



Does the self-control developed through boxing-training sparring correlate with happiness?

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Does the self-control developed through boxing-training sparring correlate with happiness?

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A Thesis in the Field of Psychology

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Abstract

Self-control predicts the quality of a person's life experience through their personal relationships, how they perform at school, work, and athletics, and their own physical and mental health. Athletic competition enhances self-control skills; however, it is self-control during athletic competition, and its relationship to aggression, that motivates this study's examination of self-control's relationship with happiness. During athletic competition, aggression is categorized into hostile aggression and instrumental aggression; the former is to cause harm for the sake of causing harm, and the latter is to cause harm that assists in the pursuit of a goal during competition, aimed at leading towards victory. Boxing-training sparring challenges a person's self-control and decision-making. Sparring often physically exhausts its participants, while they are being punched repetitively, yet having to make concurrent optimal decisions to prevent further physical pain while trying to inflict physical pain on their opponent.

This study consisted of a control group ($n = 38$) and a study group ($n = 35$). Both cohorts had the same age inclusion criteria: 30-50 years. The differentiating factor between both groups was the number of years a participant used sparring as a routine form of exercise. The control group sparred less than one year, whereas the study group had sparred for a year or more. Happiness and Aggression served as this study's Independent Variables, and Boxing-Training Sparring Self-Control served as this study's Dependent Variable. The three hypotheses were tested: (1) boxing-training sparring positively correlates with happiness, (2) boxing-training sparring negatively correlates

with aggressive behaviors, and (3) aggressive behaviors mediate the relationship between boxing-training sparring self-control and happiness.

Both groups completed Happiness, Self-Control, and Aggression Questionnaires, and the study group completed an additional Boxing-Training Sparring Self-Control Questionnaire. This correlational study is a multivariate linear regression analysis measuring two independent variables, Happiness and Aggression, against one dependent variables, Boxing-Training Sparring Self-Control. BTSSCQ was followed up by open-ended questions to help arrive at themes that guide the Discussion section.

To test Hypothesis 1, a One-Tailed Pearson correlation was conducted to test whether Melson-Pruned and Oxford had a positive relationship. There was no significant positive correlation between the two variables, $r(31) = .277$, $p = .06$. This correlation failed to support Hypothesis 1. The p-value here was cut in half because a One-Tailed analysis was conducted. The reasoning behind this was that this study's first hypothesis stated a correlational direction. To test Hypothesis 2, a One-Tailed Pearson correlation was conducted to test whether Melson-Pruned and Buss-Perry had a negative relationship. There was no significant negative correlation between the two variables, $r(30) = -.200$, $p = .136$. This correlation failed to support Hypothesis 2. The multiple regression found that Oxford and Buss-Perry did not significantly predict Melson, $F(2, 29) = 1.581$, $p = .223$. Adding the interaction between Buss-Perry and Oxford in Model 2 did not significantly improve prediction of Melson-Pruned, $\Delta R^2 = .085$, $\Delta F(1, 28) = .035$, $p = .099$. Because Model 1 was not significant and Model 2 was not a significant improvement, the coefficients will not be discussed (see Table 4). The regression failed to support Hypotheses 1, 2, or 3.

Dedication

This thesis is dedicated to Coach Ray Barone, Coach Chris Hart, and Coach Jerry Hart, who are my three West Point Boxing Team Coaches that first taught me how to box, and to West Point and Army Boxing, where I first stepped into the ring. To Coach Charles Leverette, Coach Fareed Samad, Coach Basheer Abdullah, thank you for helping me tax my gifts in order to force them to evolve in the ring at the National and International amateur boxing level, for the United States Army, and for the United States. To Coach Joey Gamache, Coach Bernie Lenahan, Coach Simon Bakinde, and Coach Elliot Ness, thank you for guiding me as a professional boxer, helping me evolve into a boxer, so that I was able to develop my craft so that I could progress into a 10-round fighter and earn a professional boxing championship. In addition, this dedication is also to the World Boxing Council (WBC), an organization I was once a professional boxing champion in, and of which I proudly serve as their Ambassador of Peace. From many years of experience in the ring, coupled with many years of life on this planet, I have learned just how beneficial the sport of boxing, and specifically sparring is; it has trained me to make optimal decisions in life, regardless of the chaos around me, all through how boxing-training sparring demanded my self-control level to increase. As a result, this study is also dedicated to the sport of Boxing itself.

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Chapter I.

Introduction

Self-control predicts a person's ability to achieve desirable goals. When self-control is being exercised, its practice allows for a person to refrain from behaviors and impulses that they may not be actively aware of, such as automatic or habitual urges, that would otherwise inhibit that person from carrying out their desired goal-directed behaviors (Baumeister et al., 1994; Barkley, 1997). These impulses result in given behaviors that satisfy that person's immediate needs. When impulses elicit low self-control behaviors, and those behaviors are not in alignment with behaviors necessary to achieve longer-term goals, the rewards associated with those long-term goals are threatened. Freud (1920) declared that exercising impulse control, is necessary for healthy psychological development. Research has demonstrated that activities developing self-control in one domain can bolster self-control in another domain (Yu et al., 2012). Happiness has a positive relationship with self-control (Yu & Yang, 2008), and the effects of happiness are the following: better life outcomes to include financial success, healthy relationships, improved mental health with effective coping mechanisms, and improved physical health (Lyubomirsky et al., 2005). Therefore, Lyubomirsky et al. (2005) suggests that happiness and self-control share predicted outcomes.

In contrast, aggressive behaviors have a negative relationship with self-control (Xin et al., 2007). Xin et al.'s (2007) research assessed the relationship between self-esteem as an independent variable, aggression as a dependent variable, and self-control as

a mediator in 705 middle school students. They determined that self-control mediates the relation of self-esteem and aggression. Additionally, self-control training can reduce aggressive behavior. Denson (2013) systematically reviewed the relationship between anger rumination and aggression, and found that cognitive abilities to reframe anger, helped reduce anger rumination which reduced aggressive tendencies. Duckworth et al. (2014) proposed and tested a Process Model of Self-Control comprising stages, each calling for different self-control techniques: situation selection, situational change, attentional deployment, cognitive change, and response modulation. Their research indicates that employing self-control strategies earlier in the process, increases the likelihood of resisting a subsequent urge.

Ego-depletion is the phenomenon where a person has fully exhausted their self-control resources (Baumeister et al., 1998). Behaviorally, they are then not capable of exercising self-control on the next immediate task that necessitates it. Wang et al.'s (2018) research investigated the effects of reaction-time performance on aggression, immediately following a reaction-time task. Participants were shown a rectangle on a computer screen. They were instructed to press the spacebar on a keyboard the moment that a rectangle changed colors from black to green. After each consecutive reaction-time task, they were then allowed to determine the intensity of the noise-blast their fictitious opponent would receive. The results showed that participants would select a larger noise-blast as their reaction-time to pressing the spacebar increased, indicating an increase in their aggressive behavior (Wang et al., 2018). As the participants' reaction-times increased, the effects of ego-depletion were represented by their increases in aggression; they administered louder noise-blasts to their opponents (Wang et al., 2018). Their results

indicate that a decrease in performance during a given task increases aggressive response, demonstrated by to the intensity of the noise-blasts that the study's participant delivered to their opponent (Wang et al., 2018). With self-control inversely relating to ego-depletion, and ego-depletion positively relating to aggression, these findings support Denson's (2013) research that self-control training can reduce aggressive behavior (Wang et al., 2018).

Duckworth et al.'s (2014) research examined strategies that may allow for a person to better exercise their self-control. They researched school-aged children, a demographic that is typically challenged by engaging in immediately rewarding behaviors in opposition to behaviors that delay their reward (Duckworth et al., 2014). The process model of self-control divides these strategies into five categories that correspond to sequential phases; the phases represent assessments of wanted and unwanted urges and their intensities over time (Duckworth et al., 2014). Situation selection and situation modification strategies involve a person altering where they are physically located or who they are interacting with. Attentional deployment and cognitive change strategies involve framing given circumstances differently by applying alternative meanings to objective information in that scenario (Duckworth et al., 2014). Finally, response modulation strategies refer to subduing or magnifying a given urge (Duckworth et al., 2014). According to Duckworth et al. (2014), "The process model of self-control predicts that strategies deployed earlier in the process of impulse generation and regulation generally will be more effective than those deployed later" (p. 199).

The finding that that self-control is negatively related to aggression was contradicted by other research that found self-control to have a positive relationship with

aggression. Stucke and Baumeister's (2010) research involved participants resisting the urge to eat for an extended period. They then subjected them to verbal insults. They found that participants who refrained from eating for longer periods of time, were much more likely to respond aggressively to insults, than those who were allowed to eat as they wished before being insulted (Stucke and Baumeister, 2010). Their contrasting finding is important to my research because it contrasts with Xin et al. (2007); these two studies indicate that self-control's relationship with aggressive behaviors is ambiguous.

Self-control can be enhanced (Piquero et al., 2010). Yu et al. (2012) determined that when athletic competition requires its participants to exercise increased levels of self-control, their levels can increase with the demands of the competition. Boxing-training sparring requires marked self-control. In this case, the purpose of sparring is to punch your opponent more frequently than they punch you. When appropriate amounts of self-control are not demonstrated during this sparring, immediate physical harm is always a likely possibility.

Boxing-training sparring is a component of combat-sports training, that involves striking with either-hand punches. Combat-sports that involve striking are unique sports in that the sport's sole intention necessitates aggression; striking your partner's body with your own body, to physically harm that person, is the only way to win. Boxing-training sparring requires its participants to strike each other by punching each other to the front of their bodies, from their bellybutton to the top of their heads, while wearing 16-ounce gloves, cushioned along the knuckles. The sport requires self-control as well as aggression. If high self-control predicts low aggression, and boxing-training sparring requires high self-control while simultaneously behaving with high levels of aggression,

then this suggests that not all aggressive behaviors relate the same to self-control. This raises two relevant points for my research: First, boxing provides an interesting context to study the relationship between aggression and self-control. Second, boxing provides an interesting context to ask about the outcomes related to self-control and aggression. Self-control predicts higher level of happiness (Cheung et al., 2014), and aggressive behaviors predict lower levels of happiness (Kilicarslan & Liman., 2020). If boxers have high levels of self-control and high levels of aggression, what does that mean for outcomes like happiness?

Strength Model of Self-Control

Malleability is one of self-control's defining traits (Piquero et al., 2010). Much like a muscle, constant repetition through practice, allows for a muscle to grow. The Strength Model of Self-Control explains Self-Control's malleability. Self-control's malleability results in self-control building practices helping increase self-control resources (Muraven & Baumeister, 2000). Their research determined that the energy system used to focus one's attention is the same energy system required for self-control implementation, and this suggests that practices that strengthen a person's ability to focus will produce the same benefits attributed to self-control. When a person begins exercising self-control from a position with an increased amount of self-control resources, this increase serves as a buffer against the "self-control well" running dry (otherwise known as ego-depletion). An increased amount of self-control resources may moderate the effects of self-control fatigue or ego-depletion (Muraven, et al., 1998).

During athletic competition, anxiety is an emotion that requires regulation. Fear is related to anxiety. Fear can result in inappropriate decision-making. When an athlete

regulates their attention to the extent that their anxiety decreases, their athletic performance improves (Englert, 2016). Englert's (2016) conducted a meta-analysis that provided an overview of present understandings of self-control and the Strength Model of Self-Control. Anxiety's effect on athletic performance, and how through the Strength Model of Self-Control, anxiety can be regulated by self-control, was determined (Englert, 2016). Attention regulation utilizes the same resources as self-control, which suggests that enhancing a person's self-control skills may serve as a moderator between anxiety and athletic performance. Consequently, there is a likelihood that self-control can moderate the relationship between anxiety and other positive outcomes.

Boxing-training, with a focus on sparring, presents an opportunity for its participants to experience significant amounts of anxiety prior to sparring because of the inevitable physical pain that is part of the practice. Regulating attention is a tool to combat anxiety, and regulating attention requires self-control resources as does sparring. This is important to my research because of self-control's previously discussed transferability. Sparring requires participants to pay attention to their fellow participant who is trying to punch them, real-time instruction from the person in their corner (serving as a pseudo-coach) while sparring, and then their own body which is fatiguing as well in real-time. Sparring presents a dynamic that requires significant amounts of decision-making, attention regulation, and self-control, with an error in any of the three traditionally resulting in physical pain. Decision-making requires self-control. Wilkinson (2019) conducted a literature review of self-control's effect on decision-making, evaluating maladaptive decisions, automatic decisions, and management decision. He

determined that decision-making uses the same resources as self-control, and decision-fatigue effects that person's ability to then exercise self-control (Wilkinson, 2019).

Life involves experiencing anxiety. Happiness in life involves being able to manage that anxiety. If a significant amount of self-control is needed to help moderate the effects of anxiety on happiness, and because self-control skills are transferable between activities, then this supports Yu & Yang's (2008) findings that determined self-control will correlate with happiness.

When a person has exhausted their decision-making resources, inherently depleting their self-control resources, they are then more likely to respond to a given trigger with an aggressive behavior (Denson et al., 2012). Their research, according to McCord (2021), examined the "I-Cubed Theory" that states that aggression is composed of the following: "instigation, impellance, and inhibition" (p. 7). Instigation, in this case, refers to a person feeling victimized, impellance refers to the psychological phenomena that prepares someone to fight, and inhibition refers to the ability to suppress aggressive urges. Aggressive urges arise when both "instigation and impellance are strong, and inhibition is weak" (p. 7). Sparring can exhaust a person's self-control resources, and being punched in one's face can serve as an increased instigation factor, together increasing the likelihood for an aggressive response in return.

Dorris et al. (2012) determined that self-control during athletic competition, is critical for success, as well as its ability to decrease aggressive behavior. Their research design involved taking competitive rowers and hockey players who had to perform sit-ups or push-ups. Participants who performed a cognitive task prior to physical exercise, performed fewer repetitions than did those who did not perform a cognitive task. Dorris

et al. (2012) determined that the initial usage of decision-making resources resulted in less self-control available for the follow-on task. Their research supports Wilkinson's (2019) research that determined decision-making impacts self-control (Dorris et al., 2012).

Happiness and Self-Control

Happiness is a multi-faceted concept that predicts multiple outcomes. A broader definition of happiness encompasses global life satisfaction, immediate domain satisfaction, an optimistic view of life, and more positive emotions than negative emotions (as reviewed by Cohn et al., 2009). These authors' research findings are important to my study because they break happiness into components that each have their own relationship with self-control. Cohn et al.'s (2009) research additionally identifies happiness as a trait that lacks a single identifiable component.

Positive emotions are a measured component of happiness that relates to life satisfaction. When positive emotions are experienced, they help empower a person by building resources to handle needed growth and change in life (Cohn, 2009). Cohn's (2009) research examined 86 participants and measured their life satisfaction and trait resiliency at the beginning and end of each month. The results determined that positive emotions serve as the link between happiness and desirable life outcomes (Cohn, 2009). One potential resource built through positive emotions is an ability to handle adversity. A person's ability to handle adversity positively impacts their life satisfaction, and consequently, positive emotions have a stronger causal relationship to happiness than life satisfaction has to happiness (Cohn, 2009). Sparring offers participants an opportunity for

a complete physical catharsis. If a person has pent-up aggression fueled by negative emotions, sparring offers an opportunity to rid its participants of that aggression. Decreasing aggression, that is fueled by negative emotions, might create an opportunity for a person to experience positive emotions.

Research has determined that self-control is a resource that has a set limit; when this resource is exercised rapidly in a short period of time, it can be completely depleted (Hagger et al., 2010). A human has a fixed amount of resources available for decision-making; the frequency, intensity, and duration of decisions made can deplete the ability to make optimal decisions (Vohs et al., 2014).

Sparring is a consistently dynamic environment placing continually evolving demands on participants' bodies and minds. Within the same sparring session, a participant's opponent may vary their aggressive behaviors round by round. In a three-round sparring session, an opponent may spend the entire round aggressively boxing, advancing forward the entire three-minute round, while throwing a high volume of punches. In the next round, that same opponent may choose to only counterpunch, which is a punch in response to their opponent punching; they may also retreat backwards during the round to a greater frequency, appearing less aggressive to their fellow opponent. In the third round, they may choose to only target their partner's abdomen with their punches. When a participant adjusts to varying styles of aggression during the same sparring session, the participant must exercise behaviors that require varying levels of self-control. These changes in sparring aggression tactics have a likelihood of requiring the partner to make multiple decisions in a short period of time that can draw from the same resource center that self-control draws from.

This is why sparring is of interest here. Its participants must train their minds to rapidly make decisions while exercising self-control, in order to be successful. Physical pain is concurrently an ever-present concern and consequence. A participant's set-limit resource center used for self-control, is simultaneously being used for decision-making. Sparring requires making rapid decisions for a prolonged period. A traditional round lasts three-minutes, and a sparring session can last up to 12 consecutive rounds with one-minute rest between each round. Decision-making fatigue has a likelihood of depleting the participants' abilities to then exercise self-control, induced by ego-depletion, and creating an increased potential for that person to experience physical pain during sparring.

Vohs et al. (2014) determined that a person positively framing a task helps reduce the decision-fatigue effect that takes place when they encounter an undesirable task. Their research involved 4 laboratory studies assessing how decision-making fatigue impacted their selection choice. Participants made choices among consumer goods or college courses. Various participants spent time thinking over the decision but did not make a final choice. Their findings indicate that when a person has to continually make decisions, it can impair their future decisions (Vohs et al., 2014). Sparring requires exerting an intense amount of physical effort that is likely to be physically exhausting, and it has aspects that involve both potential or actual significant physical pain. A person who participates in this type of training is routinely exposed to voluntarily engaging in an activity that may require them to alter their perspective; they may enter the ring with a partner who punches much harder than they do. Fear is a common response to this dynamic.

Framing the sparring session to actively decide that exploiting a sparring partner's lack of speed can mediate the fearful effects of that person's punching power. A person may alter their strategy to focus on maximizing their own speed against a slower partner, while helping them concurrently avoid their partner's power. When a sparring-opponent makes decisions based on avoiding what their respective sparring-opponent can do to them, as opposed to making decisions based on seeking out what they can initiate themselves, that frame of mind has a likelihood of impacting their decision-making and potential resource depletion. Making decisions to avoid a sparring-opponent's power has a likelihood of using more decision-making resources than making decisions to exploit their opponent's lack of speed. This alteration may be needed to mediate the negative effects of rapid decision-making. For a person who is about to begin a boxing-training sparring session, entering the session accepting you will be punched against being afraid to get punched, can have a positive impact on a person's decision-making. Successful reframing while sparring may support Vohs et al.'s (2014) findings that help mediate the effects of decision-fatigue.

Optimal decision-making is a component of happiness, and suboptimal decisions inherently create the risk for harm. Even though optimal decisions may not be intended to immediately increase happiness, impaired decision-making increases the risk for suboptimal decisions that may negatively affect happiness. Vohs et al.'s (2014) research showed how decision-making depletion can negatively impact a person's happiness. When a person is engaged in a boxing-training sparring session, their decision to immediately punch back after receiving a highly impactful blow, instead of grabbing

their opponent to tie them up, so that they will not be punched again during that exchange, may impact their happiness at that moment.

Self-Control and Aggressive Behavior

Tenenbaum et al. (1997) stated in their ISSS Position Paper that hostile aggression's harm-inducing behavior, when not related to the goals of the sport, is recognized as purely violent behaviors. These types of behaviors are in opposition to instrumental aggressive behaviors that are within the rules of the sport, performed for the purpose of overall victory during athletic competition (Terry & Jackson, 1985). Tenenbaum et al.'s (1997) research assessed the factors that contribute to violence in sports, and they categorized aggression by instrumental and hostile. Their research refers to violence specifically as the physical component of aggression, relating violence to physical aggression. Here lays the importance of intent. If the intent of aggression is for superior athletic performance and not harm, then the individual is deemed assertive instead of aggressive (Thirer, 1993). It is of importance again to recognize that these same actions would be hostile if the intent of the violence was only to harm the competitor (Anshel, 1990). Sport in this case justifies the use of aggression when it is instrumental, and research suggests that instrumental aggression in sport relates to goal achievement in competition. Instrumental aggression and hostile aggression both relate to sports performance, but these two variables may relate differently to an outcome such as happiness. Sparring is of interest because of its relationship with aggression. The sole purpose of aggression while sparring is to cause physical harm to the participant's opponent, which is hostile aggression, while concurrently being instrumental. Sparring

involves a person implementing a fluid combination of instrumental aggression and hostile aggression.

Research indicates that self-control training reduces aggression (Denson, 2013; Duckworth et al., 2014; Wang et al., 2018). Denson (2013) assessed a cohort of participants by exposing them to two weeks of self-control training, then exposed them to verbal insults, and found that self-control training negatively predicted how aggressively they responded. Duckworth et al.'s (2014) research suggested that self-control allows for adjusting one's perception, and doing so has a negative relationship with aggression. Wang et al.'s (2018) research determined that a person has a greater likelihood to behave aggressively when provoked if they have depleted their self-control resource, especially when provoked with an aggressive behavior; their research supports Denson et al.'s (2012) findings. Amongst boxers, self-control was shown to have a negative relationship with aggressive behavior (Chen et al., 2019). The given research found that time-spent practicing boxing-training predicts aggression, and a person's ability to combat self-control fatigue (ego-depletion) while on the receiving end of aggressive behaviors, impacts their own aggressive response. Chen et al. (2019) assessed middle-school children by administering to them aggression, self-control, and self-esteem scales, and determined that self-control mediates the relationship between self-esteem and happiness. Combined, these studies support the Strength Model of Self-Control. In addition to increasing a person's self-control, the amount of time spent, in years, practicing boxing-training sparring, might also decrease their aggressive behavior.

An athlete's ability to control their aggressive behaviors positively impacts their performance during competition (Newman et al., 2021); their research involved a meta-

analysis of 83 studies, involving youth between 10 and 24 years of age, by sport, by degree of measured aggression. When assessing the participants' performances during competition, Newman et al. (2021) determined an inverse relationship between non-contact-sports and aggression, while also determining a direction relationship between contact-sports and aggression.

Boxing-training sparring's aggressive behavior requirement for success is interesting in that aggressive behavior negatively predicts athletic performance, and the nature of sparring requires aggressive behavior. This research suggests that forms of aggression, such as context-specific aggression, have their own relationships with self-control as well as happiness. Context-specific aggression is aggression that is viewed as appropriate in a given situation. This raises the questions whether the relationship between aggression and self-control is more complicated in boxers.

Two separate studies found contrasting results when assessing the relationship between self-control and aggressive behaviors. Self-control has a direct relationship with aggressive behavior (Dewall et al., 2007; Stucke & Baumeister, 2010). Stucke and Baumeister's (2010) research suggests that there is a danger for individuals that score high in self-control when they are not allowed time to recover from using this resource. At any given moment, as determined by Baumeister et al. (1998) through their ego-depletion research, self-control has a capacity limit. Despite this capacity having various ranges, its prolonged usage will eventually deplete this resource. Scoring high in self-control enables a human to demonstrate their self-control resilience, but research supports the claim that regardless of its capacity, it will deplete. Scoring high in self-control may create a false sense of security in a human's own self-control abilities. Consequently, the

willingness to continue utilizing this resource increases their risk of experiencing ego-depletion. A filled soda-can serves as a metaphor for the direct relationship between self-control and aggression. An average can of soda has a certain capacity to be shaken before exploding upon opening, due to a build-up of carbon dioxide inside of the can. This is like humans' various levels of self-control that have respective ego-depletion levels.

To complement this false sense of security, research examined a proposed inverted-U shape relationship between self-control, and its beneficial effects (Wiese et al., 2018). Researchers have examined if too much self-control results in a negative effect. Wiese et al. (2018) determined that the benefits of self-control predict positive effects to a certain point before they plateau; regardless of how much self-control is implemented however, harmful effects are never predicted. Their research potentially contradicts Dewall et al. (2007) and Stucke and Baumeister's (2010) research that determined increased self-control's harmful effect of increased aggression. As cited by Dewall et al. (2007) and Stucke and Baumeister (2010), the dual nature of the relationship between self-control and aggressive behaviors, and the negative relationship between aggressive behaviors and happiness, assist in providing the justification for my proposed study.

Boxing-Training and Self-Control

Self-control has shown to have a positive relationship with sports performance (Wilson et al., 2009). The given research determined that anxiety and self-control share an energy source, anxiety impacts a person's performance during athletics participation, and this suggests anxiety impacts a person's ability to exercise self-control. Successful sports performance involves resisting potentially detrimental urges that may result from

physical and mental fatigue, as well as physical and mental excitement. Before athletic competition, a participant may experience fear. The autonomic fight or flight response, has a likelihood of affecting the relationships between decision-making and self-control. Managing resources such as energy expenditures, to mediate the effect of fear on decision-making and self-control resources, helps predict better athletic performance (Wilson et al., 2009). Therefore, it is incumbent upon a person participating in athletic competition to effectively manage their energy expenditures to improve their chances for success.

Performing successfully while sparring necessitates increased levels of self-control (Ba & Zhu, 2008). During sparring, physical pain serves a consequence when a boxer poorly displays self-control; a boxer is constantly fatigued, experiences intermittent physical pain, and they must protect themselves from physical harm that their opponent is trying to inflict upon them. All of this is taking place while the boxer attempts to mount an offensive attack. Increasing levels of fatigue are ever-present. While this is transpiring concurrently, boxers must remain disciplined; they must execute their trained offensive and defensive skills, listen to their coach, control their breathing, and do so while in physical danger. Ba and Zhu's (2008) research is important because it assesses sparring as an event that not only requires increased levels of self-control, but also requires an even further increased amount of self-control for success; sparring qualifies as an effective self-control enhancing tool (Ba & Zhu, 2008).

Self-control during athletic-training and competition benefits a person's physical and mental-health developments (Strayhorn, 2002). Strayhorn's (2002) research suggested the importance of implementing self-control practices while treating

psychiatric disorders because of its adjunct benefits to treating mental-health conditions. Self-control impacts a person's sense of resiliency, and resiliency impacts a person's experience of anxiety (Strayhorn, 2002). Research suggests that self-control's effect on anxiety offers sparring as an interesting practice that has a likelihood of mediating anxiety.

The concept of experiencing physical harm can be terribly frightening for a person. Sparring exposes you to an environment where you willingly engage in an event that involves being punched in your face and your frontal torso. This can create a tremendous amount of anxiety. If a person can train themselves so that they do not experience anxiety when physical pain is inevitable, then that same person's decreased level of anxiety is accessible to help them manage their life stressors that positively affect their anxiety (Muraven & Baumeister, 2000).

Boxing is a sport where self-control allows for the reduction of impulsivity, and this reduction has beneficial effects on that boxer's performance (Xin et al., 2007). While sparring, a participant may feint a punch, as if they are going to throw that punch, but instead does not. They do this to try to evoke a reaction from their opponent that they can then capitalize on by punching them. If a boxer remains disciplined by not reacting to a feint, then this increases the likelihood that they will not be punched, which is a positive outcome during sparring. There are multiple reasons that sparring participants may or may not react sub-optimally to a feint, and ego-depletion is one of them. This real-life example supports the claim that when it comes to sparring, high self-control is a prerequisite for boxers to excel (Ba & Zhu, 2008).

Research suggests that self-control's effect on anxiety offers boxing-training sparring as an interesting tool. The fear of physical pain can create a tremendous amount of anxiety. If a person can train themselves so that they do not experience anxiety when physical harm is inevitable, then those benefits are accessible to help them manage their life stressors that positively affect their anxiety (Muraven & Baumeister, 2000).

When a human is experiencing positive mental-health, they possess the resources that enable them to demonstrate resiliency during life's stresses as well as an overall ability to cope with life's challenges (Fusar-Poli et al., 2020). Fusar-Poli et al.'s (2020) study defined "good mental-health" by assessing it through 14 different categories. Two of these categories are "behaviors" and "decision-making" (Fusar-Poli et al., 2020). Their research supports Dorris et al.'s (2012) findings that there is a positive relationship between self-control and appropriate behaviors and Vohs et al.'s (2014) findings that there is positive relationship between self-control and appropriate decision-making (Fusar-Poli et al., 2020). Together, this suggests a positive relationship between self-control and good mental-health. However, the reverse then applies when humans are experiencing poor mental-health. Poor mental-health correlates with depression; depression predicts poor mental-health (Wing, 2002), decreased levels of positive emotions (Vanderlind et al., 2020), impaired decision-making (Lawlor et al., 2020), and increased levels of aggressive behaviors (Knox et al., 2000). Research suggests that these four measures that are related to depression, are impacted by self-control. This information is important to my research because depression's predictive direction opposes self-control's predictive direction for the same measures.

The concept of “control” has shown to have a strong enough ability that even the illusion of control was found to help moderate the effects of a depressive event on a good-mood state (Alloy & Clements, 1992). Alloy and Clements’s (1992) research design involved 145 participants and assessed how the illusion of control affected their depression. The results stated that the illusion of control helped buffer against the following: naturally occurring negative life events, expressing a negative mood after laboratory equipment failed, and time to experience sadness after multiple negative life events (Alloy & Clements, 1992). Almadani and Alwesmi’s (2023) research found that mental-health severity has an inverse relationship with happiness. This relationship, similar to the inverse relationship between self-control and mental-health, is supported by the correlation between self-control and happiness.

Research Problem

Increased levels of self-control have shown to predict key beneficial areas of life; increased levels of self-control have shown to positively predict a person’s overall health, wealth, and their adherence to societal norms (Moffit et al., 2011; Tangney et al., 2004). Daily eating involves making choices regarding what foods and beverages to consume, and what a person consumes impacts their health. Job performance involves making decisions, and it is important to make appropriate decisions as an employee at an organization. Societal norms are relative norms that apply to a given society, and societies are full of inter-personal relationships; relationships involve making choices, and it is important for the relationship’s health that appropriate decisions are made. Self-control’s benefits suggest that many important aspects of people’s lives would benefit from self-control enhancing tools.

Boxing becomes a practice of interest. Ba and Zhu's (2008) research is important because it assesses boxing-training sparring as a practice that not only requires increased levels of self-control to participate in, but then requires an even further increased amount of self-control for success; sparring qualifies as an effective self-control enhancing tool.

Aggression during athletic competition, especially in contact-sports, was researched to determine how it relates to achieving a goal in an athletic setting. Tenenbaum et al. (1997) determined that aggression is intent-specific, categorizing aggression as either hostile or instrumental. These two different forms of aggression may relate to self-control, and happiness, differently.

Therefore, the focus of my proposed research is on aggression's relationship with boxing-training sparring self-control and happiness. Improving self-control predicts increased happiness, but aggressive behavior may positively or negatively mediate the relationship between self-control and happiness, depending on the type of aggression. Hostile aggression has a likelihood of interacting with self-control differently than instrumental aggression so that only instrumental aggression will positively relate to self-control. Boxing offers a model system to examine how boxing-training sparring self-control, aggression, and happiness relate to one another. This study hypothesized that (1) boxing-training sparring self-control (Melson-Pruned BTSSCQ) positively correlated with happiness in that person's life, (2) Melson-Pruned BTSSCQ negatively predicts aggressive behaviors, and (3) aggressive behaviors mediate the relationship between Melson-Pruned BTSSCQ and happiness.

Chapter II

Method

The present study implements a hierarchical regression analysis to determine the effects of two different predictor variables on the same outcome variable. Here I analyzed the relationships between the OHQ (predictor variable) and the Pruned BTSSCQ (outcome variable) as well as the relationship between the BPAQ-SF (predictor variable) and the Pruned BTSSCQ (outcome variable). The BTSSCQ is followed up by an open-ended question to help arrive at themes that guide the Discussion section. Regression was used to calculate a Mahalanobis distance, to check for outliers in a multivariate analysis. I then used a chi-square distribution, with three degrees of freedom, to determine whether each observation had a significant effect.

Participants

I received approval from the Harvard Committee on the Use of Human Subjects. The tool G*Power was used to determine the number of participants needed to provide statistical significance. The study's total sampled size ($n = 73$) provides an effect size of .2, an alphas value of .05, and a p-value of .95. An effect size of .2 is classified as a medium-sized effect.

As approved by the Harvard Committee on the Use of Human Subjects, a flyer was posted at Mendez Boxing Gym to help recruit participants into the study group. Study group participants were recruited at local boxing gyms using a posted sign-up flyer, phone calls, or verbal invitations to participate. Only verbal invitations successfully resulted in participants signing up for the research group.

The Control group was recruited through phone calls and in-person conversations asking potential participants if they would like to be included in the study.

Table 1. Years Boxing-Training Sparring Demographic

Years	Frequency	Percent
0	38	52.1
1	9	12.3
2	2	2.7
3	4	5.5
4	4	5.5
5	1	1.4
6	2	2.7
7	1	1.4
10	5	6.8
12	2	2.7
20	3	4.1
22	1	1.4
29	1	1.4

**Using the cut-off of any time period of years less than 1 equals 0.*

After one of the study-group participants was removed because they fell below the age inclusion criteria of 30 years, while another participant that qualified for the research group was excluded due to their not completing one of the Questionnaire's, a sample ($n = 73$) was tested. The sample of participants were men ($n = 52$) and women ($n = 21$). The sample's mean age was 41.81 years ($SD = 4.43$). The study's youngest participant was 30-years old, and the oldest participant was 50-years old. The study's participants were divided into a control group ($n = 38$) and a study group ($n = 35$); the shared inclusion criteria for both groups was they had to be between 30 and 50 years of age. The control group was comprised of females ($n = 17$) and males ($n = 21$). The research group was different from the control group in that it had a much smaller sub-

group of females ($n = 4$) than males ($n = 29$). The distinguishing factor between the study's control group and research group was whether they had participated in boxing-training sparring as part of their exercise routine, for at least one year. The study's control group participated in boxing-training sparring for less than one year or never, and the study's research group participated in boxing-training sparring for at least one year. The research group's mean years of boxing-training sparring was 7.14 years ($SD = 7.26$) with one year of sparring being the least and 29 years being the most. The surveys were available for participants to complete from May 2024 thru August 2024. Participants were informed that the study was about "self-control and happiness." The participants were never informed of any additional information regarding the study.

All participants completed the following three Questionnaires: the Tangney Brief Self-Control Scale (BSCS), the Oxford Happiness Questionnaire (OHQ), and the Buss-Perry Aggression Questionnaire Short-Form (BPAQ-SF). The research group completed the following fourth Questionnaire: Melson Boxing-Training Sparring Self-Control Questionnaire (BTSSCQ). The study group, upon completion of that group's required four Questionnaires, answered an open-ended question.

Materials

I measured three variables, and my research's study group measured the same three variables plus an additional variable; the study group was asked an open-ended question assessing situational optimal decision-making. The primary investigative materials are the BPAQ-SF (see Appendix A), the OHQ (see Appendix B), the Tangney BSCS (see Appendix C), the Melson Boxing-Training Sparring Self-Control

Questionnaire or BTSSQ (see Appendix D) pruned down during the statistical analysis to the Melson-Pruned BTSSQ (see Appendix E), and one open-ended question.

I developed the Melson Questionnaire; I have 25 years combined of experience participating in boxing-training sparring between amateur and professional boxing careers. These surveys were loaded on Harvard's Qualtrics Website. Upon either verbal or oral participant agreement, an anonymous Harvard Qualtrics website link was emailed to each participant allowing them to complete each Questionnaire for their respective research group. Each participant also provided their name, age, gender, and number of years spent using boxing-training sparring as a form of exercise.

Tangney's Brief Self-Control Scale

The first variable measured in both groups was self-control. The study implemented Tangney's 13-item BSCS to measure this variable; the BSCS was created by the same researchers that created Tangney's Self-Control Scale (Tangney et al., 2004). Tangney uses a 5-point Likert-scale (1 = extremely uncharacteristic, 5 = extremely characteristic). This Scale has demonstrated good internal consistency and retest reliability, evidenced by two study samples with an internal consistency of .83 and .85, and a reliability of .87 (Tangney et al., 2004).

Although there are models conceptualizing a multidimensional measure of self-control as a better predictor of self-control, the Tangney BSCS model, which is traditionally applied as a unidimensional model, was assessed to determine its trait self-control measure predictive ability (Lindner et al., 2015). Three multidimensional models of the BSCS were compared with a single-dimensional model, to measure trait self-control in two samples of university students ($n = 205$) and apprentices in vocational

education and training ($n = 1951$) (Lindner et al., 2015). This study found that of the three multidimensional models, only the one multidimensional model that separates both positively and negatively worded items, provided a more accurate model-fit amongst both samples than the unidimensional BSCS (Lindner et al., 2015). Despite this finding, multidimensional BSCS models did not increase that model's self-control predictive power (Lindner et al., 2015). Lindner et al. (2015) suggests that the BSCS provides an accurate tool for assessing trait self-control when determining its relationship with achievement-related dependent variables.

This 13-item Scale places a focus on self-control's behavioral aspects, such as reframing from a behavior that is no longer desired, and a person's ability to remain on task despite experiencing difficulties (Tangney et al., 2004). Within this Scale, self-control is related to the following behavioral and psychological health areas: achievement, "impulse control, psychological adjustment, interpersonal relationships, moral emotions, and personality" (Bearden et al., 2011, p. 78). According to Tangney et al. (2004), some example items are "I am good at resisting temptation," "I say inappropriate things," and "I am able to work effectively towards long-term goals" (p. 323) This Tangney BSCS is labeled good because its Cronbach's Alpha ($\alpha = 0.773$) surpasses the threshold of 0.7.

Buss-Perry Aggression Questionnaire Short-Form

The BPAQ-SF is a 12-item short-form of the Buss-Perry Aggression Questionnaire, created by Bryant and Smith (2001). The BPAQ-SF's internal consistency and reliability were assessed through a study that measured aggression amongst Law Enforcement Officers; this is a profession that presents a potential for high-stress

scenarios (Christopher et al., 2024). BPAQ-SF's internal consistency and reliability assessment were determined by combining two different ($n = 61$) and ($n = 69$) Law Enforcement Officer studies. The study results showed that the BPAQ-SF had a good internal consistency ($\alpha = .84$) and a reliability of ($r = .86$) (Christopher et al., 2024). These values indicate that the BPAQ-SF is both valid and reliable. BPAQ-SF is labeled good because its Cronbach's Alpha ($\alpha = 0.795$) surpasses the threshold of 0.7.

A study was conducted comparing the Hungarian version of the Buss-Perry Aggression Questionnaire (BPAQ) with Bryant and Smith's BPAQ-SF. (Zimonyi et al., 2021). The cohort ($n = 841$) in this comparative analysis consisted of Hungarian university students. The three main focal points of their data analysis were the following: descriptive statistics, correlations, and confirmatory factor analysis (Zimonyi et al., 2021). Their research found that the BPAQ-SF provided a more accurate model-fit than the Buss-Perry's BPAQ when measuring aggression (Zimonyi et al., 2021).

The Buss-Perry implements a 5-point Likert-scale (1= 1, 5= extremely characteristic). Some example items are: "Given enough provocation, I may hit another person," "At times I feel that I have gotten a raw deal out of life," and my friends say that I am somewhat argumentative."

Oxford Happiness Questionnaire.

The OHQ is a condensed version of the Oxford Happiness Inventory (OHI), which has 29 listed items; the OHQ consists of 8-items that measure happiness (Hills & Argyle, 2002). A study was conducted with students ($n = 55$) from Northern Irish Undergraduate University on two separate occasions (Cruise et al., 2006). The results yielded the following alpha-values, which assessed the internal consistency of the

“Happiness” measure: $\alpha = .62$ and $\alpha = .58$ (Cruise et al., 2006). Additionally, the study demonstrated a stability value of $r = .69$. These two alpha values, along with the associated stability value, support the claim that the OHQ has both internal consistency reliability and short-term test-retest reliability (Cruise et al., 2006). My study’s statistical analysis determined a Cronbach’s Alpha ($\alpha = 0.786$) for the OHQ labelling it good because it surpasses the threshold of 0.7.

Research was conducted comparing the traditional Oxford Happiness Instrument (OHI), a 29-item Instrument, with the OHQ (Hills & Argyle, 2002). Their research study consisted of Oxford Brookes University undergraduate students ($n = 171$) composed of men ($n = 66$), women ($n = 99$), and unspecified ($n = 7$); this cohort’s ages spanned from 3 to 68 years of age (Hills & Argyle, 2002). When comparing the OHI to the OHQ measures, the researchers determined the following respective reliability values: values $\alpha(167)=0.92$ and $\alpha(168)=0.91$ (Hills & Argyle, 2002). Additionally, their research determined the following respective inter-item correlations: -0.03 to .58, producing a mean of 0.28, and -0.04 to 0.65, producing an equal mean of 0.28 (Hills & Argyle, 2002). As a result, this research determined that the OHQ measures happiness as accurately as the OHI (Hills & Argyle, 2002).

The Oxford implements a 5-point Likert-scale (1 = extremely uncharacteristic, 5 = extremely characteristic). Some example items are: “I look attractive,” “I can organize time,” and “I feel that life is rewarding.”

Melson-Pruned Boxing-Training Sparring Self-Control Questionnaire (BTSSCQ) or Melson-Pruned.

Melson-Pruned is intended to gauge context-specific aggression given that boxing, by definition, is an aggressive sport. This Questionnaire was originally 15-items. After pruning the scale down to an acceptable Cronbach's Alpha ($\alpha = .730$), the final Melson-Pruned listed 6 items.

The original Melson BTSSCQ implements a 5-point Likert-scale (1 = extremely uncharacteristic, 5 = extremely characteristic), consisting of 15 items that I have constructed (see Appendix D). It is designed to assess how participants responded retroactively to listed boxing-training sparring scenarios; during sparring, a participant is fatigued, while immediately experiencing physical violence or the threat of physical violence. The original Melson BTSSCQ did not possess acceptable internal consistency ($\alpha = .219$).

Melson-Pruned is a six-item Questionnaire that implements a 5-point Likert-scale (1= extremely uncharacteristic, 5= extremely uncharacteristic). Some example items are: "Before the bell rings beginning the first round, my heart is racing," "My level of aggression is dependent upon what is required while sparring," "When I fatigue during sparring, my boxing form falls apart," and "I am able to make adjustments while sparring when the situation necessitates it."

Open Ended Question

Upon completion of the Melson BTSSCQ, each participant in the study group was asked to answer the following question: how hard is it to make optimal decisions while sparring? One participant did not respond, 32 responded in total.

Procedure

I administered all assessments. Participants provided me with either an oral or written response agreeing to participate. Participants for the control group were randomly invited to participate through verbal or written means, and if they agreed, they were provided with the necessary Harvard Qualtrics website link so that they could complete the study Questionnaires. I visited the Manhattan, New York-based gym “Mendez Boxing” where I verbally invited potential members to participate in my study. I originally posted a research study recruitment flyer, but I did not have success recruiting a single participant through this process. For prospective study group members, the only question I asked of them was if they had participated in boxing-training sparring for at least one year as part of their routine exercise, and if they were between ages of 30 and 50 years.

My study listed demographic questions that were used to differentiate Control Group participants from Study Group participants; the only differentiating factor between assigned groups pertained to their years of sparring experience. If they answered less than one year or zero years, both coded at 0 years, then they were instructed to complete Tangney’s BSCS, the OHQ, and the BPAQ-SF. If they answered one or more years, then they completed these three shortened Questionnaires listed above as well as Melson’s BTSSCQ, later pruned down to a short version. The Research Group was then provided with an open-ended question that they answered.

Chapter III

Results

This section consists of the following: a brief discussion about Cronbach's alpha value, its use to evaluate the internal consistencies of the Questionnaires used in this study, a correlations table to evaluate this study's three hypotheses, a brief discussion of the hierarchical multiple regression used in this study and its results, a correlational analysis between years sparring and Melson-Pruned, the study group descriptive statistics, and the open-ended question responses divided into five separate categorical responses.

Cronbach's alpha

Developed by Lee Cronbach in 1951, Cronbach's alpha was developed for the purpose of assessing a measuring instrument, such as a survey, scale, or questionnaire's, internal consistency (Tavakol & Dennick, 2011). It is paramount to a study's accuracy that the measuring instruments used are both reliable and valid. Reliability refers to a measuring instruments consistency amongst populations, and validity refers to that instrument's ability to accurately measure what it is intended to measure (Tavakol & Dennick, 2011).

Cronbach's alpha represents the inter-relatedness of the items listed in the scale or survey, with a low alpha indicating a decrease in item inter-relatedness and a high alpha indicating an increase in item inter-relatedness (Cortina, 1993). Cronbach's alpha values range from 0-1, and an alpha is recognized as good with acceptable inter-relatedness when it ranges from .70-.95 (Bland & Altman, 1997). A low alpha indicates that the

items on the instrument score poorly in inter-relatedness, and having too few items scored may also result in a low alpha (Tavakol & Dennick, 2011).

The Melson BTSSCQ originally listing 15-items and had a low Cronbach's alpha ($\alpha = .219$). Systematically, the item with the highest Cronbach's alpha-value was removed, followed by a recalculation of the alpha after each item removal. The finished Melson-Pruned BTSSCQ listed 6-items with a good Cronbach's Alpha ($\alpha = .730$).

Table 2. Cronbach's Alpha Adjusted Values

Item Number Removed	Adjusted Cronbach's alpha
8	0.315
4	0.410
10	0.476
7	0.514
2	0.574
15	0.603
14	0.633
12	0.682
11	0.730

Correlations

To test Hypothesis 1, a One-Tailed Pearson correlation was conducted to test whether Melson-Pruned and Oxford had a positive relationship. There was no significant positive correlation between the two variables, $r(31) = .277$, $p = .06$. This correlation failed to support Hypothesis 1. The p-value here was cut in half because a One-Tailed analysis was conducted. The reasoning behind this was that this study's first hypothesis stated a correlational direction.

To test Hypothesis 2, a One-Tailed Pearson correlation was conducted to test whether Melson-Pruned and Buss-Perry had a negative relationship. There was no

significant negative correlation between the two variables, $r(30) = -.200$, $p = .136$. This correlation failed to support Hypothesis 2.

Table 3. Correlations Table

	Tangney	Oxford	Buss-Perry	Melson-Pruned	Age	Years Sparring
Tangney	.761					
Oxford	0.033	.786				
Buss-Perry	-.355**	-.345**	.795			
Melson-Pruned	0.281	0.277	-0.2	.730		
AGE	0.057	-0.018	0.2	-0.158		
Years Sparring	.234*	-0.046	-0.159	.541**	-0.07	
Boxer	0.157	0.09	-0.07		0.073	-.585**

notes: all correlations are two-tailed

the diagonal for scales represents Cronbach's alpha

The diagonal for scales represents Cronbach's alpha.

***.* Correlation is significant at the 0.01 level (2-tailed).

Regression

To further test Hypotheses 1 and 2, as well as to test hypothesis 3, a hierarchical multiple regression was conducted. The Dependent Variable was Melson's-Pruned BTSSCQ rating. In Model 1, the Independent Variables were the Oxford Happiness Questionnaire (Cruise et al., 2006) and The Buss-Perry Aggression Questionnaire Short-Form (Buss & Perry, 1992).

Table 4. Melson-Pruned BTSDMQ as a Function of Happiness and Aggression

Variable	R^2	ΔR^2	B	t	p	VIF
Model 1	0.098	0.098			0.223	
Constant			2.675	2.488	0.019	
Oxford			0.274	1.371	0.181	1.128
Buss-Perry			-0.12	-0.605	0.55	1.128
Model 2	0.183	0.085			0.124	
Constant			8.035	2.426	0.022	
Oxford			-1.025	-1.304	0.203	18.611
Buss-Perry			-0.229	-1.778	0.086	51.739
OxfordXBuss-Perry			0.54	1.705	0.099	49.067

*. Correlation is significant at the 0.05 level (2-tailed).

a. Cannot be computed because only boxers completed Melson-Pruned.

VIF and Mahalanobis

The VIF value between the OHQ and Buss-Perry SF was lower than 2.5 indicating no multicollinearity issues, VIF = 1.128. Outliers were assessed using Mahalanobis distance. In all instances Mahalanobis distance values were assessed using a chi-square distribution with a significance level of .001 as suggested by Tabachnick and Fidell (2013). The maximum Mahalanobis distance value was 11.451. Because there were three Independent Variables in model 2, the Mahalanobis distance values were compared to a chi-square distribution with three degrees of freedom. This indicated no outliers at the .001 level, observation with lowest $p = .008$. The multiple regression found that Oxford and Buss-Perry did not significantly predict Melson, $F(2, 29) = 1.581$, $p = .223$. Adding the interaction between Buss-Perry and Oxford in Model 2 did not significantly improve prediction of Melson-Pruned, $\Delta R^2 = .085$, $\Delta F(1, 28) = .035$, $p =$

.099. Because Model 1 was not significant and Model 2 was not a significant improvement, the coefficients will not be discussed (see Table 4). The regression failed to support Hypotheses 1, 2, or 3.

Years Sparring

A correlational analysis was performed to determine a relationship Years Sparring and Melson-Pruned. It was determined that there is a statistically significant relationship, $r(73) = .541, p = .001$.

Table 5. Years Sparring Demographic

Years	Frequency	Percent
0	38	52.1
1	9	12.3
2	2	2.7
3	4	5.5
4	4	5.5
5	1	1.4
6	2	2.7
7	1	1.4
10	5	6.8
12	2	2.7
20	3	4.1
22	1	1.4
29	1	1.4
Total	73	100

Study Group Descriptive Statistics

The 32 study group participants averaged higher Melson-Pruned, $M = 3.50$, $SD = .75$, and Oxford scores, $M = 4.07$, $SD = .70$, than their averaged Buss-Perry scores of $M = 1.99$, $SD = .60$.

Table 6. Descriptive Statistics

	Mean	Std. Deviation	N
MelsonMean_Pruned	3.50	0.75	32
Oxfordmean	4.07	0.70	32
BussPerrymean	1.99	0.60	32
OxfordXBussPerry	8.10	0.42	32

Open-Ended Question Coded Responses

The responses were coded into five different categories. Responses such as “not hard at all” and “it’s easy” were coded as 1. Responses such as “not hard” and “not hard at all” were coded as 2. Responses such as “it could be tough. But 3 out of 5 toughness” and “easier with corner’s advice” were coded as 3. Responses such as “very hard to stick to a game plan while being punched in the face” and “moderately difficult” were coded as 4. Responses such as “very, optimal is hard to do when you are getting punched” and “very difficult” were coded as 5. The most frequent coded response was 2 with a mean score ($M = 2.68$) less than one increment greater.

Table 7. Open-Ended Question Coded Responses

Years Sparring	Open-Ended Question Coded Response
1	5
1	2
1	2
1	5
1	2
1	3
1	4
2	3
2	2
3	3
3	1
3	2
3	4
4	3
4	2
4	1
4	3
5	2
6	3
6	2
7	3
9	2
10	2
10	5
10	3
10	4
10	2
12	5
12	2
20	2
20	2
20	2
22	1
29	2

Chapter IV.

Discussion

The present study contributes to existing research examining how increased physical and mental stressors do have the ability to increase a person's self-control resources and decision-making resources; these two traits share one resource. Furthermore, this study sought to build from previous research that determined that self-control enhanced through one activity, can then be exercised during a different activity, and an increase in decision-making resources then also provides greater resources for self-control. The One-Tailed t-test performed to examine the relationship between Melson-Pruned and Happiness determined that Melson-Pruned and Happiness scores are not significantly correlated. Conversely, a different One-Tailed t-test determined that there is no significant relationship between Aggression and Melson-Pruned.

Instrument Accuracy and Questionnaire Pruning

Precise measuring instruments are of paramount importance when conducting research. An instrument that has good internal consistency, helps improve that instrument's reliability and validity while being used; it provides a better understanding of phenomena that occurs naturally or while conducting research, and of great importance, helps the investigator make informed decisions (Nnamoko & Ng, 2023). Accuracy assesses whether the instrument is measuring the variable it is designed to measure. Benefits to accuracy involve reduction in both systematic and random error along with supporting that instrument's reliability: will this instrument accurately repeat its results (Nnamoko & Ng, 2023)?

When developing the Melson Questionnaire, 15-items were originally included with the purpose of measuring boxing-training sparring self-control. The original 15-item Melson Questionnaire was developed and used only in this research study. The intention of the Melson instrument was to quantify a boxing-training sparring self-control scale, which would serve as a correlational variable, to measure against Oxford's Happiness. With Melson's instrument being developed prospectively, there was no mechanism to assess Melson's internal consistency, validity, or relationship with Tangney's Self-Control prior to conducting this study. A consequence of this was realizing that the 15-item original version of Melson had a low Cronbach's alpha ($\alpha = .219$), supporting Melson's low internal consistency. Systematic pruning of the 15-item Melson scale was performed by running Melson's original alpha, and then removing individual items one at a time, based on which item at that time had the highest alpha, and then re-determining the alpha after each item removal, until a satisfactory alpha was reached. In total, nine of the study's original 15 items were removed from Melson until an alpha of .7 or higher was determined ($\alpha = .730$). Additionally, Melson was not significantly related to Tangney $r(31) = .281, p = .113$. Melson's lack of a significant relationship to Tangney suggests that the Melson instrument does not measure self-control.

The study group completed Melson. Two test submissions that were recorded were later deleted from the analysis. A participant was removed because of falling under the lower limit of the study inclusion criteria. After these adjustments, 34 participants comprised the study group.

Melson-Pruned Scale Item-Analysis

Melson-Pruned listed six different items that attempted to capture moments during sparring where decisions were made under physical and mental stress. Six items were listed on Melson-Pruned:

1. Before the bell rings beginning the first round, my heart is racing.
2. When the round ends, the first thing I focus on is controlling my breathing.
3. When my sparring partner hits me to the extent that I am dazed cognitively, I panic.
4. My level of aggression is dependent upon what is required while sparring.
5. When I fatigue during sparring, my boxing form falls apart.
6. I am able to make adjustments while sparring when the situation necessitates it.

Item #1 is the only item listed on Melson-Pruned that depicted a scenario that takes place before sparring begins. The attempt here was to understand how anxiety impacts their decision-making. This item builds from Englert's (2016) research that assessed the impact of anxiety on athletic performance and determined that self-control can help mediate the effects of anxiety. It is typical that anxiety expends energy in an unproductive manner. Fear can trigger an autonomic response where a person's heart rate rapidly increases, and this can result in using energy to process fear-induced anxiety. Before a sparring session begins, the experience of anxiety is being attributed to events that have not yet happened. This suggests that a person whose heart is beating at a rapid pace prior to sparring, will have that much less self-control to exert while sparring.

Item #2 is similar to Item #1 in that the scenario presents no immediate physical danger or decision-making that is in response to immediate physical danger. This item

builds from Wilkinson's (2019) research that determined decision-making fatigue effects self-control. Upon completion of a three-minute round of sparring, a participant's brain is forced to make decisions while under physical and mental duress. The end of a round signifies a rest in that participant's decision-making, immediately after three-minutes of constant impactful decision-making. Now the participant has to exercise self-control by focusing on controlling their breathing while in a potentially physically exhausted state.

Item #3 involves decision-making while under increased mental stress, with the potential of receiving physical pain being an immediate consequence. A punch that causes a participant to be cognitively dazed may result in an increase in anxiety. As Wilkson's (2019) research determined, anxiety effects both a person's decision-making and ability to exercise self-control. While sparring, there is a constant juggle between using the same resource center for either self-control or for decision-making.

Item #4 directly presents a scenario where the participant is not being asked to either respond aggressively or not. Rather, the participant understands that they are already choosing aggression as a response. Based off their scored answer, there are varying amounts of self-control required. Aggressive behaviors inside of the boxing ring, during the sparring session, and as the rounds progress, do tend to increase at times. Two individuals participating in sparring may have an agreement to work at a given intensity with an understood amount of aggression. A challenge may arise when one participant is punched in their face harder than they preferred, and they may want to retaliate. Due to their agreement prior to entering the ring, they have to decide whether to exercise self-control and not increase their own aggression. This item is supported by Terry and Jackson's (1985) research involving two types of aggression, hostile and instrumental.

Item #4 assesses a participant's ability to refrain from transitioning their aggression from instrumental to hostile, which is related to self-control.

Item #5 depicts a moment when a participant is sparring, they have exhausted their energy resources, and ego-depletion has occurred (Baumeister et al., 1998). The physical response of "boxing form falls apart" varies between that participant not keeping their gloves up high enough to protect their face to completely keeping their gloves down by their waist. A participant's choice to have their boxing form fall apart to the extent where they choose to completely rest on the floor, represents this instant's case of full ego-depletion; the participant has completely exhausted their self-control resources.

Item #6 assesses a participant's ability to make appropriate decisions in response to what a given sparring session is presenting to them. This item supports Piquero et al.'s (2010) research on self-control's malleability. Their research determined that self-control can increase through practicing self-control. As a result, Year's Sparring may impact a participant's Likert-scale choice selection; the ability to make an appropriate decision during sparring in relation to what their opponent is doing, requires self-control. With a participant having a fixed amount of self-control when entering a given sparring session, Piquero et al.'s (2010) research would determine that participants with greater amounts of years sparring would have increased energy resources that would assist their decision-making in response to their opponent's decisions.

Although Melson-Pruned did not relate to the Tangney, the Cronbach's alpha ($\alpha = .730$) does demonstrate that Melson-Pruned has a 6-item list that is a measuring instrument with good internal-consistency. There are physical stressors and mental stressors that effect decision-making, and while sparring, decisions result in a behavioral

response that require varying amounts of self-control. The Cronbach alpha value suggests that future research may implement a Decision-Making Questionnaire instead of the Tangney Scale for both cohorts, and then determine if Melson-Pruned correlates with that Decision-Making Questionnaire.

A hierarchical multiple regression was used because of its ability to discriminate the effects of more than one independent variable acting on the same dependent variable. This regression showed that there were no significant interactions between Melson-Pruned and Oxford. This form of regression is used when the two independent variables have minimal relation to one another, like Oxford and Buss-Perry. When these two variables interacted, the Melson-Pruned significance ($p = .468$) eliminated doubt that these two independent variables interacting together, then interacted with Melson-Pruned, with greater significance than the independent relationships between Oxford and Melson-Pruned or Buss-Perry and Melson-Pruned.

Years Sparring

Although Years Sparring is not a variable analyzed in any of my three hypotheses, it is a variable that was collected, and this variable's relationship with Melson-Pruned did have statistical significance $r(73) = .541$, $p = .001$. This finding supports research stating that practicing activities that involve self-control is the best way a person can increase their self-control (Muraven, 2010). There is a level of familiarity with a task that a person has spent time practicing through repetition. Muraven's (2010) research suggests that members of my research's study group should have enhanced their boxing-training sparring self-control by practicing sparring for a greater number of years.

Participants that participated in sparring for more years than their fellow participant, not only have an increase in their self-control resources, but also have an increase in their decision-making resources. This would suggest that the number of Years Sparring would impact that participant's Melson-Pruned score, and this rationale supports why Years Sparring is significantly related to Melson-Pruned.

Decision-Making

Decision-making involves a person evaluating a potential choice, comparing it to other potential choices, and then selecting the choice that best satisfies their needs (Kaya, 2014). A need may be arbitrary, as they may be just as dependent on the person's preferences as they are on the external situation at hand. When there is a clash between what is being presented versus what the person desires, the decision-making process may become more stressful.

When evaluating decision-making during athletic competition, there are three main characteristics: decisions are made through a naturalist lens, decisions are revealed over time, and decisions have a dynamic nature (Johnson, 2006). The natural lens here refers to the participant in that athletic competition making their decisions based on their prior experiences they have had while participating in that same athletic event. Decisions being revealed over time speaks to the fluidity of athletic competition, and choices made in real-time may pertain to an event that is not happening at that moment. Additionally, as any given scenario evolves, new information becomes available, and the correctness of a made decision may no longer apply to the newly evolved scenario. The dynamic nature of decisions during athletic competition refers to how decisions are made in real-time while the athletic competition is still in play; this is in opposition to decisions being

revealed over time, which can involve a decision to be made during a stop in play, such as a timeout or the end of a round.

Technical skills during athletic competition impact a person's decision-making. In my study, the control group's experience with sparring ranged from one year to 29 years. This vast range of sparring experience would indicate that the technical abilities of the participants had a likelihood of varying. Dr. Richard Martens (Martens, 2012) defined technical skills as "the procedures to move one's body to perform the task that needs to be accomplished (p. 169)." The duration and frequency of practice (Martens, 2012), paired with the participant paying attention to how they are physically executing their decisions, help increase that person's sports-specific technical skills (p. 169). Since the frequency and duration of routine sparring amongst the research group was not collected, there was no mechanism to measure the research group's participants technical skills that apply to sparring.

Familiarity with a practice has the potential to allow for an increase in that participant's potential decision-making options. This can be attributed purely to the fact that that person has experienced that scenario before, and they have learned the respective consequences that are associated with one decision over another. With a range of Years Sparring that extended from one year to 29 years of practice, the technical skill component of each study group participant had a likelihood of varying, and this had a likelihood of effecting their responses to Melson-Pruned. If a participant responded to an item on Melson-Pruned that represented a scenario that they did not have as much experience with handling technically, then this difference in experience and self-perceived technical abilities may have impacted their choice selection.

When applying decision-making to athletic competition, Wood (2014) divided technical learning of decision making into three categories. The first category applies to beginners in that form of athletic competition, and it involves someone else providing basic feedback that helps the participants understand what they are performing technically that is correct or incorrect (Wood, 2014). The second category applies to the athletic competition participant that has a firm grasp conceptually of the technical skills required to make a given decision, and they are able to self-evaluate while making decisions requiring technical skill competency (Wood, 2014); this typically results in the participant committing fewer errors, recognizing patterns more quickly, and focusing on what is needed at that moment in order to execute a decision. The third category applies to the athletic competition participant that has attained such a level of familiarity with the technical skills they need to successfully execute, that automaticity and muscle memory play a much larger role during competition negating the need to spend time deciding (Hopper & Kruisselbrink, 2006).

Both Wood (2014), and Hopper and Kruisselbrink (2006), provide reference to the recognition that decisions involving a technical skill component, in the case of athletic competition, are largely dependent upon the amount of time that the participant has spent engaging in that sport's activities.

Hopper and Kruisselbrink (2006) reference that athlete that now makes decisions more influenced by automaticity than purposeful deliberate thinking. Since familiarity comes with practice, and expanding technical proficiencies comes with practice, my study's participant range of one year to 29-years' experience with routine sparring, brings with it a likelihood that the sparring technical competencies varied across the study

cohort. As Hopper and Kruisselbrink (2006) define the third category of athletic competition as that space where an athlete has a great deal of familiarity with the sport and the techniques needed to carry out competition-based decisions, the range in Years Sparring throughout the research cohort would indicate that participants in that cohort were dispersed amongst these three categories. As a result, there is a likelihood that this impacted their choice of selection when completing Melson-Pruned.

Decision-Making Questionnaire (DMQ)

By not correlating Melson-Pruned with Tangney, yet while Melson-Pruned still measured good for internal consistency, the DMQ serves as a measure to compare to Melson-Pruned for the purposing of analyzing their correlation. Decision-making and self-control do utilize the same energy resource center, but they are two different measures (Wilkinson, 2019). The DMQ was designed and then validated to assess the factors that affect decision-making (Lizarraga, et al., 2009). Their study involved two samples that comprised 170 participants and 425 participants that were mixed gender (Lizarraga et al., 2009). Two different versions of the DMQ were used to assess their internal validities. The study's analysis determined that their DMQ internal consistency was good for Version A ($\alpha = .87$) and good for Version B ($\alpha = .84$). "Version A consisted of 84 items, grouped into 15 subfactors or scales: uncertainty, time pressure, money pressure, task complexity, quantity of information, multiple goals, consequences of the decision, motivation, self-regulation, cognition, emotion, experience, social pressure, pressure from other people, and pressure from work rules" (Lizarraga et al., 2009, p. 360). The Questionnaire's items are "rated on a 9-point Likert-scale, where 1 stands for not at all important, and 9 for very important" (p. 360). Version B consisted of 74 items,

10 subfactors, and 3 factors. (Lizarraga et al., 2009). The analysis of these two measuring instruments determined that both DMQs are reliable and do measure the variable they are intended to measure. Either version used in Lizarraga et al.'s (2009) research would serve as a good starting point for comparison to see how a participant scored on one of these two scales in relation to how they scored on Melson-Pruned. A potential difficulty however with both DMQs mentioned here is their length. An investigator may find difficulty finding a willing participant when they must complete either an 84-item or 74-item Questionnaire. Seeking out a short-form version of this scale may be beneficial.

Forms of Aggression

Regarding boxing-training sparring and aggression, for three-minute rounds at a time, each participant's behaviors involve aggression as a baseline behavior. Additionally, the three-minute rounds of sparring require a participant to dynamically assess if and how they need to modulate their present level of aggression. Of interest here is that hostile aggression, by definition, is also the same type of aggression that is instrumentally needed in order to achieve the specific sparring goal of hitting your opponent while not being hit. Not all aggressive behaviors in boxing are performed at the same intensity. A participant may choose to alter the amount of speed and power they deliver their punches with for the purpose of achieving a sub-goal while sparring a few moments later into the session. Sparring requires a participant to develop a skillset where they are constantly having to make decisions regarding their level of aggressive behaviors while there is a persistent threat of being punched by their fellow participant. A mean comparison of the research group's Buss-Perry score ($M = 1.99$) and Melson-Pruned

score ($M = 3.5$) brings into question a future study that evaluates different forms of aggression and comparing them both to Melson-Pruned to assess their interaction.

Controlling For Potential Noise

The nature of this study is prospective with items on each Questionnaire that pose a future scenario that is then given a score by the participant. This study's collected demographics did not involve collecting data that asked the participant if they still participate in sparring routinely in their exercise, and if they do not, how many years have passed since they have. This would have served as a control measure to account for potential memory deficits when a participant was trying to accurately determine what they would do based on what they had done in the past. It would be understandable that a participant that is currently engaging in sparring as a form of exercise, would be able to more accurately recall their choices they had made when answering the Questionnaire, than someone who had not sparred for multiple years. An ability to more easily recall an event is helpful when completing a prospective survey. When making an accurate decision, accurate information helps support this process.

Providing a control to account for how long ago they stopped sparring as part of their routine exercise allows for potential mediation between Years Sparring and Melson-Pruned. In this research study, participants were included in both groups if they were 30-50 years. A participant that sparred for five years, and then stopped sparring five years ago, may not be able to recall their sparring experiences as well as a participant who sparred for five years as well, but stopped only one year ago. This may have affected their total scores as well.

Another control that would have provided benefit would be asking the participant to list what other combat-sport they have routinely participated in, and how long. If a participant had a history of exercise in their life that routinely involved some form of combat-sport sparring, then this would suggest that they also exercised the amount of self-control that that sport requires for success. Boxing is a combat-sport. There is a likelihood that if participants that had routinely participated in combat-sport sparring prior to boxing-training sparring, then their levels of self-control would have been increased before they switched to boxing. This control has a likelihood of providing an overall better statistical analysis.

Non-Compliance

One of the participants ($n = 32$) that was in the study group failed to fully complete the Buss-Perry Questionnaire. This did not affect the analysis of this study's hypotheses. It would affect how additional data in this study is analyzed, and this would impact this research study's data's effectiveness if applied to similar fields of research.

Open-Ended Question

Twenty-Six of the participants in total responded with answers coded 1 thru 3. There was no impact by Years Sparring on the dispersion of responses coded 1 thru 3 as participants ranging from 1-29 years of sparring responded with a coded value of 1 thru 3. Their responses did show that once at least 20 years of boxing-training sparring was practiced as exercise by the participants, then a level of familiarity amongst those boxing-training sparring participants was likely to result in their responding to each item as easy or not difficult. A future study could build upon this finding by categorizing participants

into clumps by “number of years sparring as routine exercise,” having each clump complete the open-ended question, and then running a correlation to see if years sparring is correlated to classification of open-ended response.

~~By the end of the study, the researcher was left with~~

Limitations

This research study set out to determine if boxing-training sparring self-control correlates with happiness in that person’s life. My research analysis determined that the initial 15-item version of the Melson Questionnaire did not have items with a strong enough inter-relatedness that would provide good internal consistency. Nine of the 15-items were pruned until an acceptable Melson-Pruned internal consistency was measured. Neither the original Melson version or the Pruned version were significantly related to Tangney’s BSCS scale as well.

A pre-pruned Questionnaire that has bad internal consistency and does not correlate with the trait it is designed to measure can still be salvaged by removing an item at a time and recalculating the Questionnaire’s alpha. However, when that pruned version now has good internal consistency, but the Questionnaire still does not relate significantly to the trait it is designed to measure, the use of that instrument has the potential to create great challenges for any statistical analysis directed at proving or disproving a study’s stated hypotheses. This study experienced this dynamic in that the instrument developed did not correlate with the trait it was trying to measure. By this research not having a valid instrument to measure one of the study’s research variables, the analysis does not support any of the three hypotheses, but it also does not deny any of the three hypotheses. Administering a Decision-Making Questionnaire to participants may have resulted in a Decision-Making score that correlates with the 6-item Melson-Pruned Questionnaire.

Additional demographic information that involved occupation and years in that occupation, may have helped. Occupations that have a routine physicality component to them may require different levels of self-control than jobs that are more stationary and intellectually demanding. The lack of this control prevented potential noise from interfering with the desired measured variables, such as baseline self-control before a participant had chosen to begin boxing-training sparring as their routine form of exercise. Research has demonstrated that self-control increased through one activity can then be applied to another activity (Boat & Cooper, n.d.). An occupation as a First Responder may require more self-control than an occupation working in a tollbooth as a toll collector. These may represent two of the participants in my study group, and these occupations may have affected their baseline self-control score when they first began boxing-training sparring as routine exercise.

The static nature of the items listed on Melson-Pruned presented another limitation. Static nature here refers to the items calling on the participants to assess what they would do during a given scenario. These items are static, yet the nature of sparring is fluid and dynamic. An example of how the Melson-Pruned design creates a limitation can be demonstrated by Item #1 that asked if that participants heart is racing prior to the beginning of the sparring training factor. An increased heartrate may be a response to stress and anxiety. A person's heartrate as they prepare to begin sparring, may be different if they are sparring against someone that has never sparred before verse sparring against someone that has sparred for more years than them. Perhaps this is their second time sparring the same person, and the last session resulted in that person being knocked to the ground. Sparring with this same person again, after having been knocked down

during the prior sparring session, could impact that person's heartrate to a different degree than the novice sparrer would impact it.

Future Research

Future research could involve revisiting this same thesis topic to test the three hypotheses, but first do so by developing an instrument that is valid in that it measures the correctly intended variable. My research only proved that the Melson-Pruned Questionnaire does measure a trait, and accurately determining that trait then allows for a correlation between that Melson-Pruned and a validated psychological assessment construct that measures that trait.

Additionally, boxing is not the only combat-sport that involves sparring as part of its exercise regimen. Research comprised of different arms of combat- sports that participate in sparring, could each serve as sub-groups of the combat- sports cohort. This could potentially inform the investigator about relationships between various combat-sports sparring, how it effects their participants' decision-making, if sparring correlates with happiness, and the magnitudes of the correlations.

Appendix A.

Tangney's Short-Form Self-Control Scale

Items of the Self-Control Scale (Tangney et al., 2004)

Below are a number of statements about self-control. Please indicate how much you agree or disagree with each by entering a number in the blank after each statement, according to the following scale:

Place your rating in the box to the right of the statement.

1 = extremely uncharacteristic of me

2 = somewhat uncharacteristic of me

3 = neither uncharacteristic nor characteristic of me

4 = somewhat characteristic of me

5 = extremely characteristic of me

1. I am good at resisting temptation.
2. I have a hard time breaking bad habits.
3. I am lazy.
4. I say inappropriate things.
5. I do certain things that are bad for me, if they are fun.
6. I refuse things that are bad for me.
7. I wish I had more self-discipline.
8. People would say that I have iron self-discipline.

9. Pleasure and fun sometimes keep me from getting work done.
10. I have trouble concentrating.
11. I am able to work efficiently towards long-term goals.
12. Sometimes I can't stop myself from doing something, even if I know it is wrong.
13. I often act without thinking through all the alternatives

Appendix B.

Oxford Happiness Questionnaire

Below are a number of statements about happiness. Please indicate how much you agree or disagree with each by entering a number in the blank after each statement, according to the following scale:

Place your rating in the box to the right of the statement.

1 = extremely uncharacteristic of me

2 = somewhat uncharacteristic of me

3 = neither uncharacteristic nor characteristic of me

4 = somewhat characteristic of me

5 = extremely characteristic of me

Please read the statements carefully, some of the questions are phrased positively and others negatively. Don't take too long over individual questions; there are no "right" or "wrong" answers (and no trick questions). The first answer that comes into your head is probably the right one for you. If you find some of the questions difficult, please give the answer that is true for you in general or for most of the time.

1. I am pleased with myself.
2. I feel that life is very rewarding.
3. I can organize time.
4. I find beauty in things.

5. I am satisfied with life.
6. I look attractive.
7. I look mentally alert.
8. I have happy memories.

Appendix C.

Buss-Perry Aggression Questionnaire

Aggression Questionnaire (Buss & Perry, 1992) Instructions: Using the 5-point scale shown below, indicate how uncharacteristic or characteristic each of the following statements is in describing you.

Place your rating in the box to the right of the statement.

1 = extremely uncharacteristic of me

2 = somewhat uncharacteristic of me

3 = neither uncharacteristic nor characteristic of me

4 = somewhat characteristic of me

5 = extremely characteristic of me

1. I can't help getting into arguments when people disagree with me.
2. I wonder why sometimes I feel so bitter about things.
3. I have threatened people I know.
4. Given enough provocation, I may hit another person.
5. At times I feel I have gotten a raw deal out of life.
6. I have trouble controlling my temper.
7. I often find myself disagreeing with people.
8. I sometimes feel like a powder keg ready to explode.
9. Other people always seem to get the breaks.

10. There are people who pushed me so far that we came to blows.

11. My friends say that I'm somewhat argumentative.

12. Sometimes I fly off the handle for no good reason.

Appendix D.

Original Melson Boxing-Training Sparring Self-Control Questionnaire

Below are a number of statements about boxing training sparring aggression.

Please indicate how much you agree or disagree with each by entering a number in the blank after each statement, according to the following scale:

Place your rating in the box to the right of the statement.

1 = extremely uncharacteristic of me

2 = somewhat uncharacteristic of me

3 = neither uncharacteristic nor characteristic of me

4 = somewhat characteristic of me

5 = extremely characteristic of me

1. Before the bell rings beginning the first round, my heart is racing.
2. When the round begins, my mindset is to allow my partner to throw the first punch.
3. When the round ends, the first thing I focus on is controlling my breathing.
4. While boxing, I am unable to pay attention to voices coming from outside of the ring.
5. When my sparring partner hits me to the extent that I am dazed cognitively, I panic.
6. My level of aggression is dependent upon what is required while sparring.

7. When the round begins, I begin the round defensively minded.
8. When I hit my sparring partner, I wait to see how they respond.
9. When I fatigue during sparring, my boxing form falls apart.
10. I clinch during sparring when I am tired.
11. When my sparring partner hits me and it hurts, I immediately seek offensive revenge.
12. I feel comfortable only targeting a lesser ability sparring partner's lower body with my punches, even after they hit me hard in my head.
13. I am able to make adjustments while sparring when the situation necessitates it.
14. When my partner lands a blow on me that is a foul, accidental or intentional, I return the foul.
15. I enjoy engaging in sparring where my partner and I are standing toe-to-toe punching each other back punching each other back and forth.

Appendix E.

Melson Pruned Boxing-Training Sparring Self-Control Questionnaire

Below are a number of statements about boxing training sparring aggression.

Please indicate how much you agree or disagree with each by entering a number in the blank after each statement, according to the following scale:

Place your rating in the box to the right of the statement.

1 = extremely uncharacteristic of me

2 = somewhat uncharacteristic of me

3 = neither uncharacteristic nor characteristic of me

4 = somewhat characteristic of me

5 = extremely characteristic of me

1. Before the bell rings beginning the first round, my heart is racing.
2. When the round ends, the first thing I focus on is controlling my breathing.
3. When my sparring partner hits me to the extent that I am dazed cognitively, I panic.
4. My level of aggression is dependent upon what is required while sparring.
5. When I fatigue during sparring, my boxing form falls apart.
6. I am able to make adjustments while sparring when the situation necessitates it.

References

- Allen, J., & Anderson, C. (2017). Aggression and violence: Definitions and distinctions. *The Wiley Handbook of Violence and Aggression*.
<https://doi.org/10.1002/9781119057574.whbva001>
- Alloy, L., & Clements, C. (1992). Illusion of control: Invulnerability to negative affect and depressive symptoms after laboratory and natural stressors. *Journal of Abnormal Psychology*, 101, 234–245. <https://doi.org/10.1037//0021-843X.101.2.234>
- Almadani, N. A., & Alwesmi, M. B. (2023). The relationship between happiness and mental health among Saudi women. *Brain Sciences*, 13(4), 526.
<https://doi.org/10.3390/brainsci13040526>
- Anshel, M.H. (1990). Sport psychology: From theory to practice. *Gorsuch Scarisbrick*.
- Ba, Y.M., & Zhu, R.H. (2008). Construction of index system of selecting reserve talent for topnotch male boxers of our country. *Journal of Shanghai Physical Education Institute*, 32, 89–92. doi: 10.16099/j.cnki.jsus.2008.06.022
- Badri, M. A., Yang, G., Al Khaili, M., Al Bahar, M., Al Rashdi, A., & Al Hyas, L. (2021). Hierarchical Regression of Wellbeing and Self-Rated Health among Older Adults in Abu Dhabi. *International Journal of Environmental Research and Public Health*, 18(15), 8006. <https://doi.org/10.3390/ijerph18158006>
- Barkley, R. A. (1997). *ADHD and the nature of self-control*. The Guilford Press.
- Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology*, 74(5), 1252–1265. <https://doi.org/10.1037/0022-3514.74.5.1252>
- Baumeister R. F., Heatherton T. F., & Tice D. M. (1994). *Losing Control: How And Why People Fail At Self-Regulation*. Academic Press.
- Bearden, W. O., Netemeyer, R. G., & Haws, K. L. (2011). Traits and individual difference variables. In *Handbook of Marketing Scales: Multi-Item Measures for Marketing and Consumer Behavior Research* (3 ed., pp. 15-150). SAGE Publications, Inc., <https://doi.org/10.4135/9781412996761>
- Bland, J. M., & Altman, D. G. (1997). Statistics notes: Cronbach's alpha. *BMJ*, 314(7080), 572. <https://doi.org/10.1136/bmj.314.7080.572>
- Boat, R., & Cooper, S. B. (n.d.). Self-Control and Exercise: A Review of the Bi-Directional Relationship. *Brain Plasticity*, 5(1), 97–104.
<https://doi.org/10.3233/BPL-190082>

- Bryant, F. B., & Smith, B. D. (2001). Refining the architecture of aggression: A measurement model for the Buss–Perry Aggression Questionnaire. *Journal of Research in Personality*, 35, 138–167. DOI: 10.1006/jrpe.2000.2302
- Buss, A. H., & Perry, M. (1992). The Aggression Questionnaire. *Journal of Personality and Social Psychology*, 63(3), 452–459. <https://doi.org/10.1037/0022-3514.63.3.452>
- Cheema, B. S., Davies, T. B., Stewart, M., Papalia, S., & Atlantis, E. (2015). The feasibility and effectiveness of high-intensity boxing training versus moderate-intensity brisk walking in adults with abdominal obesity: A pilot study. *BMC Sports Science, Medicine and Rehabilitation*, 7, Article 3. <https://doi.org/10.1186/2052-1847-7-3>
- Chen, X., Zhang, G., Yin, X., Li, Y., Cao, G., Gutiérrez-García, C., & Guo, L. (2019). The relationship between self-efficacy and aggressive behavior in boxers: The mediating role of self-control. *Frontiers in Psychology*, 10. doi: 10.3389/fpsyg.2019.00212.
- Cheung, T. T. L., Gillebaart, M., Kroese, F., & De Ridder, D. (2014). Why are people with high self-control happier? The effect of trait self-control on happiness as mediated by regulatory focus. *Frontiers in Psychology*, 5, Article 722. <https://doi.org/10.3389/fpsyg.2014.00722>
- Christopher, M., Ferry, M., Simmons, A., Vasquez, A., Reynolds, B., & Grupe, D. (2024). Psychometric properties of the Buss-Perry Aggression Questionnaire-short form among law enforcement officers. *Aggressive Behavior*, 50(2), e22145. <https://doi.org/10.1002/ab.22145>
- Cohn, M. A., Fredrickson, B. L., Brown, S. L., Mikels, J. A., & Conway, A. M. (2009). Happiness unpacked: Positive emotions increase life satisfaction by building resilience. *Emotion*, 9(3), 361–368. <https://doi.org/10.1037/a0015952>
- Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology*, 78(1), 98–104. <https://doi.org/10.1037/0021-9010.78.1.98>
- Cruise, S. M., Lewis, C. A., & McGukin, C. (2006). Internal consistency, reliability, and temporal stability of the Oxford Happiness Questionnaire short-form: Test-retest data over two weeks. *Social Behavior and Personality: An International Journal*, 34(2), 123–126. <https://doi.org/10.2224/sbp.2006.34.2.123>
- Denson, T.F. (2013). The multiple systems model of angry rumination. *Personality and Social Psychology Review*, 17(2):103-23. doi: 10.1177/1088868312467086.
- Denson, T. F., DeWall, C. N., & Finkel, E. J. (2012). Self-control and aggression. *Current Directions in Psychological Science*, 21(1), 20-25. <https://doi.org/10.1177/0963721411429451>

- DeWall, C. N., Gilman, R., Sharif, V., Carboni, I., & Rice, K.G. (2007). Left out, sluggardly, and blue: Low self-control mediates the relationship between ostracism and depression. *Personality and Individual Differences*, 53(7):832–7. doi: 10.1016/j.paid.2012.05.025
- Diamond, P. M., & Magaletta, P. R. (2006). The Short-Form Buss-Perry Aggression Questionnaire (BPAQ-SF): A Validation Study With Federal Offenders. *Assessment*, 13(3), 227-240.
- Dorris, D. C., Power, D. A., & Kenefick, E. (2012). Investigating the effects of ego depletion on physical exercise routines of athletes. *Psychology of Sport and Exercise*, 13(2), 118–125. <https://doi.org/10.1016/j.psychsport.2011.10.004>
- Duckworth, A. L., Gendler, T. S., & Gross, J. J. (2014). Self-control in school-age children. *Educational Psychology*, 49, 199–217. doi: 10.1080/00461520.2014.926225
- Englert, C. (2016). The Strength Model of Self-Control in sport and exercise psychology. *Frontiers in Psychology*, 7. doi: 10.3389/fpsyg.2016.00314
- Etherington, T. R. (2019). Mahalanobis distances and ecological niche modelling: Correcting a chi-squared probability error. *PeerJ*, 7, e6678. <https://doi.org/10.7717/peerj.6678>
- Freud, S. (1920). Introductory lectures on psychoanalysis. Norton.
- Fusar-Poli, P., Salazar de Pablo, G., De Micheli, A., Nieman, D. H., Correll, C. U., Kessing, L. V., Pfennig, A., Bechdolf, A., Borgwardt, S., Arango, C., & van Amelsvoort, T. (2020). What is good mental health? A scoping review. *European Neuropsychopharmacology*, 31, 33–46. <https://doi.org/10.1016/j.euroneuro.2019.12.105>
- Ghani, I., & Rozubi, N. (2020). Content validity and reliability of Buss and Perry Aggressive Questionnaire (BPAQ) inventory. *International Journal of Education, Psychology and Counseling*, 5, 297–303. <https://doi.org/10.35631/IJEPC.5370024>
- Hagger, M. S., Wood, C., Stiff, C., & Chatzisarantis, N. L. D. (2010). Ego depletion and the strength model of self-control: A meta-analysis. *Psychological Bulletin*, 136(4), 495–525. <https://doi.org/10.1037/a0019486>
- Hennecke, M., & Bürgler, S. (2022). Metacognition and self-control: An integrative framework. *Psychological Review*. <https://doi.org/10.1037/rev0000406>
- Hills, P., & Argyle, M. (2002). The Oxford Happiness Questionnaire: A compact scale for the measurement of psychological well-being. *Personality and Individual Differences*, 33, 1073-1082.

- Hofmann, W., Baumeister, R. F., Förster, G., & Vohs, K. D. (2012). Every day temptations: An experience sampling study of desire, conflict, and self-control. *Journal of Personality and Social Psychology*, 102(6), 1318–1335. <https://doi.org/10.1037/a0026545>
- Hopper, T. & Kruisselbrink, D. (2006). Teaching games for understanding: what does it look like and how does it influence student skill learning and game performance. *Avant*. <https://www.semanticscholar.org/paper/Teaching-Games-for-Understanding-%3A-What-does-it-and-Hopper-Submitted/8d5e5e3636bfb207433f579aec0a009e8110240>
- Johnson, J. (2006). Cognitive modeling of decision making in sports. *Psychology of Sport and Exercise*, 7(6), 631–652
- Kaya, A. (2014). Decision Making by Coaches and Athletes in Sport. *Procedia - Social and Behavioral Sciences*, 152. <https://doi.org/10.1016/j.sbspro.2014.09.205>
- Kilicarslan, S., & Liman, B. (2020). Examining the relationship between happiness and aggression among adolescents. *International Online Journal of Educational Sciences*, 12(5), 244-262.
- Knox, M., King, C., Hanna, G. L., Logan, D., & Ghaziuddin, N. (2000). Aggressive behavior in clinically depressed adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry*, 39(5), 611–618. <https://doi.org/10.1097/00004583-200005000-00015>
- Kostelnik, M., Purcell, S.E., Schroeder, D. E., Nelson, M. E., Krumbach, E. M., Hanna, J. S., Durden, T. R., Defrain, J., & Bosch, K. R. (2010). Helping Children Resolve Conflict: Aggressive Behavior of Children .G2016. *Faculty Publications from Nebraska Center for Research on Children, Youth, Families, and Schools*, 72.
- Lawlor, V. M., Webb, C. A., Wiecki, T. V., Frank, M. J., Trivedi, M., Pizzagalli, D. A., & Dillon, D. G. (2020). Dissecting the impact of depression on decision-making. *Psychological Medicine*, 50(10), 1613–1622. <https://doi.org/10.1017/S0033291719001570>
- Lindner, C., Nagy, G., & Retelsdorf, J. (2015). The dimensionality of the Brief Self-Control Scale—An evaluation of unidimensional and multidimensional applications. *Personality and Individual Differences*, 86, 465–473. <https://doi.org/10.1016/j.paid.2015.07.006>
- Lizarraga, M., Baquedano, M. T., Soria-Oliver, M., & Closas, A. (2009). Development and Validation of a Decision-Making Questionnaire. *British Journal of Guidance & Counselling*, 37. <https://doi.org/10.1080/03069880902956959>
- Lyubomirsky, S. (2008). *The how of happiness: A scientific approach to getting the life you want*. Penguin Books.

- Lyubomirsky, S., King, L. A. & Diener, E. (2005). The benefits of frequent positive affect: Does happiness lead to success? *Psychological Bulletin*, 131, 803-855.
- Martens, R. (2012). *Successful coaching*. 4th ed. Champaign, IL: Human Kinetics.
- McCord Wilson, A. (2021). *Comparing cyberincivility and cyberbullying in the workplace: Measurement, outcomes, and the power imbalance* (Order No. 28547077). Available from ProQuest Dissertations & Theses Global. (2576838417). Retrieved from <http://search.proquest.com.ezp-prod1.hul.harvard.edu/dissertations-theses/comparing-cyberincivility-cyberbullying-workplace/docview/2576838417/se-2>
- 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 of the United States of America*, 108(7), 2693–2698. <https://doi.org/10.1073/pnas.1010076108>
- Muraven, M. (2010). Building Self-Control Strength: Practicing Self-Control Leads to Improved Self-Control Performance. *Journal of Experimental Social Psychology*, 46(2), 465–468. <https://doi.org/10.1016/j.jesp.2009.12.011>
- Muraven, M., & Baumeister, R. F. (2000). Self-regulation and depletion of limited resources: Does self-control resemble a muscle? *Psychological Bulletin*, 126(2), 247–259. <https://doi.org/10.1037/0033-2909.126.2.247>
- Muraven, M., Tice, D. M., & Baumeister, R. E (1998). Self-control as limited resource: Regulatory depletion patterns. *Journal of Personality and Social Psychology*, 74, 774-789.
- Newman, T. J., Magier, E., Kimiecik, C., & Burns, M. (2021). The relationship between youth sport participation and aggressive and violent behaviors: A scoping review of the literature. *Journal of the Society for Social Work and Research*, 12(2), 371–389. <https://doi.org/10.1086/714421>
- Nnamoko, G. & Ng. (2023). Performance characteristics of instruments: A comprehensive review. <https://doi.org/10.13140/RG.2.2.22394.26567>
- Piquero, A. R., Jennings, W. G., & Farrington, D. P. (2010). On the malleability of self-control: Theoretical and policy implications regarding a general theory of crime. *Justice Quarterly*, 27(6), 803–834. <https://doi.org/10.1080/07418820903379628>
- Rosenbaum, M., Ronen, T., Abuelaish, I., Orkibi, H., & Hamama, L. (2018). Positivity ratio links self-control skills to physical aggression and happiness in young Palestinians living in Gaza. *YOUNG*, 26(4_suppl), 78S-95S. <https://doi.org/10.1177/1103308817743371>

- Strayhorn, J. M. (2002). Self-control: Theory and research. *Journal of the American Academy of Child and Adolescent Psychiatry*, 41(1), 7–16. <https://doi.org/10.1097/00004583-200201000-00006>
- Stucke, T. S., & Baumeister, R. F. (2010). Ego depletion and aggressive behavior: is the inhibition of aggression a limited resource? *European Journal of Social Psychology*, 36, 1–13. doi: 10.1002/ejsp.285
- Tabachnick, B. G., & Fidell, L. S. (2019). *Using multivariate statistics* (7th ed.). Pearson.
- Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality*, 72(2), 271–322. <https://doi.org/10.1111/j.0022-3506.2004.00263.x>
- Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach’s alpha. *International Journal of Medical Education*, 2, 53–55. <https://doi.org/10.5116/ijme.4dfb.8dfd>
- Terry, P.C., & Jackson, J.J. (1985). The determinants and control of violence in sport. *Quest*, 37(1), 27-37.
- Tenenbaum, G., Stewart, E., Singer, R., & Duda, J. (1997). Aggression and violence in sport: An ISSP position stand. *The Journal of Sports Medicine and Physical Fitness* 37, 146-50. doi: 10.1123/tsp.11.1.1.
- Thirer, J. (1993). Aggression. In R.N.
- Vanderlind, W. M., Millgram, Y., Baskin-Sommers, A. R., Clark, M. S., & Joormann, J. (2020). Understanding positive emotion deficits in depression: From emotion preferences to emotion regulation. *Clinical Psychology Review*, 76, 101826. <https://doi.org/10.1016/j.cpr.2020.101826>
- Vohs, K. D., Baumeister, R. F., Schmeichel, B. J., Twenge, J. M., Nelson, N. M., & Tice, D. M. (2014). Making choices impairs subsequent self-control: A limited-resource account of decision making, self-regulation, and active initiative. *Journal of Personality and Social Psychology*, 94(5), 883-898.
- Wang, Y., She, Y., Colarelli, S. M., Fang, Y., Meng, H., Chen, Q., Zhang, X., & Zhu, H. (2018). Exposure to nature counteracts aggression after depletion. *Aggressive Behavior*, 44(1), 89–97. <https://doi.org/10.1002/ab.21727>
- Wiese, C. W., Tay, L., Duckworth, A. L., D’Mello, S., Kuykendall, L., Hofmann, W., Baumeister, R. F., & Vohs, K. D. (2018). Too much of a good thing? Exploring the inverted-U relationship between self-control and happiness. *Journal of Personality*, 86(3), 380–396. <https://doi.org/10.1111/jopy.12322>
- Wilkinson, D. (2019). Decision-making and self-control: The cost. *The Oxford Review*. <https://oxford-review.com/self-control-cost-of-decision-making/>

- Wilson, M. R., Vine, S. J., & Wood, G. (2009). The influence of anxiety on visual attentional control in basketball free throw shooting. *Journal of Sport and Exercise Psychology*, 31(2), 152–168. <https://doi.org/10.1123/jsep.31.2.152>
- Wing, R. R., Phelan, S., & Tate, D. (2002). The role of adherence in mediating the relationship between depression and health outcomes. *Journal of Psychosomatic Research*, 53(4), 877–881. [https://doi.org/10.1016/S0022-3999\(02\)00315-X](https://doi.org/10.1016/S0022-3999(02)00315-X)
- Wood (2014, June 1). The Stages of Learning Sport Skills. Retrieved on June 1, 2014 from <http://www.sports-training-adviser.com/sportstraining.html>
- Xin, Z.-Q., Guo, S.-R., & Chi, L.-P. (2007). The relationship of adolescent's self-esteem and aggression: the role of mediator and moderator. *Acta Psychologica Sinica*, 39, 845–851.
- Yu, G. Q., & Yang, Z. L. (2008). A research on the implicit effect of self-control. *Psychological Science* 31, 614–616. doi: 10.16719/j.cnki.1671-6981.2008.03.018
- Yu, Y., Hu, Y. H., Zhu, D. P., Gao, P., & Wang, M. (2012). Research on technical and tactical characteristics model of Chinese men undefined boxing Olympic champion. *Beijing: Department of science and Education, State Sport Administration*. Olympic champion. *Beijing: Department of Science and Education, State Sport Administration*.
- Zimonyi, S., Kasos, K., Halmai, Z., Csirmaz, L., Stadler, H., Rózsa, S., Szekely, A., & Kotyuk, E. (2021). Hungarian validation of the Buss–Perry Aggression Questionnaire—Is the short form more adequate? *Brain and Behavior*, 11(5), e02043. <https://doi.org/10.1002/brb3.2043>