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Preface

I was always interested in martial arts, and that's where this idea flourished to fruition. I have been training ever since I was a kid, and just wanted to use this opportunity to write about something I love. I was interested in figuring out if my lifetime hobby had an impact on my own levels of aggression, and if the phenomenon did actually ring through. . It definitely wouldn't have been possible without the help I have received over the last few weeks. The late nights and the coffee.

Chapter One

Abstract

The aim of this study is to investigate the relationship that aggression has between intensity of training in martial art and the type of martial art an individual engages in. It was expected that an association existed between hours trained in martial arts and levels of aggression. It was also hypothesised that an association exist between the type of martial art an individual engaged in on the aggression levels. The rationale behind this explains that many studies have reported that the longer an individual engages in martial arts, the less aggressive they become, with the type of martial art playing a key role in this decreased aggression. The Buss-Perry Aggression Questionnaire was used and individuals answered twenty-nine statements such as ‘’My friends think I’m hotheaded’’. Answers ranged from ‘’completely uncharacteristic’’ to ‘’completely characteristic’’. Individuals who engaged in four types of martial arts took part: jiu jitsu, karate, MMA, and boxing. Analysis suggested no significant difference between hours trained per week and aggression levels. The same was discovered for type of martial art an individual engaged in and levels of aggression. Findings suggest other variables such as gender be controlled for more prominently in order to help findings be more reliable overall. The study suggests clinical applications of martial arts engagement in light of the current findings.

Acknowledgments

I would like to thank my supervisor for her continued hard work to help me complete my thesis. I'd also like to thank my family for supporting me through this - My mother June, and My father John. Last, but by certainly no means least, . I'd also like to thank David Carey. The best friend anyone could have and one of the biggest inspirations I had. Hope to become a psychologist like him someday

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Chapter Two
Introduction

The subject of aggression has appeared in research questions frequently over the course of psychology. It is portrayed as an unprovoked hostile thought or action or attacks on other individuals which are not approved by society (Kerr, 1997, p. 116). In some sport, especially combat sport, aggression is acceptable, and discerned as a normal component of the sport. Within martial arts, however, it is accepted, and sometimes provoked, in the sense that the athletes willingly engage in competition. Aggression is acknowledged as acceptable and sometimes an important aspect of the sporting world and its behaviour (Maxwell & Moores, 2007). Parry (1998) suggested how aggression in sport allows participants to become normalised to its effects and then identify it as a part of their normal behaviour. In essence, findings suggest that it legitimizes and advocates aggression within martial artists aggression within the boundaries of the particular sport (Kerr, 2008). Kerr (2008) suggested that aggressive sporting behaviour cannot be counted as either aggressive or non-aggressive, but that it is the individual's intention that is indicative of the correctness of an action. The legitimacy of an aggressive type of action is recognised as imperative in defining aggression in sport (Maxwell & Moores, 2007**).** Theories have tried to set out and delineate the casual motives behind people becoming aggressive. Albert Bandura (1978) attempted to explain aggression as a social concept that aggression is learned through one's environment. One such environment that has became more popular has been that of a martial arts environment. This environment has been hypothesised to be violent - with physical aggression commonplace. This essay will assess the levels of aggression in martial artists and investigate the association that intensity in hours per week and type of martial art has. Moreover, this essay will continue by assessing any gaps in literature that is apparent in the current research that need to be investigated.

Mixed Martial Arts is the fastest growing sport in the United states (Rainey, 2009) and much investigation is needed in order to explore this phenomenon in the younger demographic. Originally, most of what was known about martial arts had come from the media and other sources (Smith, 1999). However, the media distorts the integrity of martial arts, attempting to portray it negatively and characterising martial arts as a haven for aggression being considered as entertainment (Fuller, 1998). This perspective becomes even more apparent in light of the so-called "desportization "within the martial arts (Bottenburg and Heilbron, 2006), as young participants seem to become increasingly involved in harder martial arts (e.g., Thai boxing, mixed martial arts). This trend is clearly visible in Thailand, where children aged between five and nine take part in Thai boxing and starting professional fights at around 12 to 14 years old (David,2005)**.**

The information presented above indicates that uncertainties exist regarding social-psychological outcomes of martial arts practise on young participants. It is therefore worthwhile to review findings of the major studies dealing with this topic. Despite the increased attention among scientists for martial arts studies, until now only a limited number of literature reviews have been published regarding this research (e.g., Cox, 1993; Fuller, 1988; Henning,1999; Pieter, 1994). For example, Pieter (1994) suggested that exploration about the effects of martial arts are lacking. Fuller (1988) argued that one of the reasons for this is due to its negative public image. These reviews seem to be old, and more research is needed to investigate this phenomenon. Further, it would be advantageous to focus on this phenomenon, as martial arts is becoming more popular, especially with younger demographics (Breedveld et al., 2008). In Finland for example the percentage of young people practising martial arts is between 64% and 86% (Tammelin et al., 2003).

Therefore, much needs to be studied and research is imperative about the domain of martial arts to investigate whether this phenomenon holds true in research. Further, investigation would be beneficial as to whether a correlation does exist between aggression and intensity of martial arts participation, and type of martial art, before a conclusion is drawn. Some research suggests that aggressive individuals are initially attracted to martial arts, only to become more mellow over time (Daniels and Thornton, 2008). However, some research disagrees and find that this effect does not ring through (Reynes & Lorant, 2001). This research is supported by other analysis which suggest the time an individual engages in martial arts, dictates how strong this effect is (Lamarre and Nosanchuk, 1999). Nonetheless, this consequence is dependent on the type of martial art. (Graczyk, Kucinski , Norkowski, Pęczak-Graczyk, and Rozanowska, 2010). Other research highlights the positive effects of martial arts on youth regarding aggression (Theeboom ad Deknop, 1999). However, the current literature produced on this topic has drawn some negative criticism. In particular, the Canadian Paediatric Society and the American Academy of Pediatrics oppose boxing as a sport for children and adolescents (Purcell and LeBlanc, 2012). Therefore, this literature review will investigate the recent literature, keeping in mind the hypothesis of the current study. Further, this essay aims to pose a reasonable discussion detailing how aggression levels are altered and decrease over time due to engagement in martial arts.

Intensity and its effect on aggression has some standing in research but needs further proof (O'Leary and Dengerink, 2004). Stipes (1973) states that aggression is a learned behaviour and is a product of our environment. It has also been reflected in literature how increased intensity and engagement in martial arts results in higher aggression levels. For instance, Jenkins and Ellis (2011) suggest that aggression levels decrease when violent offenders actively engage in the art, and they recommend it as the best intervention for violent offenders. Further, this research is supported by Lamarre and Nosanchuk who suggested that aggression levels decreased over time of participation. Furthermore, Guilbert (2004) states that the aggression level is dependent on the

place at which someone trains. Therefore, there is a gap in the research that needs to be filled. This encompasses the levels of aggression in martial artists when participation over time and the hours per week - intensity - is taken into account. Further, the current discourse aims to investigate if this alteration of aggression level the cause of intensity of training. This may have a huge effect on aggression levels in a sample if it is taken into account. Aswell, the types of martial arts should be taken into account as each has been shown to yield different results in terms of aggression levels. The aforementioned will be discussed relating to four styles: boxing, mma, jiu jitsu, and karate

Karate and Levels of Aggression:

Nosanchuk (1981) suggests that in Karate participation, individuals exhibited less aggression levels when they had been engaging in the sport for a longer period of time, usually after one year. This is concurrent with other research such as that with Boostani and Boostani (2012) which suggests that engaging in light contact karate decreased aggression levels overall. Further studies examine belt rank as an indicator of how long someone is training. According to this research, there may be a change in overall aggression levels. In these studies, they have discovered that even belt rank has an effect on the level of aggression exhibited by participants. However, only five of these studies exist, pertaining to a need for more evidence examining the association between intensity and martial arts on aggression levels. More research is needed before a conclusion can be drawn.

Mixed Martial Arts and Aggression:

Most research about Mixed Martial arts and aggression levels discusses how aggression is seen in the sport. With little reference to examining how aggression levels changes in reference to intensity, or the time someone spends engaging in mixed martial arts, it may be difficult to attribute a causal factor that may explain whether this association exists. However, these results differ in Mixed Martial arts and people who engage in mixed martial arts demonstrated higher overall aggression levels than all the other martial arts measured - including karate, jiu jitsu, and Boxing. The argument exists that it is seen as a normal part of their training (Rosario, Kerr, and Rhodius, 2014). Therefore, they may be more desensitized to aggression and its effects (Garcia and Malcom, 2014). Martial Artists determine this aggression as a ‘’cage reality’’ mindset in which aggression is part and parcel of their training (Jensen, Roman, Shaft, and Wrisberg, 2013). Moreover, a study conducted by Havlíček, Roberts, Little, and Kleisner (2013) added and states that the amount of fights that someone had predicted their aggression levels which means the more fights someone had, the less aggressive they became. However, the perception of aggressiveness in Mixed Martial Arts may be different and and might cue different aspects of success in the Martial art. Overall, the research predicts that higher overall aggression levels are seen among Mixed Martial artists due to their mindset and the role of the environment. Further,

intensity of training and how long their martial arts career has gone on for must be taken into account more readily in order to get a more accurate picture of the correlation between aggression and martial arts. Therefore, as a whole, however, studies do not take into account how intense somebody trains per week, or how long they trained over time.

Boxing and Aggression:

Boxing, on the other hand, was correlated with apical aggression levels when compared with other martial arts, including karate and jiujitsu amongst the limited research that has been conducted (Graczyk, 2010). One reason research has offered why this may be the case is because aggression through physical domination of the opponent bolsters the male integrity. Weinberg and Around (1952) suggests that aggression in boxing is largely justified and rationalised so boxers avoid guilt. This rationalisation dissociates the boxer from any responsibility (Jefferson, 1998) Since boxers, therefore, rationalise aggression there may be an increased likelihood to commit aggressive acts outside of the ring. However, little is known about the association that exists comparing aggression across other martial arts. For instance, a study conducted by Graczyk (2010) explored this phenomenon and found that boxing seems to exhibit the highest aggression levels when compared with other martial arts such as jiujitsu and karate. However, regarding intensity, no such study exists to evaluate if intensity of training effects this phenomenon across multiple training disciplines.

Aggression AND grappling:

Jiujitsu and its effect on aggression has received little attention in terms of research. One of the only studies that looks at grappling and aggression levels is conducted by Lamarre and Nosanchuk (1999) in which they suggested that aggression amongst Judoka decreased over time. However, conflicting reports state otherwise. Kuśnierz (2014) states that brazilian jiu jitsu appears the most aggressive style when compared across boxing and traditional karate (Kusnierz and Bartik, 2014). Interestingly, the role of Testosterone and aggression amongst Judoka emerges as the other only topic that has been researched by Salvador and Colleagues (1999) when attempting to correlate aggression with grappling. It was found that a positive association between testosterone and aggression existed, but failed to explore the environmental aspect of aggression in Judo. Further, research fails to investigate how frequently Judoka trained for and how often per week, which may have a crucial role on aggressive behaviour. Research fails to investigate a newer more popular sport - Brazilian Jiu Jitsu - and explore to which degree aggression levels change with exposure to this popular sport. As little to no research exists, this topic fails to be understood fully.

Rationale and hypothesis

The research is important for a number of reasons. Firstly, other forms of intensity - such as intensity of cardiovascular work - has been shown to increase aggression levels (Hoffmann, Thorén, & Ely, 1987). In this case, it could apply to martial arts and intensity could have the same effect on aggression in martial arts. Following on from this, studies have suggested from other contact sports that contact sports - such as rugby players- have higher aggression levels than non contact sports (Kosiewicz, 2018). Martial arts is innately a contact sport, therefore the same effect could be seen in the current study. Other research agrees and it has been suggested that competitive sport in general plays a big role in aggression levels (Ahmadi, Besharat, Azizi & Lairjani,2011). Since all sports looked at in this study are competitive - earning belts, for example - this effect may be seen in this study. Keeping this research in mind, there are a number of hypothesis involved in the current study.

Hypothesis:

Hypothesis one: There will be an association between intensity of martial arts practiced and levels of aggression.
Hypothesis two: There will be an association between type of martial arts practiced and levels of aggression.

Chapter three
Method

Method for FYP:

This chapter presents the chosen research design. The quantitative method used will be discussed, outlining the selection and implementation of the process. Also presented are re discussions of participant recruitment, and data collection and an overview of the ethical considerations involved.

Buss-Perry Aggression Inventory

The aim of this study was to explore the relationship between levels of aggression and type of martial art, and whether intensity played a role in this relationship. The four components of the Buss-Perry Aggression Inventory: Physical Aggression, Verbal Aggression, Anger, and Hostility has strong internal consistencies with, and has a strong positive relationship with, aggression (Harris, 1997). Therefore, this inventory was used for this study.

Ethical considerations:
Before any participants can be recruited, a number of ethical considerations had to be ensured. These included:

1. Autonomy – Autonomy includes the right to participate in the study of their own accord.. Participants and potential participants therefore have this right to participate without any coercion. The participant received full disclosure of the study and its proceedings (See Index)and their right to withdraw was fully noted.
2. Beneficence – The researcher should always bear the best interests of the participant in mind. Considerations in this study were made to ensure participants had support after the end of the study. Beneficence included assessing the risks and benefits, in which the benefits outweigh the risks.

3. Non-maleficence – This refers to the act of doing no harm. Participants were not subject to any physical harm, and helplines were given if they so felt as though they felt distressed post study
4. Justice – The concept of justice demands the fair and equal treatment of all research participants. To ensure the ethical principle of Justice was followed, every participant was given the same set of questions, the same ethical considerations were followed for each participant, and each participant was informed about the study and debriefed in the same way

Participants:

Participants in this study included 46 martial arts students from four disciplines: MMA, Boxing, Jiujitsu, and Boxing. The study consisted of 32 Males and 14 Females between the ages of 18 and 35. All participants in this study were collected using convenience sampling by using a link on social media inviting them to participate.

Measures/Materials:

As stated above, the Buss-Perry Aggression Questionnaire (Buss & Perry, 1992) was used to measure aggression levels. It is composed of twenty-nine statements which participants have to answer a multiple choice system ranging from completely uncharacteristic to completely characteristic. In a seperate two multiple choice questionnaires, completely separate from the Buss-Perry Aggression Questionnaire, individuals were then asked how often they trained per week, and in which martial art they trained in. The second multiple choice questionnaire asked the participant how long they engaged in their chosen style, from one to two hours, three to four hours, five to six hours, or more than six hours per week. The test was administered online using Google Forms. The statistical data was analysed using SPSS.

Design:

The design used in the current study was quantitative. It included a cross-sectional design. The independent variables were identified as the intensity of martial arts participation, ranging from one to two hours per week, to more than six hours per week, and the type of martial art which

included: MMA, Jiujitsu, Karate, and Boxing that they engaged in. The dependent variable was identified as the aggression levels measured by calculating the scores from the Buss-Perry Aggression inventory. This study was a between-groups design.

Procedures:

Before the start of the study, a front cover page detailing all of the participants rights and information about the study was given (See Appendix). After giving consent to participate, they then completed the initial twenty-nine item Buss-Perry Aggression Inventory. After this was submitted, a seperate two Questionnaires in the same study were administered via Google Forms. The participants were then asked how long they trained ranging from one to two hours per week to more than six hours per week, and which martial art they engaged in from MMA, Jiujitsu, Karate, and Boxing. Finally, participants were then thoroughly debriefed which included providing helplines to counselling services had the study distressed them in any way. They were then thanked after submission of the study.

Chapter Four

Results

Descriptive statistics

There were 13 Females (28.3%) and 33 Males (71.7%) that participated in the study. Seven (15.2%) participants said they engaged in MMA, 23 (50%) said they engaged in Karate, 10 (21.7) said they engaged in jiujitsu, and 6 (13%) said they engaged in boxing. Eleven participants said they did martial arts for one to two hours per week (23.9%), eleven participants stated they did martial arts for three to four hours per week (23.9%), sixteen individuals said they did martial arts for five to six hours per week (34.8%), and eight individuals said they done martial arts for six or more hours per week (17.4%).

In reference to hypothesis one, no significant effect was seen between type of martial art and levels of aggression. Karate (M = 85, SD = 12.2), MMA (M = 79.4 , SD = 10.1), Jiujitsu (M = 83.4 , SD = 15.9), and Boxing (M = 87, SD = 9.5).

Further, no significant effect was seen between intensity of martial art engagement on aggression levels. Individuals that engaged in Karate one to two hours per week (M = 51.7 , SD = 10.8), were not statistically significant from the scores of individuals who engaged in Karate three to four hours per week (M = 84.33, SD = 9.64), five to six hours per week (M = 90.2, SD = 19.6), or six or more hours per week (M = 88.3 , SD = 15.5)

The same result can be seen with the other martial arts. No significant difference between the intensity of martial arts engagement on aggression levels were found with individuals who engaged in MMA one to two hours per week (M = , SD =), to individuals who engaged in MMA three to four hours per week (M = 81, SD = -), five to six hours per week (M = 78 , SD = 13.2) or six or more hours per week (M = 88.3, SD = 15.5)

The same effect can be seen for individuals that engage in jiujitsu one to two hours per week (M = 78 , SD = -), three to four hours per week (M = 68.5 , SD = 3.53), five to six hours per week (M =88.2 , SD = 18.6), and six or more hours per week (M = 89 , SD = 15.5)

Lastly, similar results can be seen for individuals that engage in Boxing one to two hours per week (M = 91 , SD = 12.72), Five to six hours per week (M = 85 SD = 8.98)

Inferential statistics:

A two-way between groups analysis of variance (ANOVA) was conducted to explore the (1) differences in the type of martial art, and intensity of training, on levels of aggression and (2) to examine if the effect of type of martial art on aggression depends upon the influence of the intensity

Initial findings did not indicate a violation of the assumption of homogeneity of variance (P= .772). The interaction effect between the type of martial art and intensity of training was not significant (F (6, 33) = .543 P = .90, eta squared = .078) The main effect for intensity on aggression was non-significant and of a moderate to large magnitude (F (3,33) =0.937, p = .434, eta-squared = .078). The main effect for the type of martial art on Aggression was not significant however the effect was of a large (F (3, 33) = 0.755, p = .527, eta-squared = .64

A Pearson product-moment correlation was run to determine if there was a correlation between aggression and type of martial art with intensity of martial art engagement. There was a weak, positive correlation between aggression and type of martial art practised, which was statistically non significant (r = .121, n = 46, p = .211). Another Pearson's correlation analysis was run to determine if a correlation existed between aggression and intensity in hours of martial arts engagement. There was a weak positive correlation which was statistically nonsignificant (r = .152 , N = 46, p = .211)

Table 1

Variable	Frequency	Valid Percentage
Gender		
Male	33	71.7
Female	13	28.3
Type of Martial Art		
Karate	23	50.0%
Boxing	6	13%
Jiujitsu	10	21.7%
MMA	7	15.3%
Intensity		
One to two hours per week	11	24%
Three to four hours per week	11	24%
Five to six hours per week	16	34.7%
More than six	18	17.3%

Correlations between variables. Table 2

Variables	1
1. Aggression	1.00
2. Type of martial arts	.211
3. Intensity	.152

Note. Statistical significance: *$p < .05$; **$p < .01$; ***$p < .001$

Chapter Four

Discussion:

The purpose of the current study was to assess the levels of aggression in martial artists and investigate the association that intensity in hours per week and type of martial art had. It was expected that an association existed between hours trained in martial arts and levels of aggression. It was also hypothesised that an association exist between the type of martial art an individual engaged in on the aggression levels. The rationale behind this is that many studies have reported that the longer an individual engages in martial arts, the less aggressive they become, with the type of martial art playing a key role in this decreased aggression.

In the case of determining if aggression levels were correlated with intensity and type of martial art, the findings suggest that no significant effect was seen, although differences in aggression scores were seen in different martial arts and intensities (See Appendix) . The most prominent findings reported were that Mixed Martial Arts was scored as the least aggressive, followed by, Jiu Jitsu, Karate, and Boxing, and individuals who engaged in martial arts three times per week scored the lowest on the Buss-Perry Aggression Inventory. This was contrary to what was initial believed, as it was suggested that both Mixed Martial Arts, and Boxing had the highest aggression levels overall (Graczyk, 2010). Furthermore, the findings suggest that the group who trained the most scored highest on aggression than those who only trained one hour per week, with individuals who trained three hours per week exhibiting the lowest levels of aggression. However, as stated before, it was previously believed that there was an association between hours trained on levels of aggression. Although boxing was seen to have the highest aggression levels as part of the findings relating to the current study, Mixed Martial arts was exhibited to have the lowest aggression levels. The aforementioned original research also suggested that overall a negative correlation exist between hours spent engaging in martial arts and subsequent levels of aggression, with other more contrary research stating how aggression levels increased with intensity and type of martial art.

In spite of the findings not coinciding with previous literature, other research holds an explanation as to why this effect is seen. Although many of the initial studies were centred around the personality traits of martial artists in general, some researchers specifically investigated the relationship between martial arts and aggressive behavior (Daniels and Thornton, 1990). The attitudes that an individual holds may explain the reason behind no correlation being found. In one study, it was determined that karateka held negative views about negative conflict resolution, for example becoming physically aggressive in order to resolve conflict (Bjorkqvist & Varhama, 2001). This may lead to individuals becoming more passive in martial arts, and in general. Twemlow et al., (2008) investigated this phenomenon, and

discovered similar results in that individuals who started martial arts began helping others that were being bullied. This effect is observed throughout research and may suggest that in fact individuals become more solem with martial arts practise, changing their attitudes to reflect a more mellow approach. This supports the current hypothesis, although more research in the future may confirm this phenomenon to a great degree.

Further, a more plausible explanation may explain the findings of the current study. Adler (2013) found that within karate exponents, kata - a system of individual training exercises - can lower not only aggression levels but externalising behaviours in participants. This research can be supported by Reynes and Lorant (2004) who state kata increases self control acquisition, acting as a form of mediation. This may explain the effect seen within the findings of the current study. The use of kata in martial arts, but in karate in particular, may act as a meditative aspect which gives a reason as to why the results of the current study were ascertained. On the other hand, this effect can be seen throughout oher martial arts other than Karate, which further supports the findings of the current study. Research has explored a mindfulness aspect to Mixed Martial martial arts. Mindfulness, characterised by meditation which focuses on the present moment, is imperative for optimal performance, which in turn stabilises aggression levels as a whole for Mixed Martial Artists (Massey, Meyer, and Naylor, 2012). However, more support for this theory resonates in other styles of martial art which were explored in the current study. Exploring this effect across other styles of martial arts, it can be noted that individuals who engage in karate found aggression levels decreased when compared to a CBT (cognitive behavioural therapy) control group (Boostani & Boostani, 2012). This provides support for the findings of the current study. This phenomenon also may provide a research question to be expanded in future study.

Regarding other types of martial arts presented in the study, it can be understood the reason behind why no significant difference was found overall in light of the current study. Chinkov (2014) suggested that increased engagement in Jiu Jitsu was observed to be positively correlated with respect, and tolerance of other people, and it also created a sense of a community environment. It has also been observed that in comparison to karate, Jiu Jitsu also has a mindfulness aspect to its engagement (Usher, 2019). Due to this phenomenon being observed in the current study, it can be suggested that engagement in martial arts may humble individuals and centre them, which causes their aggression to level off.

However, the findings may provide empirical support regarding what was initially believed. Originally, it was thought that martial arts engagement increases levels of aggression, with differences being observed within the different martial arts. Although nonsignificant, a difference nonetheless in the levels of aggression was seen in respect to the different martial arts. For instance, Boxing was seen as the most aggressive style, with Mixed Martial Arts being seen as the least aggressive. Following on from this, these observations from the findings of the

current study are discussed in general research. For example, Vertonghen, Theeboom, and Pieter (2014) explain the difference observed between the different martial arts in terms of the goal orientations and social background of the individual, which may play a role in levels of aggression within martial arts. Further, the type of martial art plays a role in the goal orientations. In this way, the type of martial art an individual engages in may have an impact on aggression, supporting the original idea that this phenomenon has an impact on levels of aggression. This is reflected in some research, and supports the notion of increased aggression within martial arts, but may also provide evidence pertaining to a difference between styles of martial arts on levels of aggression. Boxing is regarded as one of the most aggressive styles, according to research, and therefore may be damaging to the mindset of younger individuals (Lafferty & McKay, 2012). Therefore, more study is required to investigate this phenomenon. .

However, following on from this phenomenon, there may be empirical evidence to support an alternative theory. Although some of the previous research suggested that increased engagement in martial arts decreased overall levels of aggression, there was some research to suggest the opposite. Although nonsignificant, the levels of aggression differ for each level of intensity, peaking when individuals engaged in martial arts for six hours more. This could provide support for the theory which suggests that the more an individual has an engagement within martial arts, the more aggressive they become. This phenomenon can be reflected in general research. Endresen and Olweus (2005) explored this result, and found that a positive relationship exists between martial arts engagement and aggression levels. Moreover, this result may be explored by future research and found to hold through in the general population of martial artists. However, due to the nature of the limitations, it is difficult to generalise findings and comment with confidence as to the nature of this effect.

There are limitations with every study that must be discussed. For instance, gender could be controlled for which would lead to a more accurate result overall. The general consensus is that stereotypically males are more aggressive than females (Harris & Miller, 2000). Further, the two genders exhibit their aggression in different ways, which future research could control for. While males exhibit their aggression more physically, women show their aggression more verbally (Bjorkqvist, Lagerspetz & Kaukiainen, 1992). This may lead to an unreliable result, as the Buss-Perry inventory combines all four components of aggression together.

In addition, other factors such as a participants mood during the study can influence a their responses. For instance, it can be suggested by research that there is an association between mood and aggression insofar as a decreased mood increases the rate of aggression in individuals (Young & Layton, 2002). In line with mood, psychological fatigue could affect aggression levels of participants (Kuo & Sullivan, 2001). If a participant is tired during the study, it could have an affect on the results. None of these variables were accounted for in the current study. The

wording of the statements could also have influenced the results. Perhaps the participants did not understand a statement. This could result in wrong data. Also, participants were asked about their current state of mind which a longitudinal study design could provide more information.

However, unlike the present study, future research may need to consider specific timepoints at which an individual has been training. In this way, it accounts for an individual feeling more aggressive one day than the next. (Harris & Miller, 2000). The duration of which someone has been training in their lifetime is key to understanding the whole phenomenon of aggression in martial arts which could be applied in future research. A two-year longitudinal study by Reynes and Lorant (2004) found that after two years of practice, karate training seemed to have neither positive nor negative effects on aggressiveness scores, while judo training seemed to have a negative effect on anger scores.

Another longitudinal study found that the form of the interaction suggests that participation in the martial arts is associated, over time, with decreased feelings of assaultive and verbal hostility (Daniels & Thornton, 1992). This is contradictory to the current studies findings than boxing and karate on verbal and physical aggression levels (Kuśnierz & Bartik, 2012). With the relevant body of research suggesting that different components of aggression being relevant in martial arts, this phenomenon may need to be addressed and may constitute a methodological flaw in ascertaining an understanding about martial arts and its effect on intensity from a more in-depth perspective.

Further, smaller sample size may have an impact on the results. Moreover, due to the limited number of participants assigned in each group, each condition might not have been reflected adequately. (Freiman, Chalmers, Smith, & Kuebler, 1978). Overall, a bigger sample size may be needed in order to investigate the effect to a greater degree. Therefore, a more adept sample size may find a more statistically significant result which may reflect more accurately the true nature of the reality of the correlation between aggression levels and types of martial arts and intensity of engagement.

Furthermore, belt rank could be taken into account. There is not much research to date regarding belt rank and aggression. However, the research that has been conducted suggests that black belts in general, but especially in karate, reported more aggression than did yellow belts (Wargo, Spirrison, Thorne, & Henley, 2007). This may suggest that the effect of belt level may need to be controlled for and explored in order to make results more reliable in the future. The current study did not control for belt level in karate, and could do so in future research to mitigate such an effect and investigate whether there is a difference.

To date, research suggests there are four components to aggression: Physical Aggression, Verbal Aggression, Anger, and Hostility (Buss,& Perry, 1992). It is important to explore each

component in detail, as individuals exhibit their aggression in different ways.The current study did not investigate this phenomenon and it remains to be a methodological flaw that should be accounted for in future research. For instance, a component of aggression, anger, is seen to positively correlate with practise in Judo (Ziaee, 2012). Further, looking at the component of hostility, Daniels and Thornton found a positive correlation with engagement in karate. In line with that, Boxing has high rates of physical aggression (Davis, 1993) As a sole phenomenon, little is known about the individual martial arts and their impact on the components of aggression. Research suggests that jiu jitsu appears to score higher than boxing and karate on verbal and physical aggression levels (Kuśnierz & Bartik, 2012). However, Mroczkowska, Kownacka, and Obmiński (2008) suggested that the different levels of aggression are a direct influence of the regulations of the fighting sport, as opposed to the martial art itself. For instance, Boxing being more full contact than karate may exhibit more physical aggression. Regardless, the Buss-Perry Aggression Inventory may overlook the individual components of aggression, and this remains to be a methodological flaw.

This effect can be seen in further research that mimics the current study . Reynes and Lorant (2002) found Judo had higher scores of aggression, albeit non significant. Analysis confirmed that Judoka scored higher on three dimensions of aggression - anger, physical aggression, and Verbal Aggression, but not hostility. Therefore, results that control for the dimensions of aggression may influence a result that otherwise may not represent the current situation. Physical Aggression, Verbal Aggression, Anger, and Hostility.(Buss,& Perry, 1992). It is important to look at each component in detail, as individuals show their aggression in different ways.

In light of the research findings, many implications can be seen. For one, if the association does exist between martial arts and a mellow outlook, martial arts could be used therapeutically to help individuals with Anxiety. Studies already exist exploring this phenomenon. Originally, it was stated in the introduction that martial arts gets a bad reputation because the media portrays it as attracting and creating bad individuals. However, the current study's findings contradict this concept. In one such study, Milligan, Badalli and Spiroiu (2013) suggested that the mindfulness component of MMA was identified as helpful in promoting a sense of calm, tolerance and acceptance of distress, and self-understanding in youth. This may alleviate the already negative view portrayed by the media, but also may provide an initial step towards a new intervention for individuals who are anxious, or individuals who merely want to relax. Moreover, since Self regulation is an already important aspect to allow individuals to control their emotions, martial arts engagement may help individuals to self regulate and control their emotions. (Lakes & Hoyt, 2004).

As stated before, martial arts could be used as a form of CBT to inhibit stress and anxiety. (Weiser, Kutz, Kutz, & Weiser, 1995). Used correctly, a therapeutic form of martial arts could revolutionise counselling sessions, and allow individuals to express themselves in different ways.

In essence, this may provide a research question in the future for researchers and provide a stepping stone to enhance the CBT model, and could investigate whether karate could be used as a form of therapy for individuals with anxiety and martial arts may be used as a mediator for aggressive individuals. It may also serve as an important tool for meditation and relaxation.
.
Further implications propose that research conducted by Jansen, Zimmer, Kudielka, and Schultz (2016) found that individuals who engaged in karate exhibited an improvement in not only subjective mental health and anxiety, but cognitive processing speed too. This supports much research to suggest that martial arts could be used therapeutically. Douris and colleagues found that while other exercises such as walking generally improved attention and processing speed, it was suggested that the two martial art conditions improved the highest order of cognitive performance, executive function. The effect of extra cognitive demand by engaging in martial arts can be attributed to this effect.

Further, Burt and Butler (2012) suggested that martial arts, especially capoeira, allow for aggression levels to decrease and it is often used as a form of mediation. If more research was conducted, individuals could learn martial arts to use for meditative reasons. Oulanova (2011) explains that karate allows individuals to become more aware of their bodily movement, which also facilitates harmony and overall mental wellbeing. Moreover, in the future martial arts could become useful in counselling sessions, or for general mental stability. These implications could improve an individual's daily life and outlook.

Finally, as stated before, martial arts research is already being utilised to help the youth change their attitudes (Twemlow & Sacco, 1998). More specifically, Jiujitsu is being used to help individuals in mindfulness based exercises to decrease levels of externalising behaviours (Rinderer & Bernero, 2017). These practical implications of combat sports have facilitated many people through more difficult times in their life, and may be utilised in a more clinical manner to help other individuals, too.

Moreover, the implications of exploring the concept of martial arts and the effect it portrays on aggression levels have even been utilised clinically. Mixed Martial Arts can be observed facilitating individuals with ADHD, insofar as improving their subjective externalising behaviour (Haydicky, 2012). Therefore, the current research may attract more attention towards the positive aspects of martial arts engagement, as opposed to the already negative viewpoint portrayed by social media and other individuals. Therefore, new interventions may be put in place to facilitate the betterment of society as a whole.

Overall, there are areas that further, more developed research could cover in the future. Firstly, and as stated before, martial arts could be used as a form of mindfulness therapy for individuals. It has been suggested that martial arts improves general wellbeing and mental health. Future research could investigate whether karate could be used as a form of therapy for individuals with anxiety. It could also be an area of investigation to explore the differences in gender and aggression, and whether belt rank has an effect.

Further recommendations for future research includes exploring the individual components of aggression - Physical Aggression, Verbal Aggression, Anger, and Hostility - and investigate if a difference exists between aggression levels when compared across intensity and type of martial art practised. This would be imperative to exploring the individual dynamic behind aggression. It would also be important to study the construct of aggression, and the effect martial art may have, in great detail, as it has been suggested to affect an individual in many ways.

In all, the current research explored the relationship between intensity and type of martial art on levels of aggression. Future research attempts are imperative to develop data for improving the information that is known about martial arts and the effect it has on levels of aggression overall. However, although a difference is seen, albeit non significant, the key findings suggest that no significant effect between the two variables - intensity and type of martial art practise - on aggression exists. However, limitations exist insofar as not measuring the individual components of aggression- physical aggression, verbal aggression, anger, and hostility - while controlling for gender and belt level would also be advantageous. Controlling for these variables, and studying them in a longitudinal manner, is recommended in future research in order to obtain a more reliable result.

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Appendix

Aggression

Tukey HSD[a,b,c]

Type of martial art practised	N	Subset 1
MMA	7	79.4286
Jiujitsu	10	83.4000
Karate	23	85.0435
Boxing	6	87.0000
Sig.		.628

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 174.215.

a. Uses Harmonic Mean Sample Size = 8.830.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

Three to four hours per week	Karate	84.3333	9.64365	9
	Jiujitsu	68.5000	3.53553	2
	Total	81.4545	10.80152	11
One to two hours per week	MMA	81.0000	.	1
	Karate	81.5714	10.86059	7
	Jiujitsu	78.0000	.	1
	Boxing	91.0000	12.72792	2
	Total	82.9091	10.20250	11

More than six hours per week	MMA	80.3333	11.37248	3
	Karate	88.3333	15.50269	3
	Jiujitsu	89.0000	15.55635	2
	Total	85.5000	12.59251	8
Five to six hours per week	MMA	78.0000	13.22876	3
	Karate	90.2500	19.61929	4
	Jiujitsu	88.2000	18.67351	5
	Boxing	85.0000	8.98146	4
	Total	86.0000	15.13054	16
Total	MMA	79.4286	10.16296	7
	Karate	85.0435	12.27887	23
	Jiujitsu	83.4000	15.98750	10
	Boxing	87.0000	9.50789	6
	Total	84.0870	12.39861	46

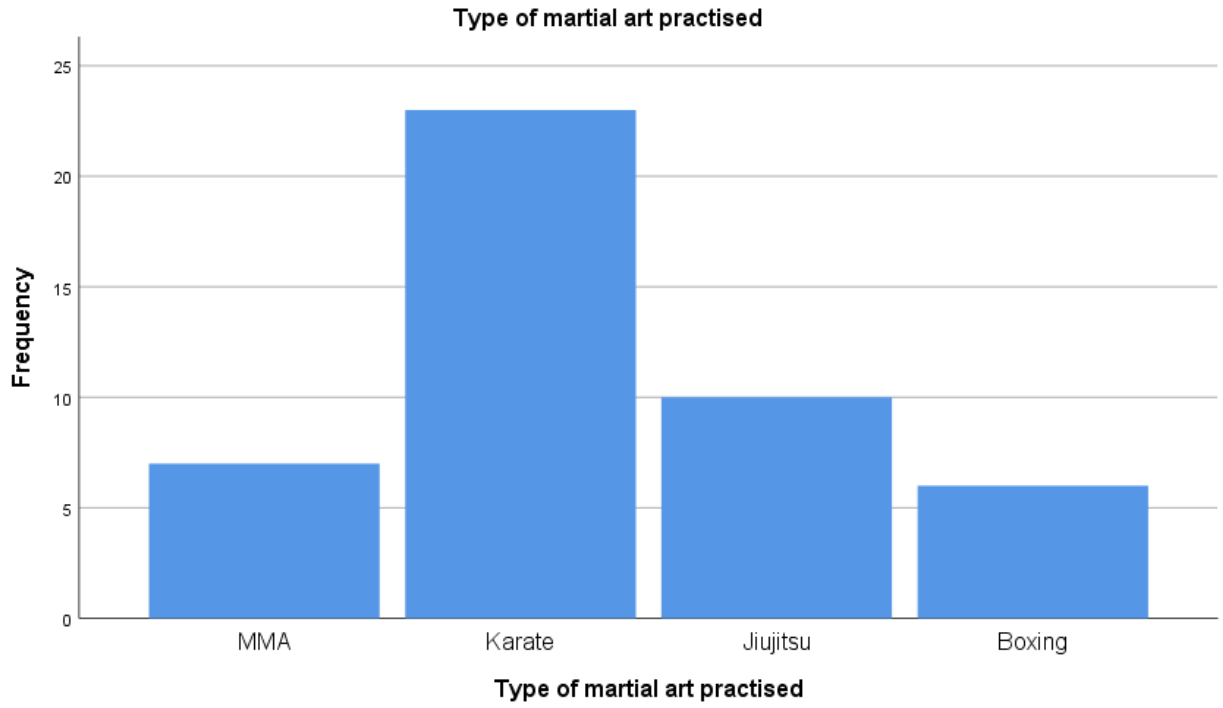
Pearson Correlation	Aggression	1.000	.152	.121
	How often do you engage in martial arts?	.152	1.000	.156
	Type of martial art practised	.121	.156	1.000
Sig. (1-tailed)	Aggression	.	.157	.211
	How often do you engage in martial arts?	.157	.	.150
	Type of martial art practised	.211	.150	.
N	Aggression	46	46	46
	How often do you engage in martial arts?	46	46	46
	Type of martial art practised	46	46	46

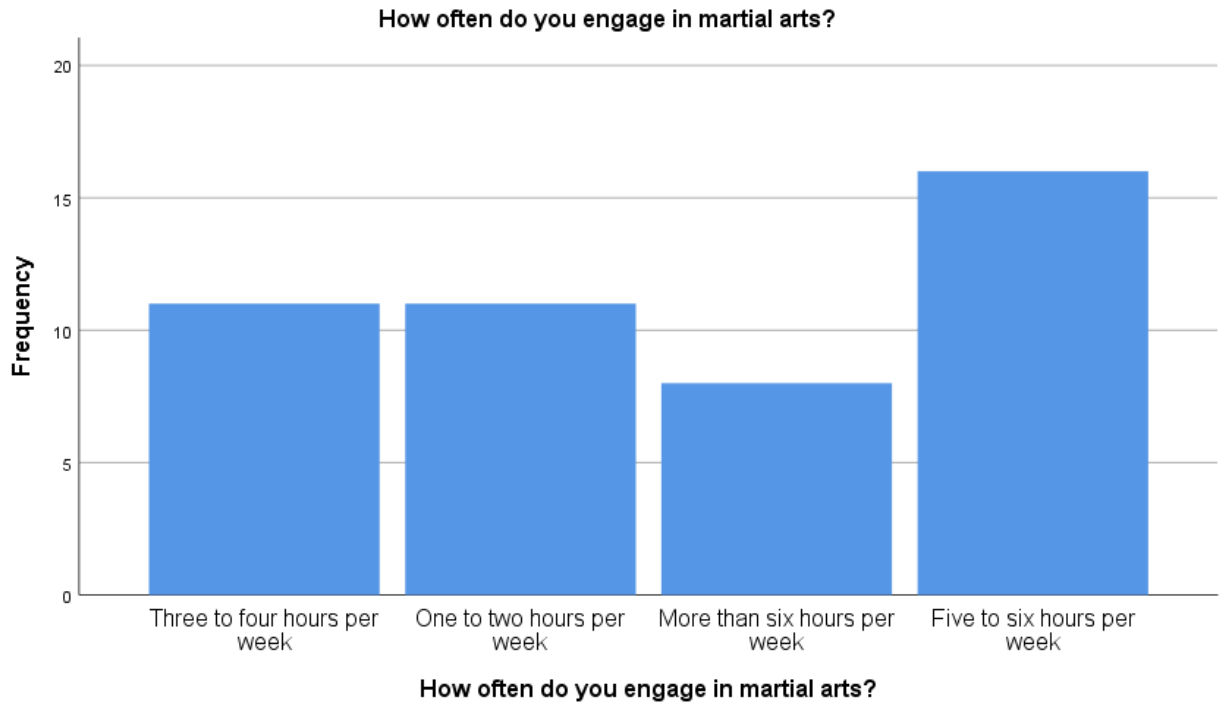
Tukey HSD[a,b,c]

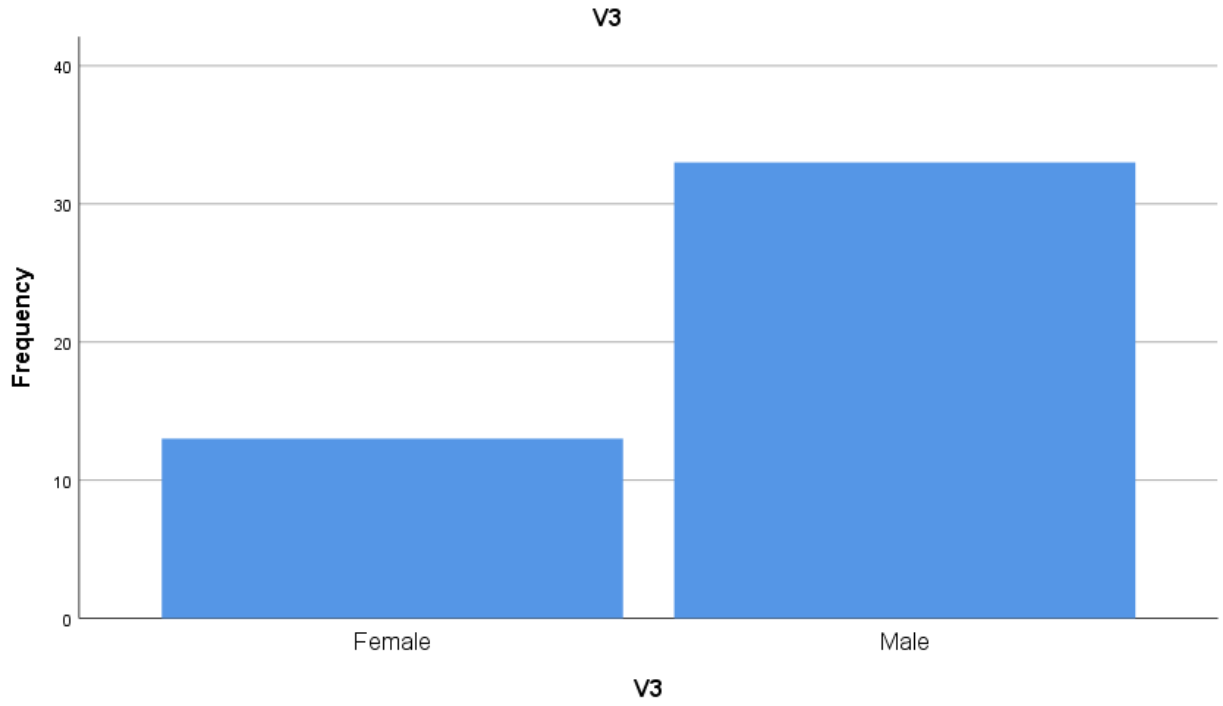
How often do you engage in martial arts?	N	Subset 1
Three to four hours per week	11	81.4545
One to two hours per week	11	82.9091
More than six hours per week	8	85.5000
Five to six hours per week	16	86.0000
Sig.		.838

Valid	MMA	7	15.2	15.2	15.2
	Karate	23	50.0	50.0	65.2
	Jiujitsu	10	21.7	21.7	87.0
	Boxing	6	13.0	13.0	100.0
	Total	46	100.0	100.0	

Valid	Female	13	28.3	28.3	28.3
	Male	33	71.7	71.7	100.0
	Total	46	100.0	100.0	




How often do you engage in martial arts?
Frequency
20
15
10
5
0
Three to four hours per week
One to two hours per week
More than six hours per week
Five to six hours per week
How often do you engage in martial arts?


V3
Frequency
40
30
20
10
0
Female
Male
V3