

Review article

The social-psychological outcomes of martial arts practise among youth: A review

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Abstract

Martial arts involvement among the youth has been described in controversial terms. Studies regarding the effects of martial arts practise on youth show contrasting images. While some refer to enhanced personal and social opportunities for those that participate, others warn against increased levels of aggressiveness and antisocial behavior among its participants. The aim of the present review is to provide, firstly, an overview of the major findings of studies concerning the social-psychological outcomes of martial arts practise. Secondly, the limitations of those studies are discussed. From more than 350 papers, collected during a two-year lasting literature study, 27 papers met all criteria to be included in this study. This review revealed that even though a considerable amount of research on social-psychological outcomes of martial arts practise has been conducted over the years, to date, it has not brought clarity in the existing duality regarding the possible effects of martial arts involvement. It is proposed that a better understanding can be provided if specific influential factors are taken into account in future research (i.e., participants' characteristics, type of guidance, social context and structural qualities of the sport).

Key words: Martial arts, youth, personality traits.

Introduction

Martial arts involvement in general can be described in controversial terms. Commonly held perceptions on the value of involvement in martial arts are mixed. As indicated by some, these common beliefs with regard to martial arts are often largely based on perceptions obtained through the media and entertainment industry (Smith, 1999). It has been pointed out that popular media have created a distorted image of martial arts for (commercial) entertainment purposes (Fuller, 1988; Grady, 1998; Stickney, 2005).

The duality in the perception regarding the effects of martial arts is perhaps even more apparent when it involves youth. On the one side, martial arts involvement is believed to provide positive learning opportunities for youth in general, as well as with regard to specific target groups. For example, a study among member countries of the European Physical Education Association (EUPEA) indicated that in the majority of countries, martial arts are introduced during physical education classes in secondary schools, because it is believed that martial arts involvement can provide positive educational opportunities to pupils (Theeboom and De Knop, 1999). Also, specific initiatives have been set up in several countries in which educators and welfare workers make use of martial arts in their work with socially deprived youth (Abrahams, 2004; Bosch, 2008; Theeboom et al., 2008; Zivin et al., 2001).

However on the other side, the relationship between (some) martial arts and adolescents has been regarded by others as problematic due to an assumed relationship with negative socialization processes. Consider the sport of boxing as an example. Several authors have pleaded for a ban of this sport for youth under the age of 16 years on medical, philosophical and ethical grounds (e.g., American Academy of Pediatrics, 1997; Pearn, 1998). Pearn (1998), for example, proposed that "... *there is no place in contemporary society for a youth sport which has, as its primary goal, the infliction of acute brain damage on an opponent*" (p. 311). 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).

Some researchers have also provided evidence for the negative effects of martial arts involvement among adolescents. For example, a Norwegian study concluded that participating in power sports such as weightlifting, wrestling and oriental martial arts (karate, judo, and taekwondo) leads to an increase in antisocial behavior in youth (Endresen and Olweus, 2005). These results led to a great deal of controversy in a number of countries leading into vehement discussions in various media and on the internet regarding the alleged effects of the practise of martial arts on the young participant, ranging from very positive to very negative. However, some researchers made comments on the Norwegian study's methodology (Sleijfer, 2005; Theeboom et al., 2008). For example, doubts have been raised about the validity of the self-composed questionnaire and an absence of specifying which type of guidance used within the selected power sports. It has also been argued that it is difficult to make general statements using the evidence from this study as a great variety of sports was selected in this study (e.g., weightlifting compared to martial arts).

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.

Popularity of martial arts

Martial arts (e.g., judo, karate, taekwondo, kickboxing) participation has universal appeal. For example, in France, the Netherlands, Canada, Finland, Australia and

Belgium martial arts are on a list of the ten most practiced sports among children and adolescents (Australian Bureau of Statistics, 2009; Ministère de la jeunesse des sports et de la vie associative, 2005; Nederlandse Hartstichting and NOC*NSF, 2007; Tammelin et al., 2003; Warren, 2008; Wolt et al., 2007). Martial arts have also been ranked among the ten most practiced sports in a club context (Bottenburg et al., 2005; Ministère de la jeunesse des sports et de la vie associative, 2002).

The popularity of martial arts has helped contribute to a growing interest in martial arts research over the years, which can be illustrated through a number of ways. Firstly, there are indications that in recent years more papers on martial arts are presented at sports scientific congresses. For example, Distaso and his colleagues (2009) examined the number of oral and poster presentations on martial arts at the annual conference of the European College of Sport Science (ECSS) and noticed a significant growth between 1999 and 2008.

Secondly, in recent years an increased number of scientific meetings with regard to martial arts have been organized. Next to conferences on martial arts in general (e.g., "Scientific Congress on Martial Arts and Combat Sports"; "World Congress on Combat Sports and Martial Arts", "International Scientific Conference of Experts – Researchers on Martial Arts and Humanists"), also scientific gatherings with regard to one particular martial arts style are being organized (e.g., "International Science of Judo Symposium"; "International Congress on Wrestling and Traditional Games"; "International Symposium on Science and Taekwondo"; "International Symposium of Traditional Karate, Budo Arts and Combat Sports").

Thirdly, it is interesting to note that in recent years the number of scientific publications regarding martial arts has increased as well. For example, there are currently a number of specific international journals reporting on martial arts research (e.g., "Journal of Asian Martial Arts", "Archives of Budo", "Journal of Chinese Martial Studies", "IDO Movement for Culture", "Electronic Journals of Martial Arts and Sciences", "Classical Fighting Arts"). In addition, the Journal of Sport Science and Medicine has published a number of special editions on martial arts.

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; Gutiérrez García and Pérez Gutiérrez, 2009; Henning, 1999; Pieter, 1994). These reviews covered a wide range of scientific disciplines (e.g., biomechanics, psychology, history, physiology, sociology, pedagogy, epidemiology of injuries) and paucities in certain domains have been reported. For example, Pieter (1994) concluded that pedagogical research in martial arts was sorely lacking and Fuller (1988) claimed that due to their negative public image, martial arts have been largely neglected as a focus of psychological research. As these reviews are more than 15 years old, it is interesting to learn about more recent martial arts research. Among other things, it would be worthwhile to specifically focus on young martial artists, as several studies have reported an increased percentage of adolescents involved in martial arts. For example, in the Nether-

lands it was found that approximately 55% of those practicing a martial art in a club setting, was youth (Breedveld et al., 2008) and in Finland the percentage of youth membership in martial arts clubs fluctuated between 64% and 86% (Tammelin et al., 2003).

Methods

Considering controversial feelings regarding the effects of martial arts practise on young people, it is relevant to gain more insight in the social-psychological outcomes of martial arts involvement among youth by reviewing the existing research on this topic. Literature was collected over a two-year period. Apart from a number of secondary sources (e.g., research reviews), literature data were primarily collected through computer and manual searches of primary sources (e.g., journal articles, theses and dissertations) in the areas of sport sociology, psychology, pedagogy and philosophy.

For the computer search, online databases (e.g., SportDiscus, ERIC, Academic Search Elite) were combed pairing primary keywords, such as martial arts, judo, aikido, kick-/Thai boxing, boxing, taekwondo, karate, children, youth, adolescents, outcomes, effects, motivation, teaching style, teaching approach, participation, motives and aggression. In addition, the reference list of the studies obtained, were examined for additional potentially relevant articles not previously located. The literature search resulted in a database of 380 published as well as unpublished papers in total, collected from 107 different journals, of which 209 papers coming from 79 different journals, specifically focused on martial arts.

To be included in the review conducted as part of the present study, a study had to meet seven criteria. Firstly, only those studies measuring social-psychological outcomes of practicing a martial art are included. For example, this means that studies looking at the therapeutic values of martial arts are not discussed in this review (for such a review, see Burke et al., 2007). Secondly, studies in which martial arts were incorporated as part of a larger intervention program, were excluded from this review (e.g. Glanz, 1994; Smith et al., 1999; Twemlow et al., 2008) as limited evidence could be provided that measured outcomes were specifically attributed to martial arts practise. Thirdly, studies evaluating self-defence programs were also excluded as Brecklin (2008) recently reviewed the majority of these studies. Fourthly, when the used methodology was not presented clearly or when a study had many limitations (as concluded by the authors), they were omitted from this review (e.g., Delva-Taullili, 1995; Strayhorn and Strayhorn, 2009). Fifthly, as only few studies focused on specific target groups, such as persons with disabilities (e.g., Conant et al., 2008; Martin, 2002) or made use of a qualitative research methodology (e.g., interviews) (Konzak and Klavora, 1980; Theeboom et al., 2008; 2009), none of this research was included in this review as no meaningful comparison would be possible. Sixthly, the focus is on studies conducted from the mid '90s onwards, as the older ones were mostly included in the previous reviews (such as Cox, 1993; Fuller, 1988; Pieter, 1994). However, to enable a comparison with more recent research, major findings of these older stud-

ies were included as well. Seventhly (and finally), the review covers only research that has been published in English, Dutch or French. Studies written in another language were not discussed in the review (e.g., Matsumoto et al., 2006; Matsumoto and Konno, 2005). The final selection resulted in 27 studies that will be reviewed below (12 studies before and 15 studies after the mid '90s).

The results of this literature study will be described in the present review, which consists of two parts. In the first part, studies reporting the possible effects of martial arts practise on participants will be discussed. However, the majority of these studies cannot determine to what extent the observed effects can be attributed to the practise of a martial art since several methodological and conceptual limitations can be noticed. The second part of this review will focus specifically on these restrictions. Finally, a conclusion is presented and recommendations are provided for further investigation.

Social-psychological outcomes of martial arts practise

Firstly, a number of trends can be noticed with regard to themes, groups of participants and methodologies in martial arts research. Studies regarding social-psychological effects of martial arts practise date back to the late 60's and the early 70's (e.g., Kroll and Carlson, 1967; Pyecha, 1970). These earlier studies focused on personal characteristics of martial artists, how these characteristics determined preferences for specific types of martial arts and the extent in which they changed as a result of martial arts involvement. Since then, more researchers have become interested in the outcomes of martial arts practise. Interestingly, for a number of reasons, a turning point in martial arts research can be detected around the mid '90s. For example firstly, while earlier studies focused on martial arts involvement in general, in more recent years attention shifted to outcomes of martial arts practise among children and adolescents. More than 60% of more recent papers and reports that were analyzed, addressed youth, whereas less than 20% of the studies conducted before the mid '90s examined this issue. Secondly, a shift can be noticed regarding the type of martial arts under study. Previously, the majority of studies focused on traditional martial arts (e.g., judo, karate, taekwondo), while in more recent years a growing interest for (harder) Western martial arts can be noted (e.g., boxing, mixed martial arts). Thirdly, an evolution in the used methodology can be noticed as well. While until the mid '90s, most studies made use of cross-sectional designs (viz, 92% of the older studies included in this review), in later years more longitudinal studies have been set up (viz, 40% of the studies conducted after the mid '90s). And fourthly, throughout the years, the type of social-psychological outcomes under study changed. While most of the earlier studies primarily looked at the influence of martial arts practise on a variety of personality traits of practitioners (viz, 58% of the studies conducted before the mid '90s), in recent years the emphasis is more on the relationship between martial artists and aggression (viz, 61% of all studies that were analyzed).

In the following section an overview is presented of empirical studies with regard to social-psychological outcomes of martial arts practise, in which, among other

things, results and used methodology will be examined more closely.

Studies examining different personality traits, such as self-confidence, self-assurance, anxiety level, and self-regulation are discussed first (Table 1). Afterwards, research regarding the relation between martial arts practise and aggressive behavior is looked at because of its increased attention by researchers in recent years (Table 2).

Personality traits

Most research looking at personality profiles of martial artists used a cross-sectional design. A number of these studies have compared personality traits according to the performance level of martial artists (e.g., winning or losing a competition, earning a trophy or a medal) (e.g., McGowan and Miller, 1989; Richman and Rehberg, 1986). In an earlier study, Richman and Rehberg (1986) showed that the level of performance had a positive impact on personality traits of participants (e.g., higher self-esteem). Around the same period, McGowan and Miller (1989) reported that successful competitors showed more anger than less successful ones. However, in this study anger was used in a positive way, namely the energy needed to win a karate competition. It is not possible to infer from these findings that competitors remain feeling angry. More recent studies (e.g., Kuan and Roy, 2007) made use of a similar research methodology and revealed positive findings. Kuan and Roy (2007) used the "Psychological Performance Inventory" (PPI) to examine differences in self-confidence and negative energy control among wushu athletes (medallist compared to non-medallist). Results revealed that medallists scored significantly higher on self-confidence and negative energy control than non-medallists. Consequently, it was also concluded that successful athletes reported more positive outcomes on personality traits than less successful athletes.

Instead of dividing the sample according to level of performance, a number of researchers examined differences in personality traits of martial artists between different teaching styles (i.e., traditional versus modern training methods). While a traditional approach was defined as focusing on meditative aspects, stressing self-control, conflict avoidance, respect for others, kata training, and the study of philosophy, modern training was described as emphasizing sport and competitive aspects, as well as focusing teaching to physical aspects only (Donohue and Taylor, 1994; Nosanchuk and MacNeil, 1989).

In an earlier study, Trulson (1986) suggested that traditional martial arts practise has a positive influence on personality traits of participants, as opposed to training in modern martial arts. More recently, Najafi (2003) also divided his sample as a function of teaching styles and came to similar conclusions. His findings revealed that practitioners of traditional martial arts emphasize more humility and report more overall levels of hope compared to those involved in modern martial arts. In this study, hope was defined as "...the motivation to accomplish the harsh task" (p. 25).

The majority of studies that employ a cross-sectional design to examine personality profiles of martial

Table 1. Overview of selected studies on martial arts and personality traits

Year	Author	Sample size	Target group*	Methodology	Martial art	Measured effect	Positive or negative effect among MA†
1978	Duthie et al.	152	General	Cross-sectional (level of experience)	Karate, other martial arts (not specified)	Self-confidence, dominance, autonomy, achievement, ...	Positive among advanced MA
1980	Konzak & Klavora	84	General	Cross-sectional (level of experience)	Karate	General development (personality factors and physical well-being)	Positive among advanced MA
1986	Richman & Rehberg	60	General	Cross-sectional (level of experience + performance)	Karate	Self-esteem	Positive among advanced and successful MA‡
1986	Trulson	34	Youth	Longitudinal (type of guidance)	Taekwondo	Anxiety, self-esteem and social adroitness	Positive among traditional MA
1989	McGowan & Miller	107	General	Cross-sectional (level of performance)	Karate	Angry	Positive among less successful MA‡
1990	Layton	93	General	Cross-sectional (level of experience)	Karate	Trait and state anxiety	Positive among advanced MA
1993	Kurian et al.	30	General	Cross-sectional (level of experience)	Taekwondo	Anxiety and independence	Positive among advanced MA
1994	Kurian et al.	72	Youth	Cross-sectional (level of experience)	Taekwondo	Self-reliance and enthusiastic optimism	Positive among advanced MA
2003	Najafi	118	General	Cross-sectional (type of guidance)	Karate	Humility and overall levels of hope	Positive among traditional MA
2004	Lakes & Hoyt	193	Youth	Longitudinal (school-linked program)	Taekwondo, control	Cognitive and affective self-regulation, prosocial behavior, classroom conduct, performance on a mental math test	Positive over time among MA
2007	Kuan & Roy	40	General	Cross-sectional (level of performance)	Wushu	Self-confidence and energy control	Positive among successful MA‡
2007	Wargo et al.	40	General	Cross-sectional (level of experience)	Taekwondo, karate	Self-esteem	Neither positive nor negative
2009	Steyn & Roux	72	Youth	Cross-sectional (comparison different groups)	Taekwondo, hockey, non-sport group	Personal growth and self-acceptance	Positive among MA

* General (general population) = adults, adolescents and/or children are pooled together into one group. Youth = youngster under the age of 18

† MA = martial artists. ‡ Martial artists were considered as successful when they won, earned a trophy or were in the top 4 of a competition.

artists divide samples as a function of level of experience in a specific martial art (e.g., belt color or length of martial arts involvement). Studies conducted before the mid '90s indicated clear similarities in their conclusions, in which length of training was found to have a positive impact on personality traits of martial artists (e.g., Duthie et al., 1978; Konzak and Klavora, 1980; Kurian et al., 1993; Layton, 1990; Richman and Rehberg, 1986). However, a number of studies conducted in more recent years resulted in less consistent findings. For example, in Wargo et al.'s study (2007) black and yellow belt taekwondo-in were asked to fill out the "Minnesota Multiphasic Personality Inventory 2" (MMPI-2). No evidence for improved self-esteem with rank was found. Furthermore, the authors suggested that the participants included in their study had no more self-esteem issues than the gen-

eral population.

A number of more recent studies, using a similar research methodology, have focused on the influence of martial arts on personality profiles among adolescents. For example, Steyn and Roux (2009) compared the psychological well-being of taekwondo-in, hockey players and a non-sport group. Adolescents between the ages of 15 to 18 years were asked to administer the "Psychological Well-being Questionnaire". Results indicated that the personal growth and self-acceptance scores of taekwondo-in were significantly higher than those of the hockey players and the non-sport group. Another study, conducted by Kurian et al. (1994), found similar results among taekwondo participants. They used the "Children's Personality Questionnaire" and found that longer times in taekwondo training were associated with more self-

Table 2. Overview of selected studies on martial arts and aggression.

Year	Author	Sample size	Target group*	Methodology	Martial art	Measured effect	Positive or negative effect among MA†
1980	Rothpearl	152	General	Cross-sectional (level of experience)	Karate	Hostility	Positive among advanced MA
1981	Nosanchuk	41	General	Cross-sectional (level of experience)	Karate	Aggressive fantasy	Positive among advanced MA
1990	Daniels & Thornton	80	General	Cross-sectional (level of experience) + (comparison different martial arts)	Karate, ju jitsu, badminton, rugby, control	Hostility	Positive among advanced MA
1991	Skelton et al.	68	Youth	Cross-sectional (level of experience)	Taekwondo	Aggressiveness	Positive among advanced MA
1992	Daniels & Thornton	79	General	Cross-sectional (level of experience)	Karate, ju jitsu, badminton, rugby	Hostility	Positive among advanced MA
1994	Edelman	15	Youth	Longitudinal (school-linked program)	Aikido	Hostility and aggressiveness	Positive over time among MA
1999	Lamarre & Nosanchuk	51	General	Cross-sectional (level of experience)	Judo	Aggressiveness	Positive among advanced MA
2001	Björkqvist & Varhama	319	General	Cross-sectional (comparison different martial arts)	Karate, wrestling and boxing, non-contact sports, no sports	Attitudes towards violent conflict resolution	Positive among male, negative among female karateka
2001	Zivin et al.	60	Youth	Longitudinal (school-linked program)	Kempo	Hostility and aggressiveness	Positive over time among MA
2001	Reynes & Lorant	150	Youth	Cross-sectional (comparison different martial arts)	Judo, karate, control	Aggressiveness	No difference compared to control (judo more anger than control)
2002	Reynes & Lorant (a)	8	Youth	Longitudinal	Judo, control	Aggressiveness	Negative compared to control group
2002	Reynes & Lorant (b)	9	Youth	Longitudinal	Karate, control	Aggressiveness	No effect compared to control, positive effect compared to judoka
2004	Reynes & Lorant	43	Youth	Longitudinal (comparison different martial arts)	Judo, karate	Aggressiveness	No effect among karate, negative among judo
2005	Endresen & Olweus	477	Youth	Longitudinal	Boxing, weightlifting, wrestling, oriental martial arts, non-participants	Violent and antisocial behavior	Negative among MA
2007	Wargo et al.	40	General	Cross-sectional (level of experience)	Taekwondo, karate	Aggressiveness	Neither positive nor negative
2009	Steyn & Roux	72	Youth	Cross-sectional (comparison different groups)	Taekwondo, hockey, non-participants	Verbal aggression and hostility	Positive among MA

* General (general population) = adults, adolescents and/or children are pooled together into one group. Youth = youngster under the age of 18.

† MA = martial artists

reliance and enthusiastic optimism. Lakes and Hoyt (2004) using a longitudinal research design to measure the impact of school-based taekwondo training on self-regulatory abilities found that after a 3-month intervention, participants of taekwondo showed greater improvements than a control group in areas of cognitive and affective self-regulation, prosocial behavior, classroom conduct and performance on a mental math test.

In general, research conducted after the mid '90s and focusing on youth showed that martial arts practise has positive effects on the personality profiles of adolescents, which clearly confirms findings of earlier studies.

Aggression

Although most of the earlier studies focused on personality traits of martial artists in general, some authors specifically looked at the relationship between martial arts and aggressive behavior (Daniels and Thornton, 1990; 1992; Nosanchuk, 1981; Rothpearl, 1980; Skelton et al., 1991). In general, it was concluded that longer training was associated with lower levels of aggressiveness.

Contrary to earlier research, only a few of the more recent studies made use of a cross-sectional design. For example, Lamarre and Nosanchuk (1999) used the "Rosenzweig Picture Frustration Test" and responses to

hostile or frustrating situations to examine the aggressiveness among judoka. Their results revealed that aggressiveness decreased across training, as well as across age, with gender having no effect. Consequently, findings were consistent with those of the previous studies. However, Wargo et al. (2007) failed to support previous findings. In their study the “Minnesota Multiphasic Personality Inventory 2” (MMPI-2) was used to assess the personalities of yellow and black belt taekwondo-in and karateka. It was reported that participants were no more likely to view ambiguous situations as warranting retaliation compared to the general population.

Instead of dividing the sample as a function of level of experience, Björkqvist and Varhama (2001) made a comparison between different types of martial arts. Attitudes towards violent conflict resolution were examined among female and male practitioners of different styles of martial arts (karateka compared to wrestlers and boxers), practitioners of non-contact sports and controls who did not practice any sport. Results indicated that martial arts practise had positive effects on male, but negative effects on female participants when compared to participants in a control group.

As indicated earlier, in recent years more researchers have become interested in the relationship of martial arts practise and aggressiveness among children and adolescents. Contrary to more general studies and those conducted in earlier years, a majority of the research involving adolescents made use of a longitudinal research design with time between pre- and post-testing ranging approximately from 2 months to 2 years. It is also interesting to note that several of these longitudinal studies have set up an experimental design in which martial art instruction was provided to adolescents with no prior martial arts experience and were aimed at examining changes in aggressive behavior over the course of the program. In most cases, specific target groups were used, such as middle or elementary school youth at risk (Edelman, 1994; Zivin et al., 2001). All these studies reported positive outcomes, with decreased post-test scores on hostility and aggression. While most of these studies made use of martial arts in general, only a few have investigated differences between specific styles of martial arts. For example, Reynes and Lorant (2001; 2002a; 2002b; 2004) compared changes in aggressiveness of children practicing either judo or karate. After a 1- and 2-year practise period, they reported distinct opposite findings between the two martial arts, namely young karateka did not differ from a control group, whereas young judoka were found to be more aggressive than both the control and the karate group. Also Endresen and Olweus (2005) reported negative effects as a result of martial arts practise among youth. As reported earlier, they conducted a longitudinal study in which they examined the relationship between participation in so-called “power sports” and violent and antisocial behavior among preadolescent and adolescent boys over a two-year period. These power sports included boxing, weightlifting, wrestling and oriental martial arts. Their findings showed that participation in these sports lead to an increase in antisocial involvement outside the sports situation with no indications of selection effects. The authors suggested that these negative

effects stemmed both from the practise of power sports itself, as well as from the repeated contact with a “macho” culture prevalent in the sporting clubs. As earlier indicated, Endresen and Olweus’ study has been criticized by others.

Finally, only a few studies made use of a cross-sectional design to measure the aggressiveness among young martial artists. For example, Steyn and Roux (2009) used the “Buss and Perry Aggression Questionnaire” to examine the aggression levels of 15 to 18 year old taekwondo-in compared to hockey players and a non-sport group of the same age category. Findings revealed that the verbal aggression and hostility scores of taekwondo participants were significantly lower than the other two groups.

In conclusion, most studies investigating the relationship between martial arts practise and aggressiveness revealed positive outcomes, in a general population, as well as specifically for adults or for adolescents. However, findings are not always consistent with one another, since some studies reported that martial arts would have no or even negative effects on the aggressiveness of participants.

Limitations

Examining effects of sports participation is complex as several factors (e.g., type of guidance, structural qualities of the sport, etc.) can be expected to have an influence. As a result, this kind of research has several methodological and conceptual limitations, which will be discussed below.

Several studies, which made use of a cross-sectional design to compare personality traits of martial arts practitioners at different levels of experience, do not seem to control for self-selection effects (e.g., Kurian et al., 1993; Steyn and Roux, 2009; Wargo et al., 2007). It is likely that participants in those studies selected martial arts training because it was consistent with their personal tendencies. It is also possible that adolescents whose values and beliefs were not in tune with those of the chosen martial art, would most likely decide to give up practise. As indicated by several authors (e.g., Cox, 1993; Fuller, 1988), it is therefore better to conduct longitudinal studies. However, this kind of design also has its limitations. Among other things, it is time-consuming and it remains difficult to control the period between the first and second measurement and to prevent the context from changing (e.g., drop-out, changing of the martial art teacher, etc.) (Gravetter and Forzano, 2009). For example, in the study of Reynes and Lorant (2002a) nearly one third of the total sample dropped-out during the one year of judo practise. Nosanchuk and Lamarre (2002) indicated in their comments on this study that those who persisted, may be more aggressive than those who dropped-out, which could be an explanation for the observed outcomes. It can also be noted that differences appear regarding the length of the intervention. While a number of studies have used a one- or two-month period (Edelman, 1994: 12 weeks; Lakes and Hoyt, 2004: 16 weeks; Zivin et al., 2001: 10 weeks), others raised questions about these short-term effects. For example, Nosanchuk and Lamarre

(2002) argued that more than one year of training would be required to assess any meaningful variations. Also other authors suggested that it takes several years of training to obtain positive outcomes (e.g., Konzak and Klavara, 1980; Layton, 1990). In addition, only a few researchers have conducted a follow-up study to assess whether martial artists' changes in personality, psychological and behavioral characteristics are long-lasting (e.g., Zivin et al., 2001). It is also interesting to note that some researchers reported significant effects, but used small-sized samples, which may have resulted in low statistical power (e.g., Edelman, 1994: $n = 15$; Reynes and Lorant, 2002b: $n = 9$). Furthermore, many studies did not take gender differences into account. For example, a number of studies only investigated boys (e.g., Endresen and Olweus, 2005; Kurian et al., 1994; Reynes and Lorant, 2002a; 2002b; 2004; Zivin et al., 2001). Only Lakes and Hoyt (2004) indicated that benefits received by girls may be manifested differently than those obtained by boys.

Moreover, a few studies made a comparison between different martial arts styles and revealed differences along the different styles (e.g., Björkqvist and Varhama, 2001; Daniels and Thornton, 1990; Reynes and Lorant, 2004). This finding indicates that each martial art has its own qualities, which can lead to different outcomes. However, in some studies the characteristics of specific martial arts were not taken into consideration. In these cases adolescents involved in different martial arts were pooled together into one group and compared with a non-participation group (e.g., Endresen and Olweus, 2005; Daniels and Thornton, 1992; Duthie et al., 1978; Nosanchuk and MacNeil, 1989; Wargo et al., 2007).

Finally, as indicated by Jones, MacKay and Peters (2006), it is not only important to take the kind of martial art into account, it is perhaps more important to look at the role played by the instructor, which can create different styles within one martial art. The effect of the martial arts being taught can be very different depending on who is teaching. It can be noted, however, that many authors did not describe the type of guidance used within the selected martial arts (e.g., Daniels and Thornton, 1992; Endresen and Olweus, 2005; Steyn and Roux, 2009). The few studies that explicitly referred to the type of guidance (e.g., Najafi, 2003; Nosanchuk and MacNeil, 1989; Trulson, 1986) reported different outcomes according to the specific guidance approach that was used.

Conclusion

To date, many common beliefs with regard to the social-psychological outcomes of martial arts practise exist, ranging from very positive to very negative. To formulate more thoughtful and scientifically based statements, in recent years, researchers have become more interested in martial arts. Next to an increased number of scientific meetings and publications with regard to martial arts, also a significant growth in the number of presentations on martial arts at sports scientific congresses has been detected.

Furthermore, a number of trends may be noticed regarding research on social-psychological outcomes of

martial arts practise. While earlier studies focused on a more general population, in more recent years, there has been a shift in attention to younger participants. There has also been more emphasis in later research on the relationship between martial arts practise and aggressive behavior and more Western martial arts have been investigated than before.

It can be argued that these trends are in line with a number of social developments, such as an increased popularity of martial arts among socially vulnerable youth. Hence, several pedagogues and welfare workers have used martial arts in their work with this target group and employ it as an instrument to improve their social and personal development (e.g., Fleisher et al., 1995; Ham, 2008; Nuchelmans, 2008; Theeboom et al., 2004).

The present review provides an overview of research that has been conducted over the past two decades on social-psychological outcomes of martial arts involvement, with youth in particular. Past research has mostly pointed in the direction of the appearance of positive effects, going from a higher level of self-regulation and an increased psychological well-being, to a decreased violence level among its participants. Nevertheless, some contrasting images have been found, since a few studies reported negative outcomes as a result of martial arts involvement, such as an increased antisocial behavior. In conclusion, it has not been able to provide overall conclusive evidence regarding the social-psychological outcomes of martial arts practise.

However, it remains difficult to determine if and to what extent the practise of a martial art can be accounted for the reported effects. The presumed effects cannot be attributed solely to mere sport participation, because other factors could have an influence as well. For example, the cause and effect relationship of martial arts practise as well as the self-selection bias remain critical issues. It has been argued that it is often too difficult to make general statements about the social-psychological outcomes of sports participation, without taking several influential factors into consideration, such as the type of guidance, the structural qualities of the sport, the characteristics of the participants and the social context (Coalter, 2007; Patriksson, 1995; Shields and Bredemeier, 1995). However, the present review shows that only a few researchers have considered one or more of these influential factors.

Based on this, some suggestion for future research will be proposed in the final part of this review. Regarding the structural qualities of the martial arts, it can be concluded that some researchers have tried to take this into consideration by making a comparison between different martial arts styles. Such studies revealed the importance of taking the specific martial arts style being practised into account. Also some attention has been paid to the type of guidance, by comparing traditional with modern training methods. In general, the former showed more positive effects than the latter. However, in future research it would be relevant to look more closely at the different teaching styles being used. For example, this can be linked to a specific climate that is created by the teacher's behavior, which in turn can have an impact on motivational responses in youth. Ames (1992) argued that

two motivational climates can be identified: a mastery climate, where self-referenced improvement and effort is focused, and a performance climate, where pupils are encouraged to perform better than others. To date, limited research has been conducted in which the motivational climate of martial arts practise has been taken into account. Hence, in future research it might be relevant to look at the motivational climate of different martial arts practises, between different martial arts as well as within one martial art, but where different approaches have been used (traditional versus modern).

Next to the type of guidance and the structural qualities of the sport, the characteristics of the participants should also be controlled when examining the social-psychological outcomes of martial arts practise. As Wisse (2007) and Anthonissen and Dortants (2006) argued, martial artists with different characteristics can give different meanings to their martial art and can experience their martial arts practise in another way. Therefore, it is important to learn more about the differences of participants' characteristics. One of these differences can be linked to the personality traits of participants (e.g., level of self-confidence, aggressiveness, ...). Furthermore, in the literature the characteristics of the participants are also related to the goal orientations of the participants. To date, two studies have examined whether achievement goal orientations vary as a function of the type of martial arts involvement and arrived at different conclusions. Gernigon and Le Bars (2000) stressed the compatibility of a competitive context and task orientation, whereas King and Williams (1997) stressed the compatibility of traditional martial arts and task orientation. Consequently, future studies might take a closer look at the relationship between the characteristics of participants and the chosen martial art. For example, it could be interesting to determine to what extent achievement goal orientations of adolescents practicing a harder martial art (e.g., kick-/Thai boxing) differ from those practicing a softer martial art (e.g., aikido) [*Martial arts can be classified as soft or hard. For example, aikido is considered as a soft martial art, because the strength and the intention of an attack is used against the opponent, to neutralize him. While kick-/Thai boxing is considered as a hard martial art, because there is often more emphasis on parrying (or just directly blocking) an attack (which does not allow to use the strength of the opponent)*].

Finally, the social context of the participants has also to be taken into consideration when investigating outcomes in sports participants. It has already been described that social class is one of the most important factors influencing sports involvement (Scheerder et al., 2005). Hence, it can be assumed that participants' socio-economical background might also have an influence on the type of martial arts involvement.

In general, future studies that can control for a number of important influencing factors might be able to provide a better understanding of the true nature of the social-psychological outcomes of martial arts practise for adolescents.

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Key points

- Many common beliefs exist about the positive and negative outcomes of martial arts practise.
- Studies regarding the effects of martial arts practise on youth show contrasting images.
- Several influential factors have to be taken into account when examining the social-psychological outcomes of martial arts practise.