh & Tschakovsky, 2018). Furthermore, healthy executive functions may inhibit reward-seeking behavior, which is crucial for limiting engagement in maladaptive behaviors (Nock et al., 2017; O'Brien, 2009).

BDNF and Exercise

An extensive body of literature, including meta-analyses and randomized controlled trials, indicates exercise increases the release of BDNF and improves outcomes in various populations, including at-risk adolescents and individuals with substance abuse disorders (Fernandez-Rodriguez et al., 2021; Nock et al., 2017; Szuhany et al., 2015; Walsh & Tschakovsky, 2018).

For example, a meta-analysis by Szuhany et al. (2015) examined 29 studies representing 1,111 male and female participants aged 18 years and older with diagnoses ranging from mental disorders to depression and anxiety, examining the effects of various exercise programs, including aerobic exercise, resistance training, and resistance training in conjunction with

aerobic training on the release of BDNF. Notably, the authors found a moderate effect size for BDNF levels after an acute bout of exercise. Additionally, the authors found that studies incorporating regular exercise for several weeks to several months further increased these results.

Similarly, a systematic review and meta-analysis by Fernandez-Rodriguez et al. (2021), including randomized controlled trials, found that high-intensity exercise induced higher BDNF levels than non-exercise conditions. However, there was no significant difference in BDNF levels between moderate-intensity and high-intensity exercise groups. While these studies demonstrate promise for using vigorous or high-intensity exercise to increase BDNF levels, results may have limited generalizability due to differences in population demographics, including age and diagnoses.

Summary

BDNF influences neuroplasticity, leading to improvements in executive functions (Fernandez-Rodriguez et al., 2021; Nock et al., 2017; Szuhany et al., 2015; Walsh & Tschakovsky, 2018). Additionally, BDNF is activity-dependent, meaning its characteristics and functions are altered by varying activities or stimuli. Therefore, exercise intensity plays an essential role in stimulating its release (Fernandez-Rodriguez et al., 2021; Nock et al., 2017; Szuhany et al., 2015; Walsh & Tschakovsky, 2018). Additionally, there is substantial research highlighted in this literature review that provides insight into the importance of exercise intensity for improved outcomes in cognitive (Moreau et al., 2017), inhibitory control (Peruyero et al., 2017), substance use (Cabral et al., 2010; Delisle et al., 2010), and health-related behaviors (Delisle et al., 2010). Additionally, several studies examining regular programmed

exercise found improvements in resting BDNF levels; however, these results were not as robust as those discovered immediately post-exercise (Szuhany et al., 2015).

These findings highlight the importance of incorporating regular exercise programs to increase BDNF and improve cognitive function and behavior. Furthermore, they illustrated the dose-response relationship between exercise and the release of BDNF (Fernandez-Rodriguez et al., 2021; Szuhany et al., 2015). These data correlate with the reviews by Nock et al. (2017) and Walsh and Tschakovsky (2018), suggesting that BDNF levels increase with exercise intensity and frequency, leading to improved neuroplasticity and outcomes in executive functions, such as self-control and reward-driven behaviors (Cabral et al., 2018; Moreau et al., 2017). This area is well within the scope of occupational therapy practice as practitioners can utilize HIT to assist individuals in gaining insight into how their client factors, context, and environments can hinder or facilitate their ability to engage in various occupations, providing them with a sense of self-efficacy and mastery, demonstrating promise for occupational therapists to use HIT as an occupation as an ends; further justifying the need for future research with occupational therapists using HIT to improve self-control, healthy-behaviors, and occupational participation in healthy occupations in at-risk adolescents.

Statement of the Purpose

This project aimed to determine the feasibility of HIT in improving self-control, health-related behaviors, and occupational participation in at-risk adolescents participating in Real Talk. The project's objectives were to develop and trial a five-week study to determine if HIT is a viable option to improve self-control, decrease adolescent participation in maladaptive behaviors, and increase occupational participation in healthy behaviors in a community-based setting. This project was also an opportunity to trial the OEP in an adolescent population. The OEP was used

to measure participant's experiences in maladaptive and healthy-related behaviors and assisted the participant and researchers in gaining insight into how experiences in these occupations contributed to their health, well-being, and occupational participation in healthy occupations and whether these experiences changed throughout the five-week intervention.

Hypothesis

HIT will improve self-control, health-related behaviors, and healthy occupational participation in at-risk adolescents.

Theoretical Frameworks

This capstone project was grounded in two distinct occupational therapy models: the Person-Environment-Occupation-Performance Model (PEOP) and the Occupation Adaptation Model (OA). The PEOP assisted in guiding the project by examining the relationship between an individual's intrinsic personal factors and extrinsic environmental factors and how these interactions facilitated or hindered their engagement in occupations, resulting in their occupational performance, with the goal of health and well-being (Hinojosa et al., 2017). The PEOP model suggests that occupational participation and performance are the underlying factors in the occupational therapy intervention process (Bass, J.D., Baum, C.M., & Christiansen, C., 2019).

The PEOP model assisted in guiding the project by allowing researchers to examine how personal factors, such as participants' self-control or behaviors, interacted with environmental factors, such as social interactions and sleep schedule, and how they contributed to their engagement in healthy or maladaptive occupations, such as substance use or crime. Using a PEOP lens with the OEP, researchers were able to assist participants in identifying their experiences with maladaptive occupations as well as healthy occupations such as HIT and how

they contributed to their pleasure, productivity, restoration, and social connectedness and led to their occupational participation, performance, health, and well-being.

The Occupational Adaptation Model (OA) assisted in guiding this project to better understand the participants' process of internal adaptation to their circumstances, physical abilities, and environmental factors, leading to self-efficacy, mastery, and occupational engagement (George-Paschal & Bowen, 2019). For example, this project used HIT as an occupation as an ends to facilitate self-control. Researchers hoped to improve participation in healthy occupations while simultaneously decreasing their engagement in maladaptive behaviors and occupations. Finally, using the OEP through an OA lens assisted participants in recognizing how engaging in healthy occupations facilitated their health and well-being, leading to feelings of self-efficacy and mastery, which increased their occupational engagement and participation in healthy occupations.

Section III

Methodology

Agency Description

This capstone project occurred at Real Talk; a 501© (3) nonprofit organization founded in 2013 by executive director Sheree Corniel. Real Talk consists of approximately 18 volunteer members who are present or former federal or state penal system offenders willing to share their life stories in the hopes of assisting a new generation of youth to make better choices. The additional volunteers include a licensed clinical psychologist, Dr. Keith Fairclough, and Real Talk's five volunteer Board of Directors members. Real Talk's funding is derived from community partner donations and potential grant opportunities.

Real Talk's mission is to assist the next generation in achieving their hopes and dreams, building character, and reaching their full potential as responsible contributing citizens and future leaders. Real Talk hosts "Change One" meetings where monthly speakers share their lived experiences leading up to and after their time in the justice system with the intent of educating and empowering Real Talk participants. Real Talk participants are youths ages 8-18 and include individuals from the community hoping to prevent maladaptive health-related behaviors, individuals who have yet to enter the juvenile system but are displaying maladaptive health-related behaviors, and individuals within the juvenile system who are on juvenile parole or probation. Participants are enrolled in the program for four months, attending monthly "Change One" meetings and one career preparation meeting. Additionally, compliant participants receive up to \$150 per month toward extra-curricular activities of their choice in a community program of their choice. Finally, Real Talk provides monthly support for parents and caregivers.

Study Design

The study used a quasi-experimental exploratory sequential mixed methods (Creswell, J.W., 2014) feasibility study design, which used pre-test and post-test standardized quantitative and qualitative assessments, as well as a student researcher-created Exercise History Questionnaire. See Appendix B for Exercise History Questionnaire. Researchers used the BSCS as a quantitative pre-test and post-test outcome measure to detect changes in participant's self-control. See Appendix C for BSCS. The study also utilized the OEP where qualitative data informed quantitative data. See Appendix D for the OEP. The participant filled out the OEP before each session, where they were instructed to recall and answer questions about an activity they did earlier in the day, and then again after the session, where the participant was instructed to answer the same questions. However, in this instance, the participant recalled his experience during and after the exercise session. The OEP was used to assist researchers and participants in detecting changes in their occupational experiences and participation in healthy or maladaptive occupations after engaging in HIT.

Three participants were recruited, and one completed the entire study. The aim was to capture a variety of ages, genders, and maladaptive behaviors intended for a feasibility study. The student-created questionnaire captured differences in participant client factors, and the recruitment process and enrollment purposely sampled these characteristics. The Internal Review Board (IRB) number is UNLV-2023-404

Sample Design

Recruitment

Following IRB approval, three participants were recruited through convenience sampling, word of mouth, and flyers handed out at Real Talk. Participant recruitment was done via a

convenience sample due to snowballing and participant involvement in Real Talk. Participants established interest through flyers (see Appendix E and F for parent and participant recruitment flyers) that provided them with the student researcher and principal investigator's email addresses or through a QR code listed on the flyer, taking them to a Google form where they indicated their preferred method of contact. See Appendix G for Google form. Once interest was established and inclusion criteria were met, the student researcher contacted interested participants and their legal guardians via Google Meet to explain the study further and address potential questions and concerns.

Participant Selection and Enrollment

The researchers recruited three at-risk adolescents ages 13-18 who were previous or current participants in Real Talk and engaging in at least one maladaptive health-related behavior. Two participants dropped out through attrition, and one completed all 12 sessions.

Inclusion Criteria

To be included in the study, participants had to be between the ages of 13 and 18 years, English-speaking (see Appendix H for demographic questionnaire), willing to participate in an exercise program and answer questions about it, cleared by a medical professional to participate in an exercise program (see Appendix I for participant physical clearance form), and enrolled in or previously enrolled in Real Talk. Additionally, participants did not have to have a formal diagnosis but must have experienced at least one of the following symptoms of maladaptive behavior: substance use or abuse, gang affiliation, current or previous status on parole or probation, grade point average < 2.0, previous or current involvement in criminal activity, or have experienced any ACEs.

Exclusion Criteria

Exclusion criteria included those under the age of 13 or older than 18 years, current or previous history of high blood pressure, current or previous history of cardiovascular disease, over the 97th percentile using the body mass index (BMI) for children scale or having experienced any joint, mobility, or movement issues that would limit participation in an exercise program. Individuals who were eligible but were deemed inappropriate for participation (e.g., unable to participate meaningfully in study activities, did not have medical clearance to participate in exercise protocol, or exhibited any other of the study's exclusion criteria) were not enrolled and instead classified as "exclusions."

Informed Consent and Enrollment

The student researcher contacted the interested participant and the participant's parent or legal guardian via their preferred method of contact, where the student researcher reviewed the inclusion and exclusion criteria. It was anticipated that up to four participants would be recruited for the four-week program, which ran from February 2024 through March 2024. However, only three participants were recruited, and only one of which completed all twelve sessions. See Appendix J for recruitment email script to appropriate participants at Real Talk; see Appendix K for informed consent with HIPPA, Appendix L for the youth assent form, and Appendix M for the parent consent form.

Data Collection

Quantitative data to describe the sample was collected via a standard demographic questionnaire pre-test and perception of exercise and habits questionnaire. Quantitative data from the BSCS was collected pre- and post-test to determine if there were changes in participants'

self-control after completing the intervention. Qualitative data, including open-ended questions on the OEP, were collected at the beginning and end of each exercise session.

Instruments

Researchers utilized a non-standardized perception of exercise history questionnaire to determine participant previous and current exercise history as well as leisure occupations. Researchers used the BSCS pre- and post-intervention to determine whether participating in HIT positively changes participants' self-control. The BSCS consists of a 13-question Likert scale and has demonstrated reliability and validity in measuring self-control and impulsive behavior in at-risk adolescents in community settings and juvenile detention centers (Pechorro et al., 2021).

Figure 1

Excerpt from Participant’s Completed OEP

Time began	Time ended	Main activity	I considered this activity to be: Select the BEST ONE :		With: Alone Other	Where Home Indoor Away Outdoor		PL	PR	Rest	Con
I got up at: 3:00 AM	1:11 PM	School	<input type="checkbox"/> Caring for Self <input type="checkbox"/> Caring for Home <input type="checkbox"/> Having Fun <input type="checkbox"/> Exper. Spirituality <input type="checkbox"/> Relaxing <input checked="" type="checkbox"/> Socializing <input type="checkbox"/> Volunteering <input type="checkbox"/> Doing nothing	<input type="checkbox"/> Caring for Others <input type="checkbox"/> Getting goods/services <input type="checkbox"/> Enriching/Learning <input type="checkbox"/> Maintaining Health <input type="checkbox"/> Meeting Obligations <input type="checkbox"/> Traveling <input type="checkbox"/> Working <input type="checkbox"/> Other _____	<input type="checkbox"/> Alone <input checked="" type="checkbox"/> Others	<input type="checkbox"/> Home <input checked="" type="checkbox"/> Away	<input checked="" type="checkbox"/> In <input type="checkbox"/> Out	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 6	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6
3:00 PM	3:30 PM	Training	<input type="checkbox"/> Caring for Self <input type="checkbox"/> Caring for Home <input checked="" type="checkbox"/> Having Fun <input type="checkbox"/> Exper. Spirituality <input type="checkbox"/> Relaxing <input type="checkbox"/> Socializing <input type="checkbox"/> Volunteering <input type="checkbox"/> Doing nothing	<input type="checkbox"/> Caring for Others <input type="checkbox"/> Getting goods/services <input type="checkbox"/> Enriching/Learning <input type="checkbox"/> Maintaining Health <input type="checkbox"/> Meeting Obligations <input type="checkbox"/> Traveling <input type="checkbox"/> Working <input type="checkbox"/> Other _____	<input type="checkbox"/> Alone <input checked="" type="checkbox"/> Others	<input type="checkbox"/> Home <input checked="" type="checkbox"/> Away	<input checked="" type="checkbox"/> In <input type="checkbox"/> Out	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 6	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 6	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 6	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 6

Note. PL= pleasure; PR = productivity; Rest = restoration; Con = social connection. Rating scales capture sense of experiences from 1-6 (i.e., 1 = strong sense of displeasure to 6 = strong sense of pleasure).

Additionally, the OEP was used pre-and post-test during each session. The intent of using the OEP was for participants to reflect on their experiences when participating in healthy and maladaptive occupations. Additionally, researchers hoped to detect a change in the subject's participation and experiences when engaging in said occupations. At the beginning of each session, the participant filled out the OEP, first answering a series of questions about how he perceived his general health and well-being, what time he went to sleep, how many hours of sleep he got, and how he felt upon waking. The participant then identified an activity he did earlier in the day, classified the activity from a list of 15 occupations, and then rated how the activity made him feel on a scale of 1-6 regarding feelings of pleasure, productivity, restoration, and social connection (see Figure 1). After engaging in the HIT exercise protocol, the participant classified the exercise protocol from the list of 15 occupations, followed by rating how the exercise made him feel regarding pleasure, productivity, restoration, and social connection. The participant then answered several open-ended questions on what he learned about himself, the activities or his experiences, and his overall feelings for the day after completing the exercise session. While the OEP has demonstrated Goodness of Fit in evaluating young adults' experiences of pleasure, productivity, restoration, and social connectedness (Atler & Fisher, 2023), it has not been used in an at-risk adolescent population. Therefore, this project was also an opportunity to help determine whether the OEP is suitable for evaluating these attributes in at-risk adolescents in future research.

The BSCS and the OEP aimed to help determine whether HIT was feasible for improving self-control, maladaptive behaviors, and occupational participation in healthy occupations in at-risk adolescents at Real Talk. Additionally, researchers used the OEP to

gain insight into at-risk adolescents' experiences of pleasure, productivity, restoration, and connectedness during participation in healthy and maladaptive occupations.

Description of Activities

Following virtual contact to determine eligibility, verbal informed consent with HIPPA, and verbal youth assent, the student researcher scheduled 12 activity sessions with the participant and his caregiver, after which the participant met the student researcher at Real Talk for 12 sessions to collect data and participate in the exercise protocol. See Appendix N for a full description of individual session activities and Appendix O full exercise protocol.

Procedures of Protocol

Intervention Procedures

All sessions took place at the Real Talk headquarters. The first and last sessions were approximately 90 minutes. The remaining ten sessions lasted approximately 40-45 minutes, approximately three times per week, for a total of 12 sessions. During the first session, the student researcher explained the exercise protocol, educated the participant on the RPE scale and how to rank exertion, introduced the OEP, and gathered client factor data, including the student researcher questionnaire. During the first and the last sessions, the participant completed pre-test and post-test measures of the BSCS. OEP data was collected at the beginning and end of each session of the twelve sessions. Prior to the exercise protocol, the participant used the OEP to identify activities done within the last 24 hours and their perceived experiences of said activities. The participant then completed the exercise protocol.

Physiological data, including heart rate, blood pressure, and oxygen saturation, were measured before and after each exercise session. Additionally, heart rate was measured throughout the exercise session via a Polar heart rate monitor (see Appendix P for Polar OH1+, monitored via the Polar application) to reach 75%-85% of their age-predicted heart rate maximum. The participant's RPE (see Appendix Q for RPE scale) was measured at least every two minutes or when the participant appeared not to meet or exceed the prescribed RPE of between 15 (hard) and 17 (very hard) while engaging in the exercise protocol.

Incentives

Researchers provided the participants with a total of \$170.00 in incentives. Incentives were disbursed as follows: \$120 in Amazon gift cards, provided in the following increments: \$30.00 following session three, \$30.00 at the end of session six, \$30.00 at the end of session nine, and \$30.00 at the end of session twelve. The participants were also provided \$50 in Shell gas cards to assist with transportation costs. Researchers disbursed the gas cards in the following increments: \$12.50 following session one, \$12.50 following session four, \$12.50 following session seven, and \$12.00 following session ten.

Withdrawal

The following occurred for participants who declined to complete the survey questions: participants were asked to set up another time to complete the survey. Data was collected from previous sessions for the participants who refused to schedule another time to answer the questions, and the participants were no longer allowed to participate in the study. Participants who declined to complete the exercise protocol were asked to set up another time to complete the session. Data was collected from previous exercise sessions

for those who refused to schedule another time to complete the exercise protocol. However, they will no longer participate in the study. For participants who wished to withdraw completely, data was collected from previously answered questions and exercise sessions, and they could no longer participate in the study. For participants who withdrew from the study, the incentives were prorated to the date of their last participation.

Data Analysis

Descriptive statistics were used for qualitative and quantitative data collected pre- and post-test exercise sessions. All data was entered into an Excel spreadsheet. The mean (M) standard deviation (SD) (+/-5), median, mode, and interquartile range (IQR) were calculated for RPE, HRmax, and percent of HRmax, which were documented and analyzed for each session to determine the participant's subjective exercise intensity, measured by RPE and how this compared to his objective exercise intensity, measured by HRmax and percent of HRmax. Time spent in heart rate zones one through five was documented and analyzed. Utilizing Creswell's design (Creswell, J. W., 2014), qualitative data from the OEP, including open-ended questions, were gathered and analyzed to understand the relationship between HIT, self-control, and healthy- occupations. These relationships impacted sleep schedule and duration, experiences during previous activities in the past 24 hours, and how that facilitated or hindered the participant's experiences of pleasure, productivity, social connectedness, and restoration upon completion of the exercise sessions.

Section IV

Results

Participant Demographics

Three participants were recruited into the study. However, due to attrition, only one participant completed all twelve exercise sessions. The participant was a 14-year-old male with a body mass index (BMI) of 19.2, placing him in the 51st percentile for his sex and age group and classifying him as a healthy weight. Prior to engaging in the exercise protocol, the participant indicated that they had not participated in exercise for approximately two weeks. However, prior to this, they were engaging in a combination of various sports, including running and martial arts, for less than five hours per week for three to five hours per week. Lastly, the participant had been participating at Real Talk for approximately one month due to being on probation for malicious destruction of property. The participant was sentenced to be on probation until the age of 18.

Table 1

Participant Characteristics n=1

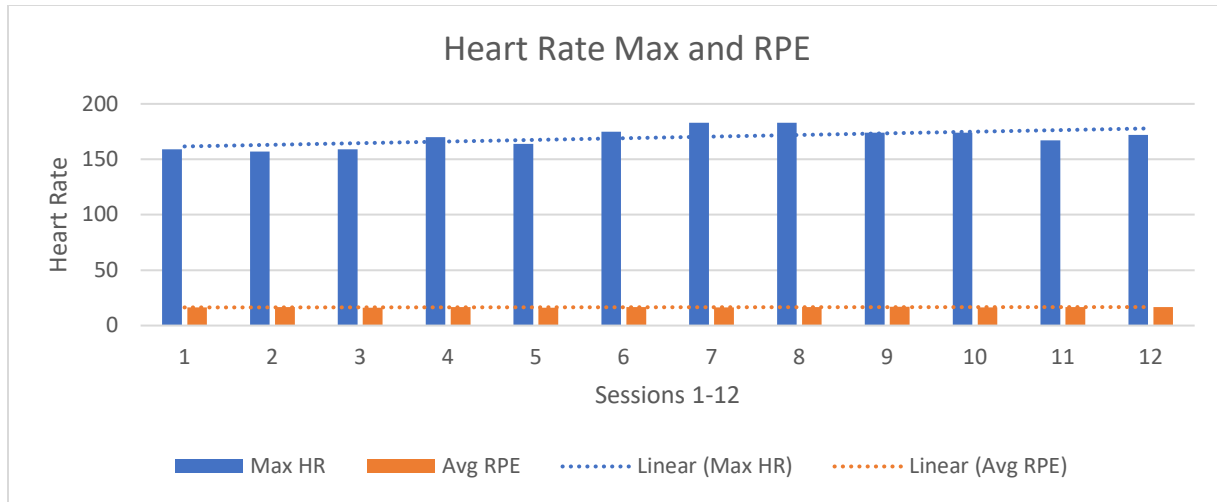
Gender	Male
Age	14 years
Height	5'11 (180.3 cm)
Weight	138 lbs
BMI	19.2
Physiological Status	
Blood Pressure	107/55
Resting Heart Rate	62 BPM
Oxygen Saturation	98
Ethnicity	White/Hispanic
Inclusion Criteria for Maladaptive Behavior	Current status on juvenile probation
Previous Exercise Participation	Three to five days per week, < five hours per week
Leisure Activities	Running, martial arts, & sports

Heart Rate and RPE

The participant's M HRmax was 169.8 BPM, with his HRmax being between 164.8-174.5 BPM 95% (2SD) of the 12 sessions. The participant's median HRmax was 171 BPM. Calculating the participant's IQR suggests no outlier values within the data set, as indicated by values below 142 BPM and above 194 BPM. The participant's M RPE was 16.5, his median RPE was 16.7, and the mode was 16.7. Calculating the participant's IQR suggests no outlier values within the data set, as indicated by values below 15.95 and above 17.15. The participant's M percent of HRmax was 73%, and his percent of HRmax was between 68-78%, 95% (2SD) of the 12 sessions. Calculating the participant's IQR suggests no outlier values within the data set, as indicated by values below 57% and above 89%. The participant's HRmax increased from 159 BPM during the first session to 183 BPM in sessions seven and eight, while the M RPE remained at 16.5 throughout the five-week intervention (see Figure 2). These results suggest improved cardiorespiratory fitness and increased intensity, while perceived intensity remained constant across sessions.

Figure 2

Heart Rate and RPE



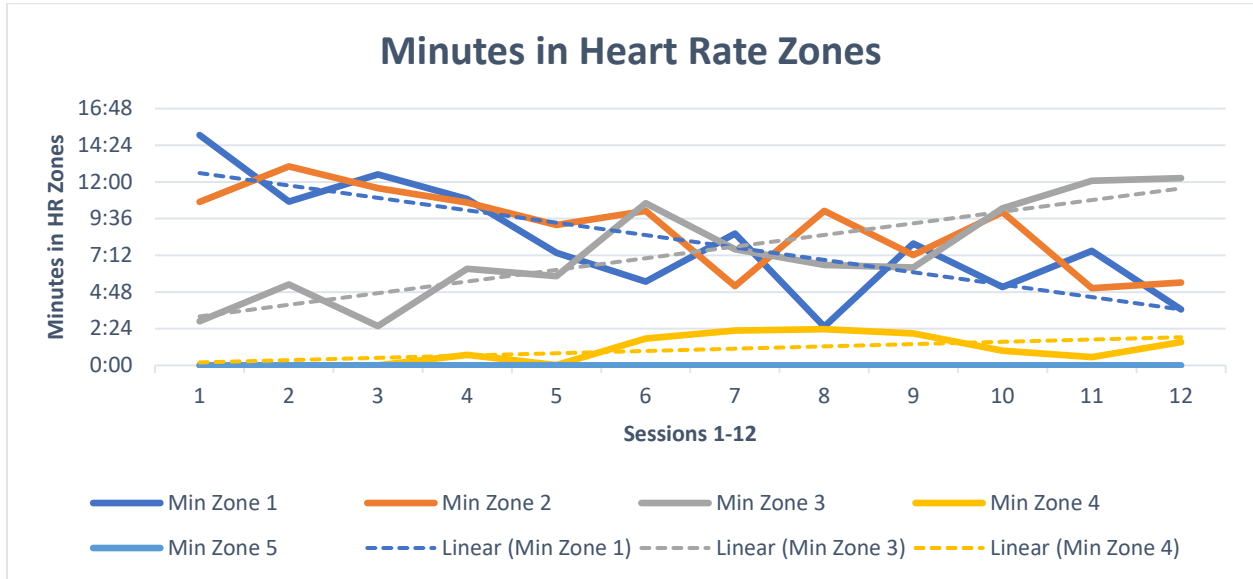
Note. The results indicate that the participant maintained an average RPE of 16.5 across twelve sessions while his maximum heart rate increased across the twelve sessions. This suggests improvements in cardiorespiratory fitness and increased intensity, while perceived intensity remained constant across sessions.

Time in Heart Zones

Over the five-week intervention, the participant spent more time during the exercise sessions at higher intensities, measured using the Polar heart rate application. In addition to measuring the participant's average heart rate and HRmax, the device measured the amount of time spent in zones 1-5, where zone one is 50-60% of HRmax, zone two is 60-70% of HRmax, zone three is 70-80% of HRmax, zone four is 80-90% of HRmax, and zone five is 90-100% of HRmax. The results demonstrated that as sessions progressed, the participant spent more time in zones three and four and less time in zones one and two (see Figure 3). Additionally, the participant increased time spent in zones three and four while maintaining the same average RPE of 16.5.

Figure 3

Minutes in HR Zones



Note. Figure 3 The participant decreased time spent in HR zones one and two while increasing time spent in HR zones three and four. The participant spent more time at increased exercise intensities while the time spent at lower exercise intensities decreased.

Perceptions of Occupations and Experiences on the OEP

Participant Perception of Daily Behaviors

Reported Activities

The OEP prompted the participant to identify and rate their experiences associated with an activity done previously in the day (see Figure 1 for the excerpt of participant completed OEP). Participant reported activities included school seven/twelve sessions, which the participant identified as socializing; two/twelve activities were time spent at a friend's house, both sleepovers, which the participant identified as having fun. Two/twelve activities include playing video games; one identified as relaxing, the other as socializing. Lastly, the participant reported

breaking up with his girlfriend, which he identified as other, commenting “anxiety.” Participant reported activities, including sleepovers and breaking up with his girlfriend, were associated with the participant rating the exercise sessions as “working” (see Table 2).

Hours Slept

The participant reported on his sleep and wake times, reporting seven to nine hours of sleep, ten/twelve sessions, one hour of sleep, one/twelve sessions, and six hours of sleep, one/twelve sessions. When the participant experienced less sleep, this was associated with rating the exercise sessions as “working” (see Table 2)

Energy Renewal

The participant rated their sense of energy renewal upon waking up. The participant rated one/twelve sessions with a (5/6) moderate sense of renewal, eight/twelve sessions as (4/6) little renewal, two/twelve sessions as (3/6) little sense of energy drain, and one/twelve sessions was not rated (see Table 2).

Perception of Exercise as Occupation

After completing the exercise sessions, the participant identified the exercise from 15 pre-determined occupations (see Figure 1). The participant rated one/twelve sessions as relaxing, two/twelve sessions as maintaining health, three/twelve sessions as having fun, five/twelve sessions as working, and one/twelve sessions as not rated. Participant ratings of “working” were associated with two reports of lack of sleep, one of getting sick, and one of breaking up with his girlfriend (see Table 2).

Sense of Pleasure

The participant reported an overall (6/6) strong sense of pleasure in eight/twelve sessions, (5/6) moderate overall pleasure in two/twelve sessions, and (4/6) little sense of pleasure in

two/twelve sessions. Little sense of pleasure was associated with one hour of sleep and breaking up with his girlfriend (see Table 2).

Sense of Productivity

The participant reported an overall (6/6) strong sense of accomplishment in eight/twelve sessions, (5/6) moderate sense of accomplishment in three/twelve sessions, and (2/6) moderate sense of non-accomplishment for one/twelve sessions. A moderate sense of non-accomplishment was associated with one hour of sleep (see Table 2).

Sense of Energy Renewal

The participant reported an overall (6/6) strong sense of energy renewal one/twelve sessions, (5/6) moderate sense of energy renewal five/twelve sessions, (4/6) little sense of energy renewal two/twelve sessions, (3/6) little sense of energy drain four/twelve sessions. Little sense of energy drain was associated with one hour of sleep, getting sick, breaking up with his girlfriend, and the first exercise session (see Table 2).

Participant Learned Experiences

The participant was asked open-ended questions to reflect on their learned experiences regarding themselves, their activities, and their experiences post-exercise sessions. The participant reported improvements in mindset in six/twelve sessions, with three sessions stating, “exercise puts him in a better mood, having a strong mindset, being a hard worker, loving the challenge, and being happy when he does this.” The participant noted difficulties during five/twelve sessions, stating that his “mental plays a huge part on how I workout” and “getting a lot of cramps,” both associated with lack of sleep (see Table 2). The BSCS yielded inconclusive results.

Table 2*Changes in Perceptions of Occupations and Experiences*

<i>Activity</i>	<i>Sleep</i>	<i>Ren</i>	<i>Occupation</i>	<i>Pl</i>	<i>Pr</i>	<i>Rest</i>	<i>Learned Exp</i>
School	7	3	Maint. Health	6	5	3	Exercise puts me in an overall better mood
School	7	4	Maint. Health	6	6	6	I have a strong mindset
School	7	4	Having Fun	5	6	5	I am a hard worker
Sleepover*	1	N/A	Working***	4	2	3	My mental plays a huge part on how I workout
School	7	4	Working***	6	6	5	I sweat a lot
Play VR	8	5	Relaxing	6	6	5	More I work the easier it gets
School **	8	4	Working***	5	5	3	I love the challenge
Sleepover*	6	4	Working***	6	6	4	I get a lot of cramps
School	7	4	Having Fun	6	6	5	Clumsy
Break-up*	8	3	Working***	4	5	3	I'm happy when I do this
School	9	4	N/A	6	6	4	I sweat too much
Video Game	8	4	Having Fun	6	6	5	N/A

Note. *Activity* = activity that the participant reported on prior to exercise session. *Sleep* = hours slept the previous night. *Ren* = feeling of renewal upon waking. *Occupation* = occupation the participant perceived the exercise session to be. *Pl* = overall pleasure; *Pr* = productivity; *Rest* = restoration. *Ren*; *Pl*; *Rr*; *Rest* capture range of experience (1-6, i.e., 1 = strong sense of displeasure to 6 = strong sense of displeasure). *Learned Exp* = comments participant learned about themselves, activities, and experiences after the exercise session. * Indicates stressful life experiences (i.e., lack of sleep and breaking up with his girlfriend) and how this changed his perception of the occupation of exercise. ** Indicates getting sick. *** Indicates rating of working associated with environmental factors listed above.

Discussion

This study aimed to examine the feasibility of HIT in improving self-control, healthy-related behaviors, and occupational participation in at-risk adolescents. The results suggest that engaging in a five-week high-intensity exercise protocol may have contributed to the participant's self-control and decision-making when engaging in various activities. Including the OEP and field notes allowed researchers to capture the participant's insight into how various activities contributed to or inhibited desired exercise intensity, leading to desired outcomes. This study details the transitions of a 14-year-old male's physiological and behavioral responses to participating in a five-week HIT protocol. The following discussion details the researcher's interpretation of physiological and participant self-reported data, study limitations, recommendations for future research, and program implementation.

Biopsychosocial Responses to HIT

Results demonstrated noticeable changes in the participant's biopsychosocial responses to the exercise intervention. Of these responses, one of the most prominent was the participant's self-reported RPE and how this corresponded with his heart rate throughout the study. The participant maintained an average RPE of 16.5 while increasing his HR max to 183 BPM. These results indicate that although the participant's objective data indicated he was working harder, his subjective perception of exercise intensity remained the same throughout the study.

Scherr et al. (2012) suggest that as heart rate increases, so does RPE. However, several factors may contribute to one's perception of effort. For example, mental stress may significantly increase subjective ratings of RPE while the heart rate remains constant (Umer et al., 2022). In contrast, as individuals increase their workload over time, they increase their cardiorespiratory fitness; therefore, the perceived effort intensity decreases (Cabral et al., 2018; Moreau et al.,

2017). This has been evidenced in previous studies where participants demonstrate increases in cardiorespiratory fitness and VO₂ max after completing an exercise protocol (Fernandez-Rodriguez et al., 2022)

As the exercise sessions progressed, the participant spent more time at higher intensities. The exercise protocol aimed for the participant to spend as much time between zones 3-5, placing him between 75-85% of his HRmax as this illicit increased BDNF and neuroplasticity (Hornby et al., 2022). The participant spent more time in zones three and four while inversely spending less time in zones one and two. Notably, the participant increased time in zones three and four while maintaining the same average RPE of 16.5. Therefore, the participant's ability to increase exercise intensity while maintaining his perceived effort is substantiated.

These findings are essential for the occupational therapy profession for many reasons. Notably, therapists are apprehensive about pushing patients to intensities promoting neuroplasticity, healing, and change. This data suggest patients' abilities to increase exercise intensities while decreasing or maintaining perceived effort. This is especially important based on the principles of neuroplasticity, specifically intensity, and repetition, as the participant increased his intensity after repeating the protocol. Additionally, these data shed light on the importance of monitoring physiological and psychological measures to ensure patients reach appropriate intensities to illicit the desired changes.

Perceptions and Experiences of Occupations

Environmental Factors and Occupational Experiences

The results of the OEP demonstrate several emerging themes. Interestingly, the participant's perception of the occupation of exercise depended largely on internal and external environmental factors. These internal and external environmental factors likely contributed to the participant's mental and physical well-being, affecting his ability to put forth the desired effort

and intensity. Of particular interest were days after the participant reported a lack of sleep, being sick, or breaking up with his girlfriend, resulting in reporting exercise sessions as “working.” This rating contrasts other exercise sessions identified as maintaining health, having fun, or relaxing. Thus, the participant’s perception of exercise altered depending on various life stressors, a finding consistent in the literature (Umer et al., 2022). Examining the participant’s reflections was crucial because it allowed researchers to see how they facilitated the participant’s insight, often lacking in adolescents, into how decisions leading to limited sleep hindered his performance and enjoyment of occupations. These insights may have improved the participant’s decision-making and self-control, as he reported ensuring more sleep during his next sleepover. Another possibility is that engaging in HIT influenced BDNF levels in the brain, leading to structural and functional alterations in the pre-frontal cortex, facilitating self-control and impulsivity, a consistent finding in the literature (Cabral et al., 2018; Fernandez-Rodriguez et al., 2022). However, future research is needed to understand the exact mechanisms involved in these behaviors.

Additionally, these environmental factors may have contributed to the participant's overall sense of pleasure, productivity, and restoration experienced after exercise sessions. Most of these sessions gave the participant a strong sense of pleasure. However, the participant reported two instances of experiencing little sense of pleasure, those being after having one hour of sleep and breaking up with his girlfriend. When examining the participant’s feelings of accomplishment, he indicated eight of the sessions provided a strong sense of accomplishment, corresponding with few stressful environmental factors, three sessions with a moderate sense of accomplishment, one of which was after his breakup with his girlfriend and the other when he

was beginning to get sick. Moreover, following reports of one hour of sleep, the session was rated as a moderate sense of non-accomplishment.

Finally, when rating his overall sense of restoration, there were variances in ratings from a little energy drain to strong energy renewal. Notably, the participant rated several sessions as leaving him feeling slightly drained; these included those proceeding one hour of sleep, getting sick, breaking up with his girlfriend, and the first session. Interestingly, all but one session was proceeding stressful environmental factors except for the first session. Feelings of drain after the first session could have resulted from a lack of familiarity with HIT, leading to feelings of exhaustion. These reflections can provide therapists and participants with insight into environmental factors and behaviors that inhibit or contribute to their participation and enjoyment in occupations, providing an opportunity to alter their decisions and improve self-control, hoping to decrease engagement in maladaptive behaviors.

Self-Efficacy, Self-Control, and Decision Making

Psychological aspects may have contributed to the participant's self-efficacy, self-control, and decision-making. Using the OEP, the participant reflected on behaviors, activities, and experiences during exercise sessions. Participant reflections from the first three sessions indicated improved mood, mindset, and effort, possibly leading to increased exercise intensity. Moreover, his reflections post-sleep deprivation indicated insight into how lack of sleep decreased performance and mental fortitude. The participant later indicated he realized how detrimental so little sleep was to his performance and state of mind, stating that the experience led him to increase his sleep during the next sleepover. These findings are consistent with literature indicating that HIT leads to improved sleep behaviors and decreased maladaptive behaviors such as substance use (Delisle et al., 2010). These findings also suggest that the

participant's belief system and sense of mastery may have led to increased efforts, improving his performance and decision-making skills (More et al., 2017).

These findings are pivotal for the occupational therapy profession as they demonstrate the interplay between an individual's context, environment, and client factors contributing to one's overall experience of occupations. For example, these data describe how the temporal aspect of sleep, the physiological aspect of one's immune system, the mental aspect of one's perception of self-efficacy, social relationships, and life stressors contribute to one's overall sense of pleasure, productivity, and restoration shaping how they experience and even define occupations.

Pierce (2001) discusses subjective dimensions of occupation, including restoration, pleasure, and productivity, ultimately leading to the appeal of occupations. Practitioners can utilize HIT to improve executive functions of problem-solving and decision-making (Delisle et al., 2010; More et al., 2017) with the OEP to assist clients in understanding how certain occupations, such as exercise, lead to feelings of pleasure, restoration, and productivity, while other occupations and behaviors, such as lack of sleep, may hinder these feelings. Furthermore, practitioners need to consider the contextual dimensions of occupations, including spatial, temporal, and sociocultural factors, leading to the intactness of occupations. Practitioners can facilitate their therapeutic power by utilizing the appeal and intactness of occupations to collaborate with clients in the intervention process, resulting in increased client outcomes.

Limitations

Various limitations inhibit the study's generalizability to the target populations. These include the duration and frequency of the intervention, accuracy of self-report data, including the OEP, engagement in maladaptive behaviors, and RPE. Moreover, the lack of transportation and participant responsibilities led to various scheduling conflicts. Future

studies would benefit from a location providing participants access after school hours and on weekends to accommodate various schedules and responsibilities. Multiple researchers conducting the study could also provide additional support and opportunities for several participants to run through the protocol simultaneously, facilitating increased access to the exercise intervention.

Research also suggests that frequency, intensity, and exercise duration are important factors for improved results (Delisle et al., 2010; Peruyero et al., 2017; Szuhany et al., 2015). While consensus regarding optimal dose, frequency, and duration of HIT is limited, research has demonstrated improvements in as little as 10 min/day for five days per week (Moreau et al., 2017). Therefore, researchers anticipated improved results with the current protocol of 30 minutes three times weekly.

Exercise requires a level of emotional resiliency, which limited some participants from completing the study. Future studies would need to identify and factor in potential subjects' emotional resiliency prior to participation. Participants' limited exposure to HIT may pose difficulty reaching intensities of 75-85% of HRmax, as a minimum of four sessions were required to reach the desired intensity throughout the study. Future protocols should consider incorporating shorter exercise durations of 15 minutes instead of the current study's 30 minutes, hoping to facilitate the prescribed exercise intensity.

Section V

Ethical and Legal Considerations

Safety

Potential Risks

Adolescents are a vulnerable population and at-risk adolescents even more so. Therefore, it was crucial to have several measures in place to ensure participant safety. While the study and exercise protocol posed a minimal risk of injury, several factors needed to be accounted for upon the study's implementation. These included receiving a letter of approval to participate in exercise from a licensed healthcare provider; participants were instructed to wear comfortable athletic clothing and shoes and be honest about their previous exercise history. In addition, the participant's blood pressure and oxygen saturation were monitored pre- and post-session, while their heart rate was continuously monitored throughout the exercise session. Additionally, the student researcher is a certified personal trainer and instructed the participant on proper body mechanics to ensure safety (see Appendix R for the exercise safety protocol).

Definition of Events

UNLV is required to conduct a continuing review of research to comply with the US Office of Human Research Protections (OHRP), the Food and Drug Administration (FDA), and the UNLV Human Subject Policy. Monitoring adverse reactions and unexpected events is part of this continuing review requirement (21 CFR 56.108 and 45 CFR 46.103).

Adverse Event Definitions

Unexpected Adverse Event is an adverse event for which the specificity is not consistent with any of the following: approved protocol, risk information in the consent form, reasonably expected natural history, and progression of the underlying disease or condition being studied (University of Nevada, Las Vegas, 2022).

Serious Adverse Event is an adverse event that results in any of the following outcomes: death, a threat to life, inpatient hospitalization, or prolongation of existing hospitalization, persistent or significant disability or incapacity, congenital anomaly or birth defect, causes cancer, an overdose, any medical event that requires treatment to prevent one of the medical outcomes listed above (University of Nevada, Las Vegas, 2022).

Related Adverse Event is an adverse event that may have been caused by the drug, device, or intervention; however, there is insufficient information to determine the likelihood of this possibility (University of Nevada, Las Vegas, 2022).

Unrelated Adverse Event is an adverse event that has seemingly no relationship to the study. See Appendix for Adverse Event Documentation (University of Nevada, Las Vegas, 2022).

Conclusion

There is a rise in adolescents engaging in maladaptive behaviors, leading to decreased engagement and participation in healthy occupations, some of which include leisure, education, and social participation (AOTA, 2016; CDC, 2019; Gupta et al., 2022). Extensive literature demonstrates exercise improve outcomes in this population (Delisle et al., 2010; Szuhany et al., 2015). Therefore, this project aimed to design a feasibility study for future research using HIT to improve self-control, health-related behaviors, and occupational participation in at-risk adolescents at Real Talk, as measured by the OEP. This project aimed to trial the OEP with an adolescent population to gain insight into their experiences when engaging in healthy and maladaptive behaviors and how their participation in these activities contributed to their health and well-being.

The study's results suggested that engaging in HIT led to biopsychosocial responses, including improved cardiorespiratory fitness, insight, executive functions, health-related choices

such as sleep, and engagement in healthy occupations. Utilizing these data in conjunction with the OEP led to improved insight into how environmental and client factors, such as sleep, immunology, social interactions, and leisure, contributed to the participant's perception of the occupation of exercise and his ability to push himself to greater intensities. These insights may have improved self-efficacy and decision-making when faced with challenging situations.

This project intended to contribute to scholarship and understanding of how occupational therapy practitioners may utilize HIT as an occupation as an ends to improve self-control and occupational participation in healthy occupations, thus providing the profession with additional therapeutic interventions for those in need. Lastly, this project aimed to increase occupational participation in healthy occupations while decreasing participation in maladaptive occupations.

Appendices

Appendix A: Definition of Terms

Definition of Terms

Adverse Childhood Experiences (ACEs): “Potentially traumatic events that occur in childhood (0-17 years)” including but not limited to “experiencing violence, abuse or neglect, witnessing violence in the home or community, having a family member attempt or die by suicide. Also included are aspects of the child’s environment that can undermine their sense of safety, stability, and bonding, such as growing up in a household with substance use problems, mental health problems, instability due to parental separation, or household members being in jail or prison” (CDC, 2023).

At-risk Adolescents/Youths: Individuals at risk for participating in health-related maladaptive behaviors that may lead to chronic disease, incarceration, or death and include substance use, tobacco use, lack of physical activity, poor dietary behaviors, behaviors contributing to violence and unintentional injuries, and sexual behaviors related to sexually transmitted diseases and unintended pregnancy (CDC, 2019).

Brain-derived Neurotrophic Factor (BDNF): “A neuropeptide that regulates the growth, survival, and differentiation of neurons and that affects synaptic plasticity, especially by mediating long-term potentiation” (Merriam-Webster Dictionary, 2023)

Decision-making Skills: A person's decision-making skills consist of cognitive and behavioral abilities that enable them to select the most appropriate course of action out of various options or alternatives (Laberge et al., 2012).

Health-related Behaviors: Individuals' actions and choices that either promote or compromise their health and well-being. These behaviors include a wide range of actions, including physical activity, nutrition, tobacco use, alcohol consumption, safe sexual practices,

stress management, preventative healthcare, injury prevention, and mental health practices, promoting self-care (CDC, 2019).

High-intensity Exercise (HIT): Exercise that targets high aerobic intensities where the goal is to maintain their heart rate between 75% to 85% of their heart rate reserve. Individual's heart rate reserve is calculated "where Maximum Predicted HR = $208 - (0.7 \times \text{age})$ and 75% to 85% HR reserve = Rest HR + [(Maximum HR – Rest HR) × (75%–85%)]." (Holleran et al., 2014).

Maladaptive Behaviors: "A condition in which biological traits or behavior patterns are detrimental, counterproductive, or otherwise interfere with optimal functioning in various domains, such as successful interaction with the environment and effectual coping with the challenges and stresses of daily life." (*APA Dictionary of Psychology*, n.d.)

Neuroplasticity: "The ability of the brain and central nervous system to adapt to environmental change, respond to injury, and to acquire novel information by modifying neural connectivity and function." (Knaepen et al., 2010)

Rate of perceived exertion (RPE): This tool measures an individual's perceived exertion during physical activity. It indicates how hard the body feels it is working based on physical sensations experienced by the participant, including elevated respiration, heart rate, sweating, and muscle fatigue. The scale ranges from 6-20, where 6 is no exertion, and 20 is maximal exertion. (Williams, 2017) See Appendix for RPE scale.

Self-control: "Restraint exercised over one's own impulses, emotions, or desires" (Merriam-Webster Dictionary, 2023).

Self-regulation: One's ability to control emotions, carry out self-directed learning, avoid inappropriate behaviors, and positively interact with others. As the voluntary execution of goal-

related behavior, self-regulation can be seen as the voluntary administration of executive function. (Pandey et al., 2018)

Appendix B: Exercise History Questionnaire

Please answer check all that apply.

Have you ever exercised or been active in sports yes no

Are you regularly active in sports and/or exercise yes no

If yes, approximately how many hours per week do you exercise?

fewer than 5 hours 10 -14 hours 20 or more hours

5 – 9 hours 15 -19 hours

If yes, approximately how many days per week do you exercise?

1-2 3-5 5 or more

If yes, what types of exercise do you do?

resistance training walking cycling

running sports (football, basketball etc.) dance

martial arts other

If no, have you ever been regularly active in sports or exercise? yes no

If yes, how long ago were you regularly active in sports or exercise?

less than two weeks ago less than one month ago less than 6 weeks ago

more than 6 weeks ago

If yes, what types of exercise did you do?

resistance training walking cycling

running sports (football, basketball etc.) dance

martial arts other

Do you have any known injuries that would prevent you from doing hard exercise?

yes no

If yes, please list your injuries _____

Appendix C: Brief Self-Control Scale

Using the scale provided, please indicate how much each of the following statements reflects how you typically are. Rate 1-5 not at all to very much (circle the correct number)

1. I am good at resisting temptation
1 2 3 4 5

2. I have a hard time breaking bad habits
1 2 3 4 5

3. I am lazy
1 2 3 4 5

4. I say inappropriate things
1 2 3 4 5

5. I do certain things that are bad for me if they are fun
1 2 3 4 5

6. I refuse things that are bad for me
1 2 3 4 5

7. I wish I had more self-discipline
1 2 3 4 5

8. People would say that I have iron self-discipline
1 2 3 4 5

9. Pleasure and fun sometimes keep me from getting work done
1 2 3 4 5

10. I have trouble concentrating
1 2 3 4 5

11. I am able to work effectively toward long-term goals
1 2 3 4 5

12. Sometimes, I can't stop myself from doing something, even if I know it is wrong
1 2 3 4 5

13. I often act without thinking through all of the alternatives
1 2 3 4 5

Appendix D: OEP

Participant Information

First Name: _____

Last Name: _____

Date of Birth: ___ / ___ / _____

Gender: _____

In general, would you say your health is:

Excellent Very Good Good Fair Poor

Do you have a medical condition or history of a medical condition? Yes No No Response

How satisfied are you with your health?

Very Dissatisfied Dissatisfied Neither Satisfied or Dissatisfied Satisfied Very Satisfied

Please explain:

How satisfied are you with your ability to perform your daily living activities?

Very Dissatisfied Dissatisfied Neither Satisfied or Dissatisfied Satisfied Very Satisfied

Please explain:

How would you rate your quality of life?

Very Poor Poor Neither Poor nor Good Good Very Good

Please explain:

Date: ___/___/___

The day I recorded was (check one): Monday Tuesday Wednesday
 Thursday Friday Saturday Sunday

I went to sleep at _____ (time)

I slept _____ hours

When I woke up this morning, I felt (check one):

Strong Sense Drain Moderate Sense Drain A little Drain Little Renewal Moderate Renewal Strong Sense Renewal

Time began	Time ended	Main activity	I considered this activity to be: Select the BEST ONE:	With: Alone Other	Where: Home Away Indoor Outdoor	PL	PR	Rest	Con
I got up at:			<input type="checkbox"/> Caring for Self <input type="checkbox"/> Caring for Others <input type="checkbox"/> Caring for Home <input type="checkbox"/> Getting goods/services <input type="checkbox"/> Having Fun <input type="checkbox"/> Enriching/Learning <input type="checkbox"/> Exper. Spirituality <input checked="" type="checkbox"/> Maintaining Health <input checked="" type="checkbox"/> Relaxing <input type="checkbox"/> Meeting Obligations <input type="checkbox"/> Socializing <input type="checkbox"/> Traveling <input type="checkbox"/> Volunteering <input type="checkbox"/> Working <input type="checkbox"/> Doing nothing <input type="checkbox"/> Other _____	<input type="checkbox"/> Alone <input type="checkbox"/> Others	<input type="checkbox"/> Home <input type="checkbox"/> Away <input type="checkbox"/> In <input type="checkbox"/> Out	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6
			<input type="checkbox"/> Caring for Self <input type="checkbox"/> Caring for Others <input type="checkbox"/> Caring for Home <input type="checkbox"/> Getting goods/services <input type="checkbox"/> Having Fun <input type="checkbox"/> Enriching/Learning <input type="checkbox"/> Exper. Spirituality <input type="checkbox"/> Maintaining Health <input type="checkbox"/> Relaxing <input type="checkbox"/> Meeting Obligations <input type="checkbox"/> Socializing <input type="checkbox"/> Traveling <input type="checkbox"/> Volunteering <input type="checkbox"/> Working <input type="checkbox"/> Doing nothing <input type="checkbox"/> Other _____	<input type="checkbox"/> Alone <input type="checkbox"/> Others	<input type="checkbox"/> Home <input type="checkbox"/> Away <input type="checkbox"/> In <input type="checkbox"/> Out	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6
			<input type="checkbox"/> Caring for Self <input type="checkbox"/> Caring for Others <input type="checkbox"/> Caring for Home <input type="checkbox"/> Getting goods/services <input type="checkbox"/> Having Fun <input type="checkbox"/> Enriching/Learning <input type="checkbox"/> Exper. Spirituality <input type="checkbox"/> Maintaining Health <input type="checkbox"/> Relaxing <input type="checkbox"/> Meeting Obligations <input type="checkbox"/> Socializing <input type="checkbox"/> Traveling <input type="checkbox"/> Volunteering <input type="checkbox"/> Working <input type="checkbox"/> Doing nothing <input type="checkbox"/> Other _____	<input type="checkbox"/> Alone <input type="checkbox"/> Others	<input type="checkbox"/> Home <input type="checkbox"/> Away <input type="checkbox"/> In <input type="checkbox"/> Out	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6

Comments:

End of Day Record

1. My overall pleasure for the day was:

- Strong sense of displeasure
- Moderate sense of displeasure
- Little sense of displeasure
- Little sense of pleasure
- Moderate sense of pleasure
- Strong sense of pleasure

2. My overall productivity for the day was:

- Strong sense of non-accomplishment
- Moderate sense of non-accomplishment
- Little sense of non-accomplishment
- Little sense of accomplishment
- Moderate sense of accomplishment
- Strong sense of accomplishment

3. My overall restoration for the day was:

- Strong sense of energy drain
- Moderate sense of energy drain
- Little sense of energy drain
- Little sense of energy renewal
- Moderate sense of energy renewal
- Strong sense of energy renewal

4. My overall connection for the day was:

- Strong sense of social disconnection
- Moderate sense of social disconnection
- Little sense of social disconnection
- Little sense of social connection
- Moderate sense of social connection
- Strong sense of social connection

5. Overall, how do you feel about your day? Please explain.

6. How well did your activities and experience recorded for the day represent a typical day in your current life?

- Very similar
- Somewhat similar
- Not similar at all

7. How well did your activities and experiences recorded for the day support your physical, mental and emotional well-being?

- Really supported
- Kind of supported
- Did not support

Comments:

Reflections

1. When thinking about the days I recorded overall, I was satisfied with how I spent my time.

- Strongly Agree Somewhat Agree Somewhat Disagree Strongly Disagree

Comments:

2. When thinking about the days I recorded overall, I was satisfied with the variety of activities

- Strongly Agree Somewhat Agree Somewhat Disagree Strongly Disagree

3. When thinking about the days I recorded overall, I was satisfied with my experiences associated with my activities?

- Strongly Agree Somewhat Agree Somewhat Disagree Strongly Disagree

Comments:

4. As you recorded your activities, what did you learn about yourself, your activities or your experiences?

5. Please share any other thoughts or comments



Doctorate of Occupational Therapy

Teenagers needed for a research study at the Real Talk Youth Impact Program (Real Talk)

Is your teenager an English-speaking teenager between **13-18 years old** currently or previously enrolled in Real Talk and who struggles with at least one of the following

- poor grades
- substance use
- criminal activity
- gang affiliation
- previously or currently on parole or probation



Your teenager will complete a 30-minute exercise session, three (3) times a week for 4 weeks, and will be asked about their experience.

Your teenager will receive compensation of up to
\$170.00

For more information, scan the QR code or contact:
Donnamarie Krause, PhD, OTR/L
donnamarie.krause@unlv.edu
and
Tashia Kaplan OTD/S
kaplat3@unlv.nevada.edu

The purpose of this research study is to understand if moderate to vigorous training improves self-control and healthy behaviors in teenagers with a history of unhealthy choices.

Appendix F: Participant Recruitment Flyer

Do you have a hard time controlling what you say or do?

Do you want to have fun and improve your health?

Join our research study at Real Talk Youth Impact Program (Real Talk)

- Have fun doing moderate to vigorous exercise for 30-60 minutes
- 3 times a week, for 4 weeks
- Answer questions about your experience

Who can join?

If you are...

- between 13-18 yrs old
- Previously or currently enrolled at Real Talk
- Meet at least one of the following
 - Poor grades
 - Use drugs, alcohol, or tobacco
 - Involved in crimes
 - Involved in gangs
 - Currently or previously on parole or probation

Participants will receive up to \$170

Help us understand if exercise will help you improve self-control and healthy behaviors

Want more information?
Scan the QR code or contact:
Donnamarie Krause, PhD, OTR/L
donnamarie.krause@unlv.edu
and Tashia Kaplan OTD/S
kaplat3@unlv.nevada.edu



UNLV
Doctorate of Occupational Therapy

Appendix G: Google Interest Form

Adolescents Exercise and Self Regulation Research Study Interest Form

If you are interested in participating in the study, please fill out the form below and you will be contacted by a doctoral student to explain the study and answer your questions,

kaplat3@unlv.nevada.edu [Switch account](#)



Not shared

Name and email address

Your answer

Telephone number

Your answer

Preferred method of contact

Your answer

Submit

[Clear form](#)

Never submit passwords through Google Forms.

This form was created inside of University of Nevada, Las Vegas. [Report Abuse](#)

Google Forms

Appendix H: Demographic Questionnaire

1. Name:

2. Age:
3. Weight:
4. Height:
5. Gender:
6. Race:
7. Ethnicity:

Appendix I: Physical Clearance Form



SCHOOL OF INTEGRATED HEALTH SCIENCES

Department of Brain Health OCCUPATIONAL THERAPY

Physician's Physical Evaluation Clearance Form

Name _____ Sex: M F

Date of Birth _____ Age _____

Please check one of the following:

- o Cleared to participate in vigorous, high-intensity-interval-training (HIIT) with no indicators for cardiovascular risk factors.
o Not cleared to participate in vigorous, high-intensity-interval-training (HIIT)

Reason _____

Any restrictions related to the individual's ability to participate in exercise:

I have examined the above-named participant and completed the physical evaluation clearance form. The participant does not present apparent clinical contraindications to participate in exercise. A copy of the physical exam is on record in my office and can be made available to the University of Las Vegas, Nevada (UNLV) at the request of the participant and/or University. If conditions arise after the individual has been cleared for participation, the Medical Practitioner may rescind the clearance until the problem is resolved and the potential consequences are completely explained to the participant (and guardians).

Name of Medical Practitioner (print/type) _____

Address _____ Phone _____

Signature of Medical Practitioner _____ Date _____

EMERGENCY INFORMATION

Allergies _____

Medications _____

Precautions _____

Other Information _____

Appendix J: Recruitment Email Script

Hello,

My name is Tashia Kaplan, OTD/S, and I am going to school to be an occupational therapist. I am going to do a research project to see if high-intensity exercise will help people have better self-control and do healthy things.

We need 1 to 4 people to be a part of our study.

To be able to take part in this study, you must meet some conditions, which are:

Be between 13 and 18 years old,

If you are under the age of 18, you must get permission from your parent or legal guardian to be in the study

Be able to speak English

Be okay with doing an exercise program and answer questions about it,

Have a medical professional say it is okay for you to do the exercise program

Have been or are in the Real Talk Youth Impact Program.

Also, you must have done or are doing now one of these next things:

- substance use;

- including things like prescription and non-prescription drugs, illegal drugs, alcohol, or tobacco

- be part of a gang;

- criminal things,

- be on parole or probation,

- have a grade point average of less than 2.0,

- have had any bad childhood events.

If you meet the above things, you will be working with a team of licensed occupational therapists, a certified personal trainer, and a doctorate of occupational therapy student to make sure you are safe in this study.

If you meet any of the following things, you will not be able to be in this study:

- Under the age of 13 years old

- Over the age of 18 years old

- Current or previous history of high blood pressure

- Current or previous history of cardiac problems

- Must be less than the 97th percentile using the BMI for Children scale

- Exclusion of non-English for safety following directions during this study

- Joint, mobility or movement issues that would limit participation in an exercise program

This study will happen from February 2023 to March 2023 over four weeks.

During the exercise portion of the sessions, you will be exercising for a total of 30 minutes. This will include a five-minute warm-up followed by 20 minutes of moderate to vigorous exercise and end with a five-minute cooldown. The exercises will be set up like a circuit, meaning they will be done one after the other. The following is what you will be doing during the exercise portion of the sessions:

- A. About five minutes
 - a. stretching
 - a. 10 bodyweight squats
 - a. 10 bear crawls
- i. repeat body weight squats and bear crawls for five minutes (rest breaks are allowed)
 - B. Circuit
 - a. ten ball slams (you will be throwing a 10-pound ball onto the ground ten times)
 - a. 30-second sled push (you will push a weighted sled for 30 seconds)
 - a. 30-second sled drags (you will pull a weighted sled for 30 seconds)
 - a. 30 seconds seated battle rope pulls (you will pull the sled with a battle rope for 30 seconds)
 - a. repeat steps 1-4 for 20 minutes
(If you get too tired at any point, you will be allowed to sit or walk before going to the next part of the circuit).
 - C. Cool down: five minutes of stretching

There are a total of 12 sessions. You will get \$10.00 per session, which will be paid out as Amazon gift cards as follows:

- The end of session three is \$30.00 (end of week one)
- The end of session six is \$30.00 (end of week two)
- The end of session nine is \$30.00 (end of week three)
- The end of session twelve \$30.00 (end of week four)

A transportation incentive of \$50.00 will be offered as a gas card for transportation costs. The \$50.00 will be given out as follows:

There are a total of 12 sessions. You will get \$12.50 per week, which will be given out at the beginning of each of the four weeks as follows:

- The end of session one is \$12.50 (the beginning of week one)
- The end of session four is \$12.50 (the beginning of week two)
- The end of session seven is \$12.50 (the beginning of week three)
- The end of session ten is \$12.50 (the beginning of week four)

The exercises will happen inside the multipurpose room at the Real Talk Youth Impact Program at 1300 S. Jones Blvd. Las Vegas, NV 89146. Your heart rate and blood pressure will be monitored to make sure that you are safe.

If you want to do the study, you will sign some forms saying that you are going to be a part of the study. The forms will be looked at by Tashia and her supervisor before you do the survey, interviews, or the exercise program. Before the exercises start, you will need to give us a form signed by your parent or guardian saying that you can be a part of an exercise program. You are expected during the duration of the study to not use illegal substances. If you have used illegal substances, we ask that you do not participate in the exercise protocol that day. You also need to have a doctor sign a Release Form. We have a medical professional that can do this for you at no charge to you.

If you are interested, please reply to this email to Tashia Kaplan at kaplat3@unlv.nevada.edu or call 702-771-2284. You can also call Donnamarie Krause at 702-895-1844 if you have questions. Thank you for your time.

Tashia Kaplan OTD/S
University of Nevada, Las Vegas
Department of Brain Health
School of Integrated Health Sciences
Occupational Therapy Program

Appendix K: Informed Consent with HIPPA



INFORMED CONSENT

Department of Brain Health-Occupational Therapy

TITLE OF STUDY: FEASIBILITY OF EXERCISE TO IMPROVE SELF-CONTROL IN AT-RISK ADOLESCENTS

INVESTIGATOR(S): DONNAMARIE KRAUSE, PHD, OTR/L; TASHIA KAPLAN OTD/S

If you have any questions about this study, contact Donnamarie Krause at **702-895-1844**. If you have any questions about the rights of research subjects any complaints or comments about how the study is being done, contact the **UNLV Office of Research Integrity – Human Subjects** at **702-895-2794** or via email at IRB@unlv.edu.

It is unknown as to the level of risk of transmission of COVID-19 if you decide to participate in this research study. The research activities will utilize accepted guidance standards for mitigating the risks of COVID-19 transmission: however, the chance of transmission cannot be eliminated.

PURPOSE OF THE STUDY

The purpose of this study is to see if a 4-week (30 minute- 60 minutes, three times per week for a total of 12 sessions) moderate to vigorous exercise program will improve self-control and health-related behaviors in at-risk adolescents as measured by the Brief Self-control Scale and the Occupational Experience Profile.

PARTICIPANTS

We are looking for individuals who are:

- 13-18 years old
- If you are under the age of 18, your parent or legal guardian must give you permission to be in the research study
- English speaking
- You were previously or currently enrolled in the Real Talk program

- Cleared by a medical professional to be in an exercise program
- Willing to be in an exercise program and answer questions about it
- Does not have to have a formal diagnosis but must have experienced at least **one** of the following:
 - Substance use or abuse, including tobacco
 - Gang affiliation
 - Currently on parole or probation
 - Less than a 2.0 GPA
 - Previous or current involvement in criminal activity
 - Experience any adverse childhood events (ACE)s

If you meet the following you will not be able to participate in the study:

Exclusion Criteria

- Under the age of 13 years old
- Over the age of 18 years old
- Current or previous history of high blood pressure
- Current or previous history of cardiac problems
- Joint, mobility or movement issues that would limit participation in an exercise program
- Must be less than the 97th percentile using the BMI for Children scale
- Exclusion of non-English for safety following directions during this study

PROCEDURES

We are looking for about 1-4 people between the ages of 13-18 to be in a research study lasting for four weeks. The research study will run from about February 2023 through March 2023. This program will happen at the Real Talk Youth Impact Program. If you or your child volunteer to be in this research study, we will ask you or your child to do these things:

Come to the Real Talk headquarters, where the exercises will take place for a total of 12 sessions during the week. The time will be decided between you and the student researcher. The first and last sessions will run for about 90 minutes so that there is time for you to fill out some forms and answer some questions, which will be used as baseline and follow-up assessments.

You are expected during the duration of the study to not use illegal substances. If you have used illegal substances we ask that you do not participate in the exercise protocol that day.

Before and during each of the 12 sessions of exercises, we will take your heart rate, blood pressure, and oxygen saturation using a pulse oximeter on your finger and a blood pressure cuff on your left arm. We will also require you to wear a heart rate monitor in the form of an armband while you exercise. The heart rate monitor is called a Polar Armband and shows us your heart rate throughout the exercise session. We are having you wear this so that we can see how hard you are exercising (see exercise safety protocol below for more details).

During the first session, we will explain how to use the Rate of Perceived Exertion scale, which is a number scale that allows you to tell us how hard you are exercising. Then the student researcher will teach you how to do the exercises during the first session (see exercise safety protocol below for more details).

During the exercise portion of the sessions, you will be exercising for a total of about 30 minutes. This will include a five-minute warm-up followed by 20 minutes of moderate to vigorous exercise and end with a five-minute cooldown. The exercises will be set up like a circuit, meaning they will be done one after the other. The following is what you will be doing during the exercise portion of the sessions:

- A. About five minutes
 - a. stretching
 - b. 10 bodyweight squats
 - c. 10 bear crawls
 - i. repeat body weight squats and bear crawls for five minutes (rest breaks are allowed)
- B. Circuit
 - a. ten ball slams (you will be throwing a 10-pound ball onto the ground ten times)
 - b. 30-second sled push (you will push a weighted sled for 30 seconds)
 - c. 30-second sled drags (you will pull a weighted sled for 30 seconds)
 - d. 30 seconds seated battle rope pulls (you will pull the sled with a battle rope for 30 seconds)
 - e. repeat steps 1-4 for 20 minutes
(If you get too tired at any point, you will be allowed to sit or walk before going to the next part of the circuit).
- C. Cool down: five minutes of stretching

If your heart rate gets too high (above 85% of your heart maximum, you will be asked to take a break until your heart rate goes back down below 70% of your heart rate maximum. During the break, you can either sit down or walk. You will also be allowed to take breaks when you feel winded or too tired to go on. If you decide to stop the exercise session for any reason, you will still get the compensation for the session and the compensation for the previous sessions that have been completed (see exercise safety protocol below).

- We will use the Brief Self-control Scale. This questionnaire helps us see how you make decisions.
- You will complete the Occupational Experience Profile time use diary before and after each exercise session. This means that you will record what activity you did earlier in the day and rate how that activity made you feel, and then you will record the exercise session and rate how doing the exercise made you feel. This will be done before and after each exercise session and will require about 20 minutes in addition to the scheduled exercise for the day.

BENEFITS OF PARTICIPATION

We hope this research study helps show the benefits and need for people to do moderate to vigorous exercise programs to help teenagers improve their decision-making and self-control. We hope having better self-control will lead to less unhealthy and more healthy daily activities.

Previous research suggests that moderate to vigorous exercise is a safe and effective way to improve different aspects of cognition, mood, self-esteem, cardiorespiratory and physical fitness, self-control, and decision-making skills in adults and adolescents. These improvements have been shown to help people engage in more healthy activities and less unhealthy activities in different areas of their lives.

RISKS OF PARTICIPATION

There are risks involved in all research studies; the risks for this study include the following:

Risks associated with the Occupational Experience Profile time use diary include: answering the well-being and satisfaction questionnaire may lead to discomfort when answering the questions.

To reduce these risks, you will be referenced by a number, and your name will be removed from all the documents. You can be as specific or general as you like when you write down your activities, as is identified in the instructions of the Occupational Experience Profile. As a mandated reporter, if you intend to harm yourself or others, we are required to report this information.

The exercise sessions will occur in a multipurpose room located inside the Real Talk building headquarters. There is a risk of loss of anonymity. Your confidentiality may be at risk while you're in Real Talk or during some of the activities you may be doing during or outside of the research. However, the sessions will take place individually. Participants will be assigned a random number that will be used for all identification purposes during the study. Participants' information (randomized number) will be stored at UNLV on an encrypted file that will be kept in a locked file that only the neutral student researcher can access. A master list will be created and kept by the Principal Investigator on a UNLV computer, password protected, and encrypted software. This information will be destroyed after seven years.

Participants doing moderate to vigorous exercise may feel uncomfortable because of a higher-than-normal heart rate, breathing (like being winded), and tired muscles.

There is also a small risk of injury when doing any exercise, including joint sprains or strains and bone breaks or fractures. Individual genetic predispositions may lead to certain cardiovascular conditions, increasing the likelihood of a heart attack. The student researcher will instruct participants on proper form and body mechanics to reduce the risk of injury.

There is an AED on site and the student researcher is a certified personal trainer with the National Strength and Conditioning Association, trained and certified in CPR and first aid, and will be present and monitoring participants throughout the entire exercise protocol.

See the exercise safety protocol below for physiological monitoring parameters and safety measures.

EXERCISE SAFETY PROTOCOL
All participants must receive a letter of approval from a licensed healthcare professional prior to beginning the exercise program.
Clothing should be unrestrictive and appropriate for physical activity to provide comfort and safety.
Clothing should be comfortable and provide room to lift, bend, and squat without restricting the body. <ul style="list-style-type: none">• Examples include joggers, sweatpants, unrestrictive shorts, leggings, tank tops, and t-shirts.
Shoes should be comfortable and appropriate for engaging in physical activities, including running and jumping, providing appropriate stability and traction. <ul style="list-style-type: none">• Examples include tennis shoes, running shoes, cross-training shoes, basketball shoes, etc.
Some participants may be deconditioned, so being honest about previous and current exercise participation, skills, and abilities is recommended. <ul style="list-style-type: none">• For example, some participants may not understand proper body mechanics while performing various types of exercise, so they may require additional instruction from the student researcher.
Participants will have their blood pressure measured pre and post-exercise and in the event that the participant requires a rest break. <ul style="list-style-type: none">• Initial blood pressure values at rest may not exceed the following:<ul style="list-style-type: none">○ Girls and boys may not exceed 120 mm Hg For safety, participants must not exceed the following blood pressure values during or post-exercise. <ul style="list-style-type: none">• For ages 12-13 years, the upper limit is 172 mm Hg for both girls and boys.• For ages 14-15 years, the upper limit is 174.7 mm Hg for girls and 177.3 mm Hg for

boys.

- For ages 16-17 years, the upper limit is 178.5 mm Hg for girls and 201.3 mm Hg for boys
- For ages 18 and above, the upper limit is > 190mm Hg for females and > 210 mmHg for males
- In the event that participants exceed the above values at any time, they will be required to rest until their blood pressure is below the values stated above
- Participant blood pressure will be taken three times, if their blood pressure readings do not meet the above specifications, they will not be allowed to participate in the day's session
- Participants will be allowed to discontinue the exercise activities at any point.
- If participants discontinue the exercise activities before the end of the session for any reason, they will still receive their incentive for that day and the previously completed sessions

Participants will be provided verbal and visual education, including the Borg 6-20 rate of perceived exertion scale (RPE) on correctly gauging and reporting their rate of perceived exertion; RPE will be monitored closely throughout the exercise session.

- Using the RPE scale is especially useful for deconditioned participants as this is a subjective measure of exercise intensity.
- Participants will be encouraged to maintain **at least an RPE 13**, which is **somewhat hard**, and not to exceed an **RPE 17**, which is **very hard**- as this is a subjective indicator of moderate to vigorous exercise intensity.
- If participants **exceed RPE 17**, they will be instructed to take a break until they feel ready to resume the exercise activity.
- Participants will be allowed to walk or sit during the break
- Participants will be provided water during the break if requested
- Participants are encouraged to express when they need a break (even if they are not meeting RPE 12-17) during the exercise session; as such, breaks will be provided when requested.
- Participants will be allowed to discontinue the exercise activities at any point.
- If participants discontinue the exercise activities before the end of the session, they will still receive their incentive for that day and the previously completed sessions.

Participants' heart rates will be monitored continuously via a Polar heart rate armband that will be secured to their upper arm throughout the entire exercise protocol to ensure safety and that they are within the parameters of **65% - 85% of their heart rate maximum HRmax (calculated at: $208 - .7 \times \text{age}$) which indicates moderate to vigorous exercise intensity.**

- Using the continuous Polar armband provides an objective measure of the participant's exercise intensity
- Participants will be encouraged to maintain at **least 65% - 75%** of their HRmax which is moderate intensity

- Participants will be encouraged to stay **within 70% - 75%** of their HRmax which is moderate to vigorous exercise intensity
- Participants will be instructed not to **exceed 75%- 85%** of their HRmax which is vigorous intensity, as measured by the Polar armband.
- If participants **exceed 85%** HRmax, they will be instructed to take a break until their heart rate is back down to **70% HRmax**, or until they are ready to resume activity
- Participants will be allowed to walk or sit during the break
- Participants will be provided water during the break if requested
- Participants are encouraged to express when they need a break (even if they are not meeting the 65% - 85% HRmax) during the exercise session; as such, breaks will be provided when requested.
- Participants will be allowed to discontinue the exercise activities at any point.
- If participants discontinue the exercise activities before the end of the session, they will still receive their incentive for that day and the previously completed sessions.

Participants' vitals, including heart rate, blood pressure, and oxygen saturation, will be monitored pre- and post-exercise sessions.

- It is expected that participants heart rate vary. See above for heart rate specifications (heart rate should not exceed 85% of HRmax)
- Participant's resting blood pressure should be between 90/60 - 115/80 for participants ages 13 and 105/73 - 120/81 for participants ages 14-19.
- Oxygen saturation should be between 95%-100%.
- See below if participants fall outside of these parameters.

Participants are recommended to alert student researchers if they experience any adverse events, including sharp pain, chest pain, dizziness, or shortness of breath.

- In the event of reporting any adverse events, vitals will be taken to ensure safety, and the session will be stopped until returning to normal
- Heart rate should not exceed 85% or their HRmax: exercise will be discontinued until participant reaches 70% of their HRmax
- Oxygen saturation should be between 95%-100%. If participants oxygen saturation levels fall outside of this range, exercise will be discontinued until values return to the normal range of 95%- 100%.

COST /COMPENSATION

There might be a financial cost to you to participate in this study, including transportation to and from Real Talk. The study will take about four weeks, about three times per week, for about 60 minutes of your time, for a total of 12 sessions the first and last session will be about 90 minutes, and the other ten sessions will be about 60 minutes. You will not be compensated for your time. A small incentive of a \$120.00 Amazon gift card will be offered to participants for volunteering for the research study. The \$120.00 will be given out as follows:

There are a total of 12 sessions. Participants will get \$10.00 per session, which will be paid out as follows:

- The end of session three is \$30.00 (end of week one)
- The end of session six is \$30.00 (end of week two)
- The end of session nine is \$30.00 (end of week three)
- The end of session twelve \$30.00 (end of week four)

A transportation incentive of \$50.00 will be offered as an Arco gas card for transportation costs. The \$50.00 will be given out as follows:

There are a total of 12 sessions. Participants will get \$12.50 per week, which will be given out at the beginning of each of the four weeks as follows:

- The end of session one is \$12.50 (the beginning of week one)
- The end of session four is \$12.50 (the beginning of week two)
- The end of session seven is \$12.50 (the beginning of week three)
- The end of session ten is \$12.50 (the beginning of week four)

If participants withdraw from the study at any time, the participant incentives will be prorated to their last participation date at a rate of \$10.00 per session. If the participant does not complete a session for any reason, they will still be provided the participant incentive for that session and the previous sessions they have completed. However, they will no longer be able to participate in future sessions.

If participants withdraw from the study at any time, the transportation incentive will not be prorated, as this incentive is provided for the week in advance. Since the participants will no longer be participating in future sessions, they will not receive any future transportation incentives.

Attendance and participation with RealTalk is separate from this study and participants are free to continue with RealTalk even if they stop participating in the study.

CONFIDENTIALITY

All information gathered in this study will be kept as confidential as possible. However, there is a risk of losing confidentiality while you're in Realtalk or some of the activities you may be doing outside of the research. However, participants will be assigned random numbers, and all written or oral references to the participants will refer to their assigned numbers. All records will be stored in a locked facility at UNLV and the principal investigator's locked office for seven years after completion of the study. After the storage time, the information gathered will be destroyed.

VOLUNTARY PARTICIPATION

Your participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. You may withdraw at any time without prejudice to your relations with UNLV. If you withdraw at any time, this will not affect your current or future participation with Real Talk. You are encouraged to ask questions about this study at the beginning or any time during the research study.

PARTICIPANT CONSENT:

I have read the above information and agree to participate in this study. I have been able to ask questions about the research study. I am at least 18 years of age. A copy of this form has been given to me.

Signature of Participant

Date

Participant Name (Please Print)

Authorization to Use or Disclose (Release) Health Information that Identifies You for a Research Study

If you sign this document, you give permission to the student researcher, PI, UNLV, and employees at the Real Talk Youth Impact Program to use or disclose (release) your health information that identifies you for the research study described above.

The health information that we may use or disclose (release) for this research includes:

All information in a medical record, results of physical examinations such as MRIs, medical history, or certain health information indicating or relating to healthy-related behaviors, including but not limited to body weight, height, substance use, and tobacco use

The health information listed above may be used by and/or disclosed (released) to:

Student researchers and their staff

UNLV and Real Talk Youth Impact Program are required by law to protect your health information. By signing this document, you authorize a student researcher from UNLV to use and/or disclose (release) your health information for this research. Those persons who receive your health information may not be required by Federal privacy laws (such as the Privacy Rule) to protect it and may share your information with others without your permission if permitted by laws governing them.

- Your health information will be used or disclosed when required by law.
- Your health information may be shared with a public health authority authorized by law to collect or receive such information to prevent or control disease, injury, or disability and conduct public health surveillance, investigations, or interventions.

- No publication or public presentation about the research described above will reveal your identity without authorization from you.
- If all information that does or can identify you is removed from your health information, the remaining information will no longer be subject to this authorization and may be used or disclosed for other purposes.

Please note that:

If you revoke this Authorization, you may no longer be allowed to participate in the research described in this Authorization.

PARTICIPANT CONSENT:

I have read the above information and agree to participate in this study. I have been able to ask questions about the research study. I am at least 18 years of age. A copy of this form has been given to me.

Signature of Participant

Date

Participant Name (Please Print)

Signature of participant or participant's personal representative (parent or legal guardian)

Date

applicable, a description of the personal personal representative

.Printed name of participant or participant's If representative's authority to sign for the participant

Signature of participant or participant's personal representative (parent or legal guardian)

Date

.Printed name of participant or participant's personal representative

If applicable, a description of the personal representative's authority to sign for the participant

Appendix L: Youth Assent Form



ASSENT TO PARTICIPATE IN RESEARCH

Feasibility of an Exercise Program to Improve Self-Control in At-Risk Adolescents

There is a virus that is going around called COVID-19 and it may make you sick. If you take part in this research study, we will try our best to keep you safe from getting COVID-19. But even though we try to keep you safe from getting COVID-19, there may be a chance you can still get this virus.

1. My name is Tashia Kaplan.
2. We are asking you to take part in a research study because we are trying to learn more about how doing moderate to vigorous exercise may help people improve their behaviors and have better self-control, especially with kids who are involved in the Real Talk Youth Impact Program.
3. If you agree to be in this study, we will ask you to come to the Real Talk Youth Impact Program headquarters over a four-week period three times per week for about 60 minutes per visit. We expect you not to use illegal substances the whole time that you are in the research study. If you have used illegal substances we ask that you do not participate in the exercise session for that day. The first session and the last sessions will last about 90 minutes so we can have you fill out a couple of assessments that will include simple questions about how you decide to respond to different situations. You will also answer a couple of short questions before and after each exercise session. After the first assessments are finished we will have you do about 30 minutes of moderate to vigorous exercise that will be set up like a circuit. This means you will do the exercises one after the other. The exercises will be things like slamming a medicine ball into the ground as hard as you can, pushing and dragging a sled, and pulling a sled while you are sitting down. The exercise is meant to feel somewhat hard to very hard. You will be allowed to take breaks as needed. If you decide that you want to stop the exercise session or that you do not want to be in the study anymore for any reason, you can drop out of the study. If you drop out of the study or stop exercising for any reason this will not affect your current or future participation in Real Talk. (See the exercise protocol below for more details).
4. There are always risks involved in research. You may feel anxious from having to answer questions. You may also feel a little discomfort, such as heavy breathing, sweating, and tired muscles. There is always a slight chance of injury when doing any type of exercise such as

sprains, strains, fractures, or broken bones and there is a risk for heart attack, depending on your family history. We are taking very strong measures to ensure your safety, so we will be monitoring your vital signs throughout the whole session. I am a certified personal trainer and will be sure to instruct you on the proper form to prevent injury. There is also a risk of a loss of confidentiality. This means that people might find out information about you. They might find this information out while you are doing activities at Real Talk or during the research study sessions.(See the exercise safety protocol below for more details)

5. There might be a financial cost to you to participate in this study, including transportation to and from Real Talk. The study will take about four weeks, about three times per week, for about 60 minutes of your time, for a total of 12 sessions the first and last sessions will be about 90 minutes, and the other ten sessions will be about 60 minutes. You will not be compensated for your time. A small incentive of a \$120.00 Amazon gift card will be offered to participants for volunteering for the research study. The \$120.00 will be given out as follows:

There are a total of 12 sessions. Participants will get \$10.00 per session, which will be paid out as follows:

- The end of session three is \$30.00 (end of week one)
- The end of session six is \$30.00 (end of week two)
- The end of session nine is \$30.00 (end of week three)
- The end of session twelve \$30.00 (end of week four)

A transportation incentive of \$50.00 will be offered as an Arco gas card for transportation costs.

The \$50.00 will be given out as follows:

There are a total of 12 sessions. Participants will get \$12.50 per week, which will be given out at the beginning of each of the four weeks as follows:

- The end of session one is \$12.50 (the beginning of week one)
- The end of session four is \$12.50 (the beginning of week two)
- The end of session seven is \$12.50 (the beginning of week three)
- The end of session ten is \$12.50 (the beginning of week four)

If you withdraw from the study at any time, the incentives will be prorated to their last participation date at a rate of \$10.00 per session. If you do not complete a session for any reason, you will still get the incentive for that session and the previous sessions you completed. However, you will no longer be able to participate in future sessions.

If you withdraw from the study at any time, the transportation incentive will not be prorated. Since you will no longer be participating in future sessions you will not get any future transportation incentives.

Attendance and participation with RealTalk is separate from this study and you are free to continue with RealTalk even if you stop participating in the study.

6. There is previous research suggesting that moderate to vigorous exercise may improve your ability to control what you say and do as well as help you make better choices, especially relating to things that can impact your health.

7. Please talk this over with your parents before you decide whether or not to participate. We will also ask your parents to give their permission for you to take part in this study. But even if your parents say “yes” you can still decide not to do this.
8. If you don’t want to be in this study, you don’t have to be. Remember, being in this study is up to you and no one will be upset if you don’t want to or even if you change your mind later and want to stop. If you decide not to volunteer for this study it will not affect your current or future participation in Real Talk.
9. You can ask any questions that you have about the study. If you have a question later that you didn’t think of now, you can call me at 702-771-2284 or ask me next time. You may call me at any time to ask questions. If I have not answered your questions or you do not feel comfortable talking to me about your question, you or your parent can call the UNLV Office of Research Integrity – Human Subjects at 702-895-2794.
10. Signing your name at the bottom means that you agree to be in this study. You and your parent or legal guardian will be given a copy of this form after you have signed it.

 Print your name

 Sign your name

 Date

 Parent or legal guardian name

 Signature of parent or legal guardian

 Date

 Parent or legal guardian name

 Signature of parent or legal guardian

 Date

Exercise Protocol Total Time ≈ 30 minutes	
Warm Up	Stretching→ 10 x body weight squats→ 10 x bear crawls <ul style="list-style-type: none"> ● Repeat body weight squats and bear crawls for two rounds ● Rest breaks are allowed
Circuit	
Pre-circuit	Pre-circuit is only done on the first session to familiarize participants with circuit and determine weight selection for sled activities and includes 5 medicine ball slams→ pushing sled x 10 seconds → pull sled x 10 seconds → seated rope pulls x 10 seconds <ul style="list-style-type: none"> ● Weight will be added to the sled in 10 lb increments: participant will indicate comfort level ● Medicine ball is 10 lbs Participants will then move on to station 1-4
Station 1	10 medicine ball slams <ul style="list-style-type: none"> ● Throw a 10 lb medicine ball forcefully on the ground
Station 2	30 second sled push <ul style="list-style-type: none"> ● Push a weighted sled for 30 seconds
Station 3	30 second sled drags <ul style="list-style-type: none"> ● Pull a weighted sled for 30 seconds
Station 4	30 second seated battle rope pulls <ul style="list-style-type: none"> ● From a seated position ● Pull weighted sled towards them Repeat stations 1-4 continuously for 20 minutes (see instructions below for instructions on RPE, heart rate, and breaks)
Cool down	<ul style="list-style-type: none"> ● Slowly walking until heart rate gets below 60% of heart rate maximum (calculated 208-age x .7)
Instructions on RPE	Participants will be provided verbal and visual education, including the Borg 6-20 rate of perceived exertion scale (RPE) on correctly gauging and reporting their rate of perceived exertion; RPE will be monitored closely throughout the exercise session. <ul style="list-style-type: none"> ● Using the RPE scale is especially useful for deconditioned participants as this is a subjective measure of exercise intensity. ● Participants will be encouraged to maintain at least an RPE 13, which is somewhat hard, and not to exceed an RPE 17, which is very hard- as this is a subjective indicator of moderate to vigorous exercise intensity. ● If participants exceed RPE 17, they will be instructed to take a break until they feel ready to resume the exercise activity. ● Participants will be allowed to walk or sit during the break

	<ul style="list-style-type: none"> • Participants will be provided water during the break if requested • Participants are encouraged to express when they need a break (even if they are not meeting RPE 13-17) during the exercise session; as such, breaks will be provided when requested. • Participants will be allowed to discontinue the exercise activities at any point. • If participants discontinue the exercise activities before the end of the session, they will still receive their incentive for that day and the previously completed sessions.
Heart rate specifications	<p>Participants' heart rates will be monitored continuously by the student researcher at all times via a Polar heart rate armband that will be secured to their upper arm throughout the entire exercise protocol to ensure safety and that they are within the parameters of 65% - 85% of their heart rate maximum HRmax (calculated at: $208 - .7 \times \text{age}$) which indicates moderate to vigorous exercise intensity.</p> <ul style="list-style-type: none"> • Using the continuous Polar armband provides an objective measure of the participant's exercise intensity • Participants will be encouraged to maintain at least 65% - 75% of their HRmax which is moderate intensity • Participants will be encouraged to stay within 70% - 75% of their HRmax which is moderate to vigorous exercise intensity • Participants will be instructed not to exceed 75%- 85% of their HRmax which is vigorous intensity, as measured by the Polar armband. • If participants exceed 85% HRmax, they will be instructed to take a break until their heart rate is back down to 70% HRmax, or until they are ready to resume activity • Participants will be allowed to walk or sit during the break • Participants will be provided water during the break if requested • Participants are encouraged to express when they need a break (even if they are not meeting the 65% - 85% HRmax) during the exercise session; as such, breaks will be provided when requested. • Participants will be allowed to discontinue the exercise activities at any point. • If participants discontinue the exercise activities before the end of the session, they will still receive their incentive for that day and the previously completed sessions.
<p>See attached exercise safety protocol for complete procedures</p>	

EXERCISE SAFETY PROTOCOL

All participants must receive a letter of approval from a licensed healthcare professional prior to beginning the exercise program.

Clothing should be unrestrictive and appropriate for physical activity to provide comfort and safety.

Clothing should be comfortable and provide room to lift, bend, and squat without restricting the body.

- Examples include joggers, sweatpants, unrestrictive shorts, leggings, tank tops, and t-shirts.

Shoes should be comfortable and appropriate for engaging in physical activities, including running and jumping, providing appropriate stability and traction.

- Examples include tennis shoes, running shoes, cross-training shoes, basketball shoes, etc.

Some participants may be deconditioned, so being honest about previous and current exercise participation, skills, and abilities is recommended.

- For example, some participants may not understand proper body mechanics while performing various types of exercise, so they may require additional instruction from the student researcher.

Participants will have their blood pressure measured pre and post-exercise and in the event that the participant requires a rest break.

- Initial blood pressure values at rest may not exceed the following:
 - Girls and boys may not exceed 120 mm Hg

For safety, participants must not exceed the following blood pressure values during or post-exercise.

- For ages 12-13 years, the upper limit is 172 mm Hg for both girls and boys.
- For ages 14-15 years, the upper limit is 174.7 mm Hg for girls and 177.3 mm Hg for boys.
- For ages 16-17 years, the upper limit is 178.5 mm Hg for girls and 201.3 mm Hg for boys

- For ages 18 and above, the upper limit is > 190mm Hg for females and > 210 mmHg for males
- In the event that participants exceed the above values at any time, they will be required to rest until their blood pressure is below the values stated above
- Participant blood pressure will be taken three times, if their blood pressure readings do not meet the above specifications, they will not be allowed to participate in the day's session
- Participants will be allowed to discontinue the exercise activities at any point.
- If participants discontinue the exercise activities before the end of the session for any reason, they will still receive their incentive for that day and the previously completed sessions

Participants will be provided verbal and visual education, including the Borg 6-20 rate of perceived exertion scale (RPE) on correctly gauging and reporting their rate of perceived exertion; RPE will be monitored closely throughout the exercise session.

- Using the RPE scale is especially useful for deconditioned participants as this is a subjective measure of exercise intensity.
- Participants will be encouraged to maintain **at least an RPE 13**, which is **somewhat hard**, and not to exceed an **RPE 17**, which is **very hard**- as this is a subjective indicator of moderate to vigorous exercise intensity.
- If participants **exceed RPE 17**, they will be instructed to take a break until they feel ready to resume the exercise activity.
- Participants will be allowed to walk or sit during the break
- Participants will be provided water during the break if requested
- Participants are encouraged to express when they need a break (even if they are not meeting RPE 12-17) during the exercise session; as such, breaks will be provided when requested.
- Participants will be allowed to discontinue the exercise activities at any point.
- If participants discontinue the exercise activities before the end of the session, they will still receive their incentive for that day and the previously completed sessions.

Participants' heart rates will be monitored continuously via a Polar heart rate armband that will be secured to their upper arm throughout the entire exercise protocol to ensure safety and that they are within the parameters of **65% - 85% of their heart rate maximum HRmax (calculated at: $208 - .7 \times \text{age}$) which indicates moderate to vigorous exercise intensity.**

- Using the continuous Polar armband provides an objective measure of the participant's exercise intensity
- Participants will be encouraged to maintain at **least 65% - 75%** of their HRmax which is moderate intensity
- Participants will be encouraged to stay **within 70% - 75%** of their HRmax which is moderate to vigorous exercise intensity

- Participants will be instructed not to **exceed 75%- 85%** of their HRmax which is vigorous intensity, as measured by the Polar armband.
- If participants **exceed 85%** HRmax, they will be instructed to take a break until their heart rate is back down to **70% HRmax**, or until they are ready to resume activity
- Participants will be allowed to walk or sit during the break
- Participants will be provided water during the break if requested
- Participants are encouraged to express when they need a break (even if they are not meeting the 65% - 85% HRmax) during the exercise session; as such, breaks will be provided when requested.
- Participants will be allowed to discontinue the exercise activities at any point.
- If participants discontinue the exercise activities before the end of the session, they will still receive their incentive for that day and the previously completed sessions.

Participants' vitals, including heart rate, blood pressure, and oxygen saturation, will be monitored pre- and post-exercise sessions.

- It is expected that participants heart rate vary. See above for heart rate specifications (heart rate should not exceed 85% of HRmax)
- Participant's resting blood pressure should be between 90/60 - 115/80 for participants ages 13 and 105/73 - 120/81 for participants ages 14-19.
- Oxygen saturation should be between 95%-100%.
- See below if participants fall outside of these parameters.

Participants are recommended to alert student researchers if they experience any adverse events, including sharp pain, chest pain, dizziness, or shortness of breath.

- In the event of reporting any adverse events, vitals will be taken to ensure safety, and the session will be stopped until returning to normal
- Heart rate should not exceed 85% or their HRmax: exercise will be discontinued until participant reaches 70% of their HRmax
- Oxygen saturation should be between 95%-100%. If participants oxygen saturation levels fall outside of this range, exercise will be discontinued until values return to the normal range of 95%- 100%.

Appendix M: Parent Consent Form



PARENT PERMISSION FORM
Department of Brain Health-Occupational Therapy

TITLE OF STUDY: FEASIBILITY OF EXERCISE TO IMPROVE SELF-CONTROL IN AT-RISK ADOLESCENTS

INVESTIGATOR(S): DONNAMARIE KRAUSE, PHD, OTR/L; TASHIA KAPLAN OTD/S

CONTACT PHONE NUMBER: FOR QUESTIONS OR CONCERNS ABOUT THE STUDY, YOU MAY CONTACT DONNAMARIE KRAUSE AT **702-895-1844**.

For questions regarding the rights of research subjects, or any complaints or comments regarding the manner in which the study is being conducted, contact the **UNLV Office of Research Integrity – Human Subjects** at **702-895-2794** or via email at IRB@unlv.edu.

It is unknown as to the level of risk of transmission of COVID-19 if you decide for your child to participate in this research study. The research activities will utilize accepted guidance standards for mitigating the risks of COVID-19 transmission: however, the chance of transmission cannot be eliminated.

PURPOSE OF THE STUDY

The purpose of this study is to determine if a 4-week (30 minute- 60 minutes, 3 times per week for a total of 12 sessions) moderate to vigorous exercise program will increase self-control and healthy-related behaviors in at-risk adolescents as measured by the Brief Self-control Scale and the Occupational Experience Profile.

PARTICIPANTS

Your teenager is being asked to participate in the study because they fit the following criteria: We are looking for individuals who are:

- 13-18 years old
- If you are under the age of 18, your parent or legal guardian must give you permission to be in the research study
- English speaking
- You were previously or currently enrolled in the Real Talk program
- Cleared by a medical professional to be in an exercise program

- Willing to be in an exercise program and answer questions about it
- Does not have to have a formal diagnosis but must have experienced at least **one** of the following:
 - Substance use or abuse, including tobacco
 - Gang affiliation
 - Currently on parole or probation
 - Less than a 2.0 GPA
 - Previous or current involvement in criminal activity
 - Experience any adverse childhood events (ACE)s

If your teen meets the following they will not be able to participate in the study:

Exclusion Criteria

- Under the age of 13 years old
- Over the age of 18 years old
- Current or previous history of high blood pressure
- Current or previous history of cardiac problems
- Joint, mobility, or movement issues that would limit participation in an exercise program
- Must be less than the 97th percentile using the BMI for Children scale
- Exclusion of non-English for safety following directions during this study

PROCEDURES

We are looking for about 1-4 people between the ages of 13-18 to be in a research study lasting for four weeks. The research study will run from about February 2023 through March 2023. This program will happen at the Real Talk Youth Impact Program. If your teen volunteers to be in this research study, we will ask them to do these things:

Come to the Real Talk headquarters where the exercises will take place for a total of 12 sessions during the week. The time will be decided between your teen and the student researcher. The first and last sessions will run for about 90 minutes so that there is time for your teen to fill out some forms and answer some questions, which will be used as baseline and follow-up assessments.

You are expected during the duration of the study to not use illegal substances. If you have used illegal substances we ask that you do not participate in the exercise protocol that day.

Before and during each of the 12 sessions of exercises, we will take your teen’s heart rate, blood pressure, and oxygen saturation using an oximeter on their finger and a blood pressure cuff on their left arm. We will also require them to wear a heart rate monitor in the form of an armband while they exercise. The heart rate monitor is called a Polar Armband and shows us your teen’s heart rate throughout the exercise session. We are having them wear this so that we can see how hard they are exercising (see exercise safety protocol below for specifications).

During the first session, we will explain how to use the Rate of Perceived Exertion scale, which is a number scale that allows your teen to tell us how hard they are exercising. Then the student researcher will teach your teen how to do the exercises during the first session (see exercise safety protocol below for specifications).

During the exercise portion of the sessions, your teen will be exercising for a total of about 30 minutes. This will include a five-minute warm-up followed by 20 minutes of moderate to vigorous exercise and end with a five-minute cooldown. The exercises will be set up like a circuit, meaning they will be done one after the other. The following is what your teen will be doing during the exercise portion of the sessions:

- A. About five minutes
 - a. stretching
 - b. 10 bodyweight squats
 - c. 10 bear crawls
 - i. repeat body weight squats and bear crawls for five minutes (rest breaks are allowed)
- B. Circuit
 - a. ten ball slams (they will be throwing a 10-pound ball onto the ground ten times)
 - b. 30-second sled push (they will push a weighted sled for 30 seconds)
 - c. 30-second sled drags (they will pull a weighted sled for 30 seconds)
 - d. 30 seconds seated battle rope pulls (they will pull the sled with a battle rope for 30 seconds)
 - e. repeat steps 1-4 for 20 minutes
(If they get too tired at any point, they will be allowed to sit or walk before going to the next part of the circuit).
- C. Cool down: five minutes of stretching

If your teen's heart rate gets too high (above 85% of their heart maximum, they will be asked to take a break until their heart rate goes back down below 70% of their heart rate maximum. During the break, they can either sit down or walk. They will also be allowed to take breaks when they feel winded or too tired to go on. If they decide to stop the exercise session for any reason, they will still get the incentive for the session and the incentives for the previous sessions that have been completed (see exercise safety protocol below).

- We will use the Brief Self-control Scale. This questionnaire helps us see how your teen makes decisions.
- Your teen will complete the Occupational Experience Profile time use diary before and after each exercise session. This means that they will record what activity they did earlier in the day and rate how that activity made them feel, and then they will record the exercise session and rate how doing the exercise made them feel. This will be done before and after each exercise session and will require about 20 minutes in addition to the scheduled exercise for the day.

BENEFITS OF PARTICIPATION

We hope this research study helps show the benefits and need for people to do moderate to vigorous exercise programs to help teenagers improve their decision-making and self-control. We hope having better self-control will lead to less unhealthy and more healthy daily activities.

Previous research suggests that moderate to vigorous exercise is a safe and effective way to improve different aspects of cognition, mood, self-esteem, cardiorespiratory and physical fitness, self-control, and decision-making skills in adults and adolescents. These improvements have been shown to help people engage in more healthy activities and less unhealthy activities in different areas of their lives.

RISKS OF PARTICIPATION

There are risks involved in all research studies; the risks for this study include the following:

Risks associated with the Occupational Experience Profile time use diary includes: answering the well-being and satisfaction questionnaire may lead to discomfort when answering the questions.

To reduce these risks, you will be referenced by a number and your name will be removed from all the documents. you can be as specific or general when you write down your activities, as is identified in the instructions of the Occupational Experience Profile. As a mandated reporter, if you intend to harm yourself or others we are required to report this information.

The exercise sessions will occur in a multipurpose room located inside the Real Talk building headquarters. There is a risk of loss of anonymity. Your teen's confidentiality may be at risk while they are in Real Talk or during some of the activities they may be doing during or outside of the research. However, the sessions will take place individually. Your teen will be assigned a random number that will be used for all identification purposes during the study. Your teen's information (randomized number) will be stored at UNLV on an encrypted file that will be kept in a locked file that only the neutral student researcher can access. A master list will be created and kept by the Principal Investigator on a UNLV computer, password protected, and encrypted software. This information will be destroyed after seven years.

Your teen will be doing moderate to vigorous exercise and may feel uncomfortable because of a higher-than-normal heart rate, breathing (like being winded), and tired muscles.

There is also a small risk for injury when doing any exercise, including joint sprains or strains and bone breaks or fractures; there may be individual genetic predispositions that may lead to certain cardiovascular conditions, increasing the likelihood of a heart attack. The student researcher will instruct your teen on proper form and body mechanics to reduce the risk of injury.

There is an AED on site and the student researcher is a certified personal trainer with the National Strength and Conditioning Association, trained and certified in CPR and first aid, and will be present and monitoring participants throughout the entire exercise protocol.

See the exercise safety protocol below for physiological monitoring parameters and safety measures.

EXERCISE SAFETY PROTOCOL
All participants must receive a letter of approval from a licensed healthcare professional prior to beginning the exercise program.
Clothing should be unrestrictive and appropriate for physical activity to provide comfort and safety.
Clothing should be comfortable and provide room to lift, bend, and squat without restricting the body. <ul style="list-style-type: none">• Examples include joggers, sweatpants, unrestrictive shorts, leggings, tank tops, and t-shirts.
Shoes should be comfortable and appropriate for engaging in physical activities, including running and jumping, providing appropriate stability and traction. <ul style="list-style-type: none">• Examples include tennis shoes, running shoes, cross-training shoes, basketball shoes, etc.
Some participants may be deconditioned, so being honest about previous and current exercise participation, skills, and abilities is recommended. <ul style="list-style-type: none">• For example, some participants may not understand proper body mechanics while performing various types of exercise, so they may require additional instruction from the student researcher.
Participants will have their blood pressure measured pre and post-exercise and in the event that the participant requires a rest break. <ul style="list-style-type: none">• Initial blood pressure values at rest may not exceed the following:<ul style="list-style-type: none">○ Girls and boys may not exceed 120 mm Hg For safety, participants must not exceed the following blood pressure values during or post-exercise. <ul style="list-style-type: none">• For ages 12-13 years, the upper limit is 172 mm Hg for both girls and boys.• For ages 14-15 years, the upper limit is 174.7 mm Hg for girls and 177.3 mm Hg for boys.

- For ages 16-17 years, the upper limit is 178.5 mm Hg for girls and 201.3 mm Hg for boys
- For ages 18 and above, the upper limit is > 190mm Hg for females and > 210 mmHg for males
- In the event that participants exceed the above values at any time, they will be required to rest until their blood pressure is below the values stated above
- Participant blood pressure will be taken three times, if their blood pressure readings do not meet the above specifications, they will not be allowed to participate in the day's session
- Participants will be allowed to discontinue the exercise activities at any point.
- If participants discontinue the exercise activities before the end of the session for any reason, they will still receive their incentive for that day, and the previously completed sessions

Participants will be provided verbal and visual education, including the Borg 6-20 rate of perceived exertion scale (RPE) on correctly gauging and reporting their rate of perceived exertion; RPE will be monitored closely throughout the exercise session.

- Using the RPE scale is especially useful for deconditioned participants as this is a subjective measure of exercise intensity.
- Participants will be encouraged to maintain **at least an RPE 13**, which is **somewhat hard**, and not to exceed an **RPE 17**, which is **very hard**- as this is a subjective indicator of moderate to vigorous exercise intensity.
- If participants **exceed RPE 17**, they will be instructed to take a break until they feel ready to resume the exercise activity.
- Participants will be allowed to walk or sit during the break
- Participants will be provided water during the break if requested
- Participants are encouraged to express when they need a break (even if they are not meeting RPE 12-17) during the exercise session; as such, breaks will be provided when requested.
- Participants will be allowed to discontinue the exercise activities at any point.
- If participants discontinue the exercise activities before the end of the session, they will still receive their incentive for that day and the previously completed sessions.

Participants' heart rates will be monitored continuously via a Polar heart rate armband that will be secured to their upper arm throughout the entire exercise protocol to ensure safety and that they are within the parameters of **65% - 85% of their heart rate maximum HRmax (calculated at: $208 - .7 \times \text{age}$) which indicates moderate to vigorous exercise intensity.**

- Using the continuous Polar armband provides an objective measure of the participant's exercise intensity
- Participants will be encouraged to maintain at **least 65% - 75%** of their HRmax which is moderate intensity
- Participants will be encouraged to stay **within 70% - 75%** of their HRmax which is moderate to vigorous exercise intensity

- Participants will be instructed not to **exceed 75%- 85%** of their HRmax which is vigorous intensity, as measured by the Polar armband.
- If participants **exceed 85%** HRmax, they will be instructed to take a break until their heart rate is back down to **70% HRmax**, or until they are ready to resume activity
- Participants will be allowed to walk or sit during the break
- Participants will be provided water during the break if requested
- Participants are encouraged to express when they need a break (even if they are not meeting the 65% - 85% HRmax) during the exercise session; as such, breaks will be provided when requested.
- Participants will be allowed to discontinue the exercise activities at any point.
- If participants discontinue the exercise activities before the end of the session, they will still receive their incentive for that day and the previously completed sessions.

Participants' vitals, including heart rate, blood pressure, and oxygen saturation, will be monitored pre- and post-exercise sessions.

- It is expected that participants' heart rate vary. See above for heart rate specifications (heart rate should not exceed 85% of HRmax)
- Participant's resting blood pressure should be between 90/60 - 115/80 for participants ages 13 and 105/73 - 120/81 for participants ages 14-19.
- Oxygen saturation should be between 95%-100%.
- See below if participants fall outside of these parameters.

Participants are recommended to alert student researchers if they experience any adverse events, including sharp pain, chest pain, dizziness, or shortness of breath.

- In the event of reporting any adverse events, vitals will be taken to ensure safety, and the session will be stopped until returning to normal
- Heart rate should not exceed 85% or their HRmax: exercise will be discontinued until the participant reaches 70% of their HRmax
- Oxygen saturation should be between 95%-100%. If participant's oxygen saturation levels fall outside of this range, exercise will be discontinued until values return to the normal range of 95%- 100%.

COST /COMPENSATION

There might be a financial cost to your teen to participate in this study, including transportation to and from Real Talk. The study will take about four weeks, about three times per week, for about 30-60 minutes of your time, for a total of 12 sessions (the first and last session will be about 90 minutes, and the other ten sessions will be about 30-60 minutes. You will not be compensated for your time. A small incentive of a \$120.00 Amazon gift card will be offered to your teen for volunteering for the research study. The \$120.00 will be given out as follows:

There are a total of 12 sessions. Your teen will get \$10.00 per session, which will be paid out as follows:

- The end of session three is \$30.00 (end of week one)
- The end of session six is \$30.00 (end of week two)
- The end of session nine is \$30.00 (end of week three)
- The end of session twelve \$30.00 (end of week four)

A transportation incentive of \$50.00 will be offered as an Arco gas card for transportation costs. The \$50.00 will be given out as follows:

There are a total of 12 sessions. Your teen will get \$12.50 per week, which will be given out at the beginning of each of the four weeks as follows:

- The end of session one is \$12.50 (the beginning of week one)
- The end of session four is \$12.50 (the beginning of week two)
- The end of session seven is \$12.50 (the beginning of week three)
- The end of session ten is \$12.50 (the beginning of week four)

If your teen withdraws from the study at any time, the participant incentives will be prorated to their last participation date at a rate of \$10.00 per session. If they do not complete a session for any reason, they will still be provided the participant incentive for that session and the previous sessions they have completed. However, they will no longer be able to participate in future sessions.

If your teen withdraws from the study at any time, the transportation incentive will not be prorated as this incentive is provided for the week in advance. Since your teen will no longer be participating in future sessions they will not receive any future transportation incentives.

Attendance and participation with Real Talk is separate from this study and participants are free to continue with Real Talk even if they stop participating in the study.

CONTACT INFORMATION

If you or your teen have any questions or concerns about the study, you may contact Donnamarie Krause PhD. OTR/L at **702-895-1844**. For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted you may contact **the UNLV Office of Research Integrity – Human Subjects at 702-895-2794, or via email at IRB@unlv.edu.**

VOLUNTARY PARTICIPATION

Your teen's participation in this study is voluntary. They may refuse to participate in this study or in any part of this study. They may withdraw at any time without prejudice to your relations with UNLV. If they withdraw at any time, this will not affect their current or future participation with Real Talk. You are encouraged to ask questions about this study at the beginning or any time during the research study.

CONFIDENTIALITY

All information gathered in this study will be kept as confidential as possible. However, there is a risk of losing confidentiality while you're teen is in Realtalk or during some of the activities they may be doing outside of the research. However, your teen will be assigned random numbers, and all written or oral references to your teen will refer to their assigned numbers. All records will be stored in a locked facility at UNLV and the principal investigator's locked office for seven years after completion of the study. After the storage time, the information gathered will be destroyed.

PARTICIPANT CONSENT:

I have read the above information and agree that my teenager may participate in this study. I am at least 18 years of age. I have been able to ask questions about the research study. I am at least 18 years of age. A copy of this form has been given to me.

Signature of Parent or Legal Guardian

Child's Name (Please print)

Parent Name or Legal Guardian Name (Please Print)

Date

Signature of Parent or Legal Guardian

Parent Name or Legal Guardian Name (Please Print)

Date

Appendix N: Overall Schedule of Activities

Overall Schedule of Activities

Sessions will be completed 3 times per week for four weeks for a total of 12 sessions. Session 1 will last approximately 90 minutes to account for assessments and explanations and demonstrations of the exercise protocol. Sessions 2-11 will be approximately 50-60 minutes. The last session, session 12, will last approximately 60 minutes. All sessions will be done on an individual basis to ensure privacy and confidentiality. Sessions will be as follows:

Session 1

i) Outcome measures:

- (1) **Participants will fill out an exercise history questionnaire and be provided instructions on how to fill out the Brief Self-control Scale (BSCS)** which will be completed in the first and last session only for a total of 2 times. A paper version will be completed while seated in the multipurpose room and being observed by the student researcher. (see attached for BSCS)
 - (a) BSCS measures self-control
 - (b) **Participant will fill out an exercise history questionnaire BSCS (15 min, including initial instructions)**
- (2) **Participants will be provided instructions on how to fill out the Occupational Experience Profile (OEP)** which will be completed before and after each exercise session for a total of 24 times. A paper version will be completed while seated in the multipurpose room and being observed by the student researcher (see attached for OEP instructions and questions).
 - (a) The OEP is a time use diary where participants will rate their experience during an activity, they did prior in the day and then again rate their experience after doing the exercise (see attached for example of OEP)
 - (b) **Participant fills out OEP (15 min including initial instructions)**
- (3) **Polar armband will be secured to the participant's upper arm** and will remain there for the entire session which will measure heart rate throughout the entire session. **Oxygen saturation and blood pressure will be measured (5 min)**
- (4) **Participants will do exercise warm-up, circuit, and cool down. (30 min). Explanation will be provided on exercise safety procedures and how to rate RPE** (see exercise protocol below). (15 min) This session will include demonstration and practice of exercise circuit; this will not be done in sessions 2-12 unless requested (See exercise protocol below for details) **(Total for this session 45 min)**

(5) Participants will fill out OEP and rate their experience while doing the exercise protocol. (10 min)

Total time for first session= approx. 90 minutes

Session 2-11

All activities will be done in the multipurpose room at Real Talk and will be monitored by a student researcher.

- (1) A paper version of the OEP will be completed while seated in the multipurpose room and being observed by the student researcher (see attached for OEP instructions and questions)
 - (a) The OEP is a time use diary where participants will rate their experience during an activity, they did prior in the day. (see attached for example of OEP)

(b) Participant fills out OEP (10 min)

- (2) Polar armband will be secured to the participants upper arm and will remain there for the entire session which will measure heart rate throughout the entire session. **Oxygen saturation and blood pressure will be measured (2.5 min)**

- (3) Participant will do exercise warm-up, circuit, and cool down. Reminders will be provided on exercise safety procedures and how to rate RPE (see exercise protocol below). **(Total time for exercise in session 2-11 = 30 min)**

- (4) Polar armband will be removed from participant's upper arm. Oxygen saturation and blood pressure will be measured **(2.5 min)**

- (5) Participant will fill out OEP and rate their experience while doing the exercise protocol. **(10 min)**

Total time for session 2-11 approx. 60 minutes

Session 12

All activities will be done in the multipurpose room at Real Talk and will be monitored by student researcher

- (1) A paper version of the OEP will be completed while seated in the multipurpose room and being observed by the student researcher (see attached for OEP instructions and questions)
 - (a) The OEP is a time use diary where participants will rate their experience during an activity, they did prior in the day. (see attached for example of OEP)

	<p>(b) Participant fills out OEP (10 min)</p> <p>(2) Polar armband will be secured to the participant's upper arm and will remain there for the entire session which will measure heart rate throughout the entire session. Oxygen saturation and blood pressure will be measured (2.5 min)</p> <p>(3) Participant will do exercise warm-up, circuit, and cool down. Reminders will be provided on exercise safety procedures and how to rate RPE (see exercise protocol below). (Total time for exercise in session 2-11 = 30 min)</p> <p>(4) Polar armband will be removed from participant's upper arm. Oxygen saturation and blood pressure will be measured (2.5 min)</p> <p>(5) Participant will fill out OEP and rate their experience while doing the exercise protocol. (10 min)</p> <p>(6) Participant will fill out BSCS which will detect a change in their self-control after the 4 week intervention (10 min)</p> <p>Total time for session 12 approx. 90 minutes</p>
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Appendix O: Full Exercise Protocol

Exercise Protocol Total Time ≈ 30 minutes	
Warm Up	Stretching→ 10 x body weight squats→ 10 x bear crawls <ul style="list-style-type: none"> ● Repeat body weight squats and bear crawls for two rounds ● Rest breaks are allowed
Circuit	
Pre-circuit	Pre-circuit is only done on the first session to familiarize participants with circuit and determine weight selection for sled activities and includes 5 medicine ball slams→ pushing sled x 10 seconds → pull sled x 10 seconds → seated rope pulls x 10 seconds <ul style="list-style-type: none"> ● Weight will be added to the sled in 10 lb increments: participant will indicate comfort level ● Medicine ball is 10 lbs Participants will then move on to station 1-4
Station 1	10 medicine ball slams <ul style="list-style-type: none"> ● Throw a 10 lb medicine ball forcefully on the ground
Station 2	30 second sled push <ul style="list-style-type: none"> ● Push a weighted sled for 30 seconds
Station 3	30 second sled drags <ul style="list-style-type: none"> ● Pull a weighted sled for 30 seconds
Station 4	30 second seated battle rope pulls <ul style="list-style-type: none"> ● From a seated position ● Pull weighted sled towards them <p>Repeat stations 1-4 continuously for 20 minutes (see instructions below for instructions on RPE, heart rate, and breaks)</p>
Cool down	<ul style="list-style-type: none"> ● Slowly walking until heart rate gets below 60% of heart rate maximum (calculated 208-age x .7)
Instructions on RPE	Participants will be provided verbal and visual education, including the Borg 6-20 rate of perceived exertion scale (RPE) on correctly gauging and reporting their rate of perceived exertion; RPE will be monitored closely throughout the exercise session. <ul style="list-style-type: none"> ● Using the RPE scale is especially useful for deconditioned participants as this is a subjective measure of exercise intensity. ● Participants will be encouraged to maintain at least an RPE 13, which is somewhat hard, and not to exceed an RPE 17, which is very hard- as this is a subjective indicator of moderate to vigorous exercise intensity. ● If participants exceed RPE 17, they will be instructed to take a break until they feel ready to resume the exercise activity.

	<ul style="list-style-type: none"> • Participants will be allowed to walk or sit during the break • Participants will be provided water during the break if requested • Participants are encouraged to express when they need a break (even if they are not meeting RPE 13-17) during the exercise session; as such, breaks will be provided when requested. • Participants will be allowed to discontinue the exercise activities at any point. • If participants discontinue the exercise activities before the end of the session, they will still receive their incentive for that day and the previously completed sessions.
Heart rate specifications	<p>Participants' heart rates will be monitored continuously by the student researcher at all times via a Polar heart rate armband that will be secured to their upper arm throughout the entire exercise protocol to ensure safety and that they are within the parameters of 65% - 85% of their heart rate maximum HRmax (calculated at: 208- .7 x age) which indicates moderate to vigorous exercise intensity.</p> <ul style="list-style-type: none"> • Using the continuous Polar armband provides an objective measure of the participant's exercise intensity • Participants will be encouraged to maintain at least 65% - 75% of their HRmax which is moderate intensity • Participants will be encouraged to stay within 70% - 75% of their HRmax which is moderate to vigorous exercise intensity • Participants will be instructed not to exceed 75%- 85% of their HRmax which is vigorous intensity, as measured by the Polar armband. • If participants exceed 85% HRmax, they will be instructed to take a break until their heart rate is back down to 70% HRmax, or until they are ready to resume activity • Participants will be allowed to walk or sit during the break • Participants will be provided water during the break if requested • Participants are encouraged to express when they need a break (even if they are not meeting the 65% - 85% HRmax) during the exercise session; as such, breaks will be provided when requested. • Participants will be allowed to discontinue the exercise activities at any point. • If participants discontinue the exercise activities before the end of the session, they will still receive their incentive for that day and the previously completed sessions.
Blood pressure	<p>Participants will have their blood pressure measured pre and post-exercise and in the event that the participant requires a rest break.</p>

- Initial blood pressure values at rest may not exceed the following:
 - Girls and boys may not exceed 120 mm Hg

For safety, participants must not exceed the following blood pressure values during or post-exercise.

- For ages 12-13 years, the upper limit is 172 mm Hg for both girls and boys.
- For ages 14-15 years, the upper limit is 174.7 mm Hg for girls and 177.3 mm Hg for boys.
- For ages 16-17 years, the upper limit is 178.5 mm Hg for girls and 201.3 mm Hg for boys.
- For ages 18 and above, the upper limit is > 190mm Hg for females and > 210 mmHg for males.
- In the event that participants exceed the above values at any time, they will be required to rest until their blood pressure is below the values stated above.
- Participant blood pressure will be taken three times, if their blood pressure readings do not meet the above specifications, they will not be allowed to participate in the day's session.
- Participants will be allowed to discontinue the exercise activities at any point.
- If participants discontinue the exercise activities before the end of the session for any reason, they will still receive their incentive for that day and the previously completed sessions.

See attached exercise safety protocol for complete procedures

Appendix P: Polar OH1








Polar OH1+

Optical heart rate sensor

Polar OH1+ is an optical heart rate monitor that combines versatility, comfort and simplicity. You can use it both as a standalone device and pair it with various fitness apps, sports watches and smart watches, thanks to Bluetooth® and ANT+ connectivity.



Appendix Q: RPE Scale

How exhausting is your exercise?		
6		
7	very, very light	
8		
9	very light	
10		
11	quite light	
12		
13	somewhat exhausting	
14		
15	exhausting	
16		
17	very exhausting	
18		
19	very, very exhausting	
20		

Appendix R: Exercise Safety Protocol

EXERCISE SAFETY PROTOCOL
All participants must receive a letter of approval from a licensed healthcare professional prior to beginning the exercise program.
Clothing should be unrestrictive and appropriate for physical activity to provide comfort and safety.
Clothing should be comfortable and provide room to lift, bend, and squat without restricting the body. <ul style="list-style-type: none">• Examples include joggers, sweatpants, unrestrictive shorts, leggings, tank tops, and t-shirts.
Shoes should be comfortable and appropriate for engaging in physical activities, including running and jumping, providing appropriate stability and traction. <ul style="list-style-type: none">• Examples include tennis shoes, running shoes, cross-training shoes, basketball shoes, etc.
Some participants may be deconditioned, so being honest about previous and current exercise participation, skills, and abilities is recommended. <ul style="list-style-type: none">• For example, some participants may not understand proper body mechanics while performing various types of exercise, so they may require additional instruction from the student researcher.
Participants will have their blood pressure measured pre and post-exercise and in the event that the participant requires a rest break. <ul style="list-style-type: none">• Initial blood pressure values at rest may not exceed the following:<ul style="list-style-type: none">○ Girls and boys may not exceed 120 mm Hg <p>For safety, participants must not exceed the following blood pressure values during or post-exercise.</p> <ul style="list-style-type: none">• For ages 12-13 years, the upper limit is 172 mm Hg for both girls and boys.• For ages 14-15 years, the upper limit is 174.7 mm Hg for girls and 177.3 mm Hg for boys.

- For ages 16-17 years, the upper limit is 178.5 mm Hg for girls and 201.3 mm Hg for boys
- For ages 18 and above, the upper limit is > 190mm Hg for females and > 210 mmHg for males
- In the event that participants exceed the above values at any time, they will be required to rest until their blood pressure is below the values stated above
- Participant blood pressure will be taken three times, if their blood pressure readings do not meet the above specifications, they will not be allowed to participate in the day's session
- Participants will be allowed to discontinue the exercise activities at any point.
- If participants discontinue the exercise activities before the end of the session for any reason, they will still receive their incentive for that day and the previously completed sessions.

Participants will be provided verbal and visual education, including the Borg 6-20 rate of perceived exertion scale (RPE) on correctly gauging and reporting their rate of perceived exertion; RPE will be monitored closely throughout the exercise session.

- Using the RPE scale is especially useful for deconditioned participants as this is a subjective measure of exercise intensity.
- Participants will be encouraged to maintain **at least an RPE 13**, which is **somewhat hard**, and not to exceed an **RPE 17**, which is **very hard**- as this is a subjective indicator of moderate to vigorous exercise intensity.
- If participants **exceed RPE 17**, they will be instructed to take a break until they feel ready to resume the exercise activity.
- Participants will be allowed to walk or sit during the break
- Participants will be provided water during the break if requested
- Participants are encouraged to express when they need a break (even if they are not meeting RPE 12-17) during the exercise session; as such, breaks will be provided when requested.
- Participants will be allowed to discontinue the exercise activities at any point.
- If participants discontinue the exercise activities before the end of the session, they will still receive their incentive for that day and the previously completed sessions.

Participants' heart rates will be monitored continuously by the student researcher at all times via a Polar heart rate armband that will be secured to their upper arm throughout the entire exercise protocol to ensure safety and that they are within the parameters of **65% - 85% of their heart rate maximum HRmax (calculated at: $208 - .7 \times \text{age}$) which indicates moderate to vigorous exercise intensity.**

- Using the continuous Polar armband provides an objective measure of the participant's exercise intensity
- Participants will be encouraged to maintain at **least 65% - 75%** of their HRmax which is moderate intensity
- Participants will be encouraged to stay **within 70% - 75%** of their HRmax which is

moderate to vigorous exercise intensity

- Participants will be instructed not to **exceed 75%- 85%** of their HRmax which is vigorous intensity, as measured by the Polar armband.
- If participants **exceed 85%** HRmax, they will be instructed to take a break until their heart rate is back down to **70% HRmax**, or until they are ready to resume activity
- Participants will be allowed to walk or sit during the break
- Participants will be provided water during the break if requested
- Participants are encouraged to express when they need a break (even if they are not meeting the 65% - 85% HRmax) during the exercise session; as such, breaks will be provided when requested.
- Participants will be allowed to discontinue the exercise activities at any point.
- If participants discontinue the exercise activities before the end of the session, they will still receive their incentive for that day and the previously completed sessions.

Participants' vitals, including heart rate, blood pressure, and oxygen saturation, will be monitored pre- and post-exercise sessions.

- It is expected that participants heart rate vary. See above for heart rate specifications (heart rate should not exceed 85% of HRmax)
- Participant's resting blood pressure should be between 90/60 - 115/80 for participants ages 13 and 105/73 - 120/81 for participants ages 14-19.
- Oxygen saturation should be between 95%-100%.
- See below if participants fall outside of these parameters.

Participants are recommended to alert student researchers if they experience any adverse events, including sharp pain, chest pain, dizziness, or shortness of breath.

- In the event of reporting any adverse events, vitals will be taken to ensure safety, and the session will be stopped until returning to normal
- Heart rate should not exceed 85% or their HRmax: exercise will be discontinued until participant reaches 70% of their HRmax
- Oxygen saturation should be between 95%-100%. If participants oxygen saturation levels fall outside of this range, exercise will be discontinued until values return to the normal range of 95%- 100%.

References

- American Occupational Therapy Association (AOTA). (2016). Occupational therapy services in the promotion of mental health and well-being. *The American Journal of Occupational Therapy*, 70(Suppl. 2), 7012410070p1-7012410070p15.
<https://doi.org/10.5014/ajot.2016.706S05>
- American Occupational Therapy Association (AOTA). (2017). Mental health promotion, prevention, and intervention in occupational therapy practice. *The American Journal of Occupational Therapy*, 71(Suppl. 2), 7112410035p1-7112410035p19.
<https://doi.org/10.5014/ajot.2017.716S03>
- American Occupational Therapy Association (AOTA). (2020). Occupational therapy practice framework: Domain and process (4th ed.). *American Journal of Occupational Therapy*, 74(Suppl. 2), 4712410010. <https://doi.org/10.5014/ajot.2020.74S2001>
- APA Dictionary of Psychology*. (n.d.). Retrieved August 21, 2023, from <https://dictionary.apa.org/>
- Astolfi, R. C., Leite, M. A., Papa, C. H. G., Ryngelblum, M., Eisner, M., & Peres, M. F. T. (2021). Association between self-control and health risk behaviors: A cross-sectional study with 9th grade adolescents in São Paulo. *BMC Public Health*, 21(1), 1706.
<https://doi.org/10.1186/s12889-021-11718-4>
- Atler, K.E., & Fisher, A.G. (2023). Validity and reliability of the Occupational Experience Profile, *Scandinavian Journal of Occupational Therapy*, 30:6, 811-821, DOI: 10.1080/11038128.2022.2027009

- Bathina, S., & Das, U. N. (2015). Brain-derived neurotrophic factor and its clinical implications. *Archives of Medical Science : AMS*, 11(6), 1164–1178.
<https://doi.org/10.5114/aoms.2015.56342>
- Bass, J.D., Baum, C.M., & Christiansen, C. (2017). Person-Environment-Occupation-Performance (PEOP): An occupation-based framework for practice. In P. Kramer, J. Hinojosa, & C. Royeen (Eds.), *Perspectives on Human Occupation: Theories Underlying Practice* (2nd ed.). Philadelphia, PA: F.A. Davis ISBN-13: 978-0-8036- 5915-5
- Cabral, D., Tavares, V., Da Costa, K., Nascimento, P., Faro, H., Elsangedy, H., & Fontes, E. (2018). The benefits of high intensity exercise on the brain of a drug abuser. *Global Journal of Health Science*, 10(6), 123. <https://doi.org/10.5539/gjhs.v10n6p123>
- Cabral, P., & Song, A. V. (2023). Child and adolescent risk behaviors. In B. Halpern-Felsher (Ed.), *Encyclopedia of Child and Adolescent Health (First Edition)* (pp. 281–283). Academic Press. <https://doi.org/10.1016/B978-0-12-818872-9.00204-1>
- Centers for Disease Control and Prevention (CDC). (2019). *High School Youth Risk Behavior Survey Data*. <http://nccd.cdc.gov/youthonline/>. Accessed on [December 19, 2022]
- Centers for Disease Control and Prevention (CDC). (2023) *CDC releases the Youth Risk Behavior Survey Data Summary & Trends Report: 2011-2021*. Accessed on [August 7, 2023]. https://www.cdc.gov/nchhstp/dear_colleague/2023/DSRT-DCL.html
- Clarkson, C., Boshoff, K., & Kernot, J. (2021). Occupational Therapy Interventions for Adolescents: A Scoping Review. *The Allied Health Scholar*, 2(1), Article 1.
<https://doi.org/10.21913/TAHS.v2i1.1575>
- Creswell, J.W. (2014). *A Concise Introduction to Mixed Methods Research* (2nd ed.) Sage Publications

- Delisle, T. T., Werch, C. E., Wong, A. H., Bian, H., & Weiler, R. (2010). Relationship between frequency and intensity of physical activity and health behaviors of adolescents. *Journal of School Health, 80*(3), 134–140. <https://doi.org/10.1111/J.1746-1561.2009.00477.X>
- Dowdy, R., Estes, J., McCarthy, C., Onders, J., Onders, M., & Suttner, A. (2022). The influence of occupational therapy on self-regulation in juvenile offenders. *Journal of Child & Adolescent Trauma, 16*(2), 221-232. <https://doi.org/10.1007/s40653-022-00493-y>
- Fernández-Rodríguez, R. et al. (2021). Immediate effect of high-intensity exercise on brain-derived neurotrophic factor in healthy young adults: A systematic review and meta-analysis. *Journal of Sport and Health Science*. Doi: 10.1016/J.JSHS.2021.08.004
- George-Paschal, L., & Bowen, M. R. (2019). Outcomes of a mentoring program based on occupational adaptation for participants in a juvenile drug court program. *Occupational Therapy in Mental Health, 35*(3), 262–286. <https://doi.org/10.1080/0164212X.2019.1601605>
- Gupta, M. K., Mohapatra, S., & Mahanta, P. K. (2022). Juvenile's delinquent behavior, risk factors, and quantitative assessment approach: A systematic review. *Indian Journal of Community Medicine: Official Publication of Indian Association of Preventive & Social Medicine, 47*(4), 483–490. https://doi.org/10.4103/ijcm.ijcm_1061_21
- Holleran, C. L., Straube, D. D., Kinnaird, C. R., Leddy, A. L., & Hornby, T. G. (2014). Feasibility and potential efficacy of high-intensity stepping training in variable contexts in subacute and chronic stroke. *Neurorehabilitation and Neural Repair, 28*(7), 643–651. <https://doi.org/10.1177/1545968314521001>
- Hornby, T. G., Rafferty, M. R., Pinto, D., French, D., & Jordan, N. (2022). Cost-effectiveness of high-intensity training vs conventional therapy for individuals with subacute stroke.

Archives of Physical Medicine & Rehabilitation, 103(7), Article 7.

<https://doi.org/10.1016/j.apmr.2021.05.017>

Knaepen, K., Goekint, M., Heyman, E. M., & Meeusen, R. (2010). Neuroplasticity–exercise-induced response of peripheral brain-derived neurotrophic factor: A systematic review of experimental studies in human subjects. *Sports Medicine*, 40(9), 765–801.

<https://doi.org/10.2165/11534530-000000000-00000>

Laberge, S., Bush, P. L., & Chagnon, M. (2012). Effects of a culturally tailored physical activity promotion program on selected self-regulation skills and attitudes in adolescents of an underserved, multiethnic milieu. *American Journal of Health Promotion*, 26(4), e105–e115. <https://doi.org/10.4278/ajhp.090625-QUAN-202>

Lubans, D., Richards, J., Hillman, C., Faulkner, G., Beauchamp, M., Nilsson, M., & Biddle, S. (2016). Physical activity for cognitive and mental health in youth: A systematic review of mechanisms. *Pediatrics*, 138(3). <https://doi.org/10.1542/peds.2016-1642>

Moffitt, T. E., Arseneault, L., Belsky, D., Dickson, N., Hancox, R. J., Harrington, H., Houts, R., Poulton, R., Roberts, B. W., Ross, S., Sears, M. R., Thomson, W. M., & Caspi, A. (2011). A gradient of childhood self-control predicts health, wealth, and public safety. *Proceedings of the National Academy of Sciences*, 108(7), 2693–2698.

<https://doi.org/10.1073/pnas.1010076108>

More, A., Jackson, B., Dimmock, J. A., Thornton, A. L., Colthart, A., & Furzer, B. J. (2017). Exercise in the treatment of youth substance use disorders: Review and recommendations. *Frontiers in Psychology*, 8, 1839.

<https://doi.org/10.3389/fpsyg.2017.01839>

- Moreau, D., Kirk, I. J., & Waldie, K. E. (2017). High-intensity training enhances executive function in children in a randomized, placebo-controlled trial. *eLife*, 6, e25062.
<https://doi.org/10.7554/eLife.25062>
- Mubarak, N. et al. (2022). An examination of temporal trends in health behaviors among United States children, adolescents, and adults from 2005 to 2016. *Journal of Public Health Research*, 11(2), 22799036221102759.
- Nock, N. L., Minnes, S., & Alberts, J. L. (2017). Neurobiology of substance use in adolescents and potential therapeutic effects of exercise for prevention and treatment of substance use disorders. *Birth Defects Research*, 109(20), 1711–1729.
<https://doi.org/10.1002/bdr2.1182>
- Núñez-Regueiro, F. & Núñez-Regueiro, S. (2021). Identifying salient stressors of adolescence: a systematic review and content analysis. *Journal of Youth and Adolescence*, 50(12), 2533-2556. <https://doi.org/10.1007/s10964-021-01492-2>
- O'Brien, C. P. (2009). Neuroplasticity in addictive disorders. *Dialogues in Clinical Neuroscience*, 11(3), 350–353. <https://doi.org/10.31887/DCNS.2009.11.3/cpobrien>
- Pandey, A., Hale, D., Das, S., Goddings, A.-L., Blakemore, S.-J., & Viner, R. M. (2018). Effectiveness of universal self-regulation–based interventions in children and adolescents: A systematic review and meta-analysis. *JAMA Pediatrics*, 172(6), 566.
<https://doi.org/10.1001/jamapediatrics.2018.0232>
- Pechorro, P., DeLisi, M., Gonçalves, R. A., Quintas, J., & Hugo Palma, V. (2021). The brief self-control scale and its refined version among incarcerated and community youths: Psychometrics and measurement invariance. *Deviant Behavior*, 42(3), 425–442.
<https://doi.org/10.1080/01639625.2019.1684942>

- Peruyero, F., Zapata, J., Pastor, D., & Cervello, E. (2017). The acute effects of exercise intensity on inhibitory cognitive control in adolescents. *Frontiers in Psychology, 8*, 921–921.
<https://doi.org/10.3389/FPSYG.2017.00921>
- Pierce, D. (2001). Occupation by design: Dimensions, therapeutic power, and creative process. *American Journal of Occupational Therapy, 55*, 249-259
- Raznahan, A., Shaw, P. W., Lerch, J. P., Clasen, L. S., Greenstein, D., Berman, R. et al. (2014). Longitudinal four-dimensional mapping of subcortical anatomy in human development. *Proceedings of the National Academy of Sciences United States of America, 111*, 1592–1597.
- Scherr, J., Wolfarth, B., Christle, J., Preßler, A., Wagenpfeil, S., & Halle, M. (2012). Associations between Borg’s rating of perceived exertion and physiological measures of exercise intensity. *European Journal of Applied Physiology, 113*(1), 147-155.
<https://doi.org/10.1007/s00421-012-2421-x>
- Szuhany, K. L., Bugatti, M., & Otto, M. W. (2015). A meta-analytic review of the effects of exercise on brain-derived neurotrophic factor. *Journal of Psychiatric Research, 60*, 56–64. <https://doi.org/10.1016/j.jpsychires.2014.10.003>
- Umer, W., Yu, Y., & Antwi-Afari, M. (2022). Quantifying the effect of mental stress on physical stress for construction tasks. *Journal of Construction Engineering and Management, 148*(3). [https://doi.org/10.1061/\(asce\)co.1943-7862.0002243](https://doi.org/10.1061/(asce)co.1943-7862.0002243)
- University of Nevada, Las Vegas. (n.d.) *Policies and regulations*.
<https://www.unlv.edu/research/ORI-HSR/policies>

- Walsh, J. J., & Tschakovsky, M. E. (2018). Exercise and circulating BDNF: Mechanisms of release and implications for the design of exercise interventions. *Applied Physiology, Nutrition, and Metabolism*, 43(11), 1095–1105. <https://doi.org/10.1139/apnm-2018-0192>
- Wijaya, S., Suparman, M. Y., & Chandhika, J. (2020). *Relationship between self-control and youth risk behavior in teenagers*. 636–641. <https://doi.org/10.2991/assehr.k.201209.100>
- Williams, N. (2017). The Borg rating of perceived exertion (RPE) scale. *Occupational Medicine*, 67(5), 404–405. <https://doi.org/10.1093/occmed/kqx063>

Curriculum Vitae

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Education

University of Nevada, Las Vegas

Occupational Therapy Doctorate

Estimated May 2024

Capstone Title: *The Feasibility of High-Intensity Training to Improve Self-Control and Occupational Participation in At-Risk Adolescents at the Real Talk Youth Impact Program*

Faculty Mentor: Dr. Donnamarie Krause, Ph.D., OTR/L

University of Nevada, Las Vegas

Bachelor of Science in Kinesiology

2018-2021

College of Southern Nevada

Associate of Science

2014-2017

Associate of Arts

2014-2017

Culinary Academy of Las Vegas

Professional Cook

2014

Related Clinical Internship Experience

Hope for Prisoners

2023

Community Re-entry (level I)

Nevada Community Enrichment Program

2023

Outpatient Neuro Rehabilitation (level II)

Cornerstone Christian Academy & Tykes Preschool <i>Pediatrics (level I)</i>	2022/2023
Clark County School District <i>Early Intervention (level I)</i>	2023
Intermountain Health-St. George Neuro Rehab <i>Inpatient Neuro Rehabilitation (level II)</i>	2022
Hanger Clinic <i>Prosthetics/Orthosis (level I)</i>	2022
Southern Nevada Adult Mental Health <i>Outpatient Adult Mental Health (level I)</i>	2021

Research Experience

University of Nevada, Las Vegas: Dept of Kinesiology <i>Undergraduate Researcher</i>	2018-2019
<ul style="list-style-type: none"> • Enzyme-Linked Immunosorbent Assay (ELISA) • Data collection: animal models • Data analysis: SBSS 	
College of Southern Nevada <i>INBRE Biomedical Undergraduate Research Workshop</i>	2016
<ul style="list-style-type: none"> • Gel electrophoresis • DNA isolation and amplification by PCR • Enzyme-Linked Immunosorbent Assay (ELISA) 	

Teaching Experience

University of Nevada, Las Vegas: Occupational Therapy <i>Teaching Assistant: Mental Health</i>	2024-Present
<ul style="list-style-type: none"> • Guest Lecture • Workshops • Grading 	

Leadership & Service

Real Talk Youth Impact Program <i>Volunteer, member and mentor to at-risk youths</i>	2013-Present
<ul style="list-style-type: none"> • Effectively communicate message to audiences of 50-200 community members during monthly “Change One Meetings” • Facilitate parent support groups of 10-20 community members • Facilitate process groups for 5-10 graduating at-risk youths 	

University of Nevada Las Vegas <i>Student ambassador and volunteer</i>	2018-Present
<ul style="list-style-type: none"> Engage in volunteer initiatives for future and fellow students and community members 	

Professional Affiliations

Pi Theta Epsilon: Alpha Phi <i>Member</i>	2023-Present
American Occupational Therapy Association <i>Member</i>	2020-Present
Nevada Occupational Therapy Association <i>Member</i>	2020-Present
National Strength and Conditioning Association <i>Certified Personal Trainer & Member</i>	2020-Present

Honors and Awards

University of Nevada, Las Vegas Capstone Scholarship	2024
University of Nevada, Las Vegas General Scholarship	2024
University of Nevada, Las Vegas General Scholarship	2023
University of Nevada, Las Vegas Out of State Scholarship	2022
University of Nevada, Las Vegas Magna Cum Laude	2021
College of Southern Nevada INBRE Award	2016

References Available Upon Request