

# Internal Martial Arts Training and the Reduction of Hostility and Aggression in Martial Arts Students

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**ABSTRACT.** Traditional martial arts focus on both *external* (i.e., striking and kicking) and *internal* (breathing and self-control) techniques to teach a balance between physical and mental techniques. The present study tested whether the type of martial arts training affects state hostility and aggressive behavior, and whether this relation differs based on trait aggression within the framework of the General Aggression Model (Anderson & Bushman, 2002). Following a martial arts lesson in external techniques, half of the students at 2 dojos were taught internal breathing techniques, and the other half were not. State hostility and aggression, measured by the number of exercises they would have another student do if they were the instructor, were subsequently measured. High trait aggressive participants reported higher state hostility and rated that they would inflict more push-ups, sit-ups, and leg lifts on others than did low trait aggressive participants ( $r$  values ranged from .33–.65). Participants who practiced internal techniques reported less state hostility ( $M = 1.85$ ,  $SD = 0.61$ ) than did those engaged in external (and not internal) training ( $M = 2.17$ ,  $SD = 0.65$ ),  $F(1, 46) = 4.37$ ,  $p = .042$ ,  $\eta_p^2 = .087$ . The internal technique group also allocated slightly fewer push-ups and sit-ups ( $ps = .068, .081$ ) than did the external-only training group. No significant interaction was found between trait aggression and type of technique ( $p > .05$ ). Including internal techniques in martial arts training may ameliorate the effect that this training may have on aggressive impulses and behavior.

Development of the capacity for self-control increases flexibility and adaptability, which may increase the ability to survive (Bushman, 2010). Parents often enroll children in martial arts programs to help them learn self-control and experience mastery. Conversely, theory and research on aggression (e.g., Bandura's, 1971, Social Learning Theory) has suggested that teaching children to physically hurt others with their bodies (kicking, punching) may increase the likelihood that this behavior may be generalized to other situations, perhaps impulsively. If a

child learns self-control strategies while learning martial arts, the child may be more able to manage aggressive motivation when provoked and may engage in less subsequent aggressive behavior. Whether a student of martial arts learns self-control regarding the use of physical force may depend on whether they are trained in traditional or modern martial arts.

## Traditional and Modern Martial Arts

There are currently two main categories of martial arts: traditional and modern (Fuller, 1988).

FALL 2015

PSI CHI  
JOURNAL OF  
PSYCHOLOGICAL  
RESEARCH

Traditional martial arts instruction emphasizes psychological, spiritual, and nonaggressive aspects of the art, and modern martial arts tend to focus on competition and aggression (Fuller, 1988). Traditional martial arts training has been shown to reduce aggressive tendencies, and modern martial arts have been shown to increase the propensity to aggress in students who practice the training (Twemlow, Sacco, & Fanog, 2008).

This pattern of results has been consistently found with aggressive youth. Trulson (1986) found decreases in self-reported aggression and anxiety, and increases in self-esteem in a group of aggressive male adolescents after a 6-month training program in traditional martial arts. In a similar study, Twemlow, Sacco, et al. (2008) found that these improvements remained at a 1-year follow-up. In contrast, a group that received modern martial arts training focused entirely on fighting skills actually increased in aggression compared to a control group that engaged in supervised physical activity that did not change significantly.

Different training schools may have different effects. Vertonghen and Theeboom (2010) claimed that how the student is influenced by the martial art could be linked to a specific climate created by a traditional teaching of a martial art or a more modern competitive approach. These two types of approaches greatly influence how students respond to many other confrontations in their lives because martial arts teaches a person defense in case of physical assault, and also teaches coping mechanisms that can be utilized in situations that are not combative. Vertonghen and Theeboom described the mastery climate and the performance climate. The mastery climate focuses on self-referenced improvement, and effort is rewarded; the performance climate encourages pupils to perform better than others. Therefore, it may be relevant to look at the motivational climate of different martial arts practices between different martial arts and also within the same martial art where different approaches are used (i.e., traditional versus modern).

### Benefits of Traditional Martial Arts Training

Twemlow, Sacco, and colleagues (2008) posited several therapeutic effects of martial arts training in a traditional dojo, particularly for troubled youths. Training in traditional martial arts philosophy and codes of conduct may enhance character development and altruism. Traditional training can also foster positive attachments and develop skills

fundamental to transform destructive aggressiveness into self-confidence. The practice of linking the mind with the body promotes self-awareness of physical movements and control of breathing and emotions such as fear and anger. This training may teach students how to stay calm when under great amounts of physical stress, improving the capacity to respond correctly. It is impossible to perfect a technique when a student is tense, out of control, angry, or inattentive because this leads to being off-balance and committing errors, which are often correctable in a balanced mindset. In a traditional dojo, students must accept that they need to show respect to the sensei in order to learn a desired skill. This change in thought is important because, instead of obeying the sensei merely because of their position of authority, the student develops a desire for self-discipline and then obeys in order to learn (Twemlow, Sacco, et al., 2008).

Twemlow, Biggs, et al. (2008) evaluated a traditional martial arts program implemented in three elementary schools named *The Gentle Warrior Program*, which was designed to reduce aggression in children. The sample consisted of 254 children in grades 3, 4, and 5, who participated in the Gentle Warrior Program as part of a larger school violence intervention. The results indicated that boys who participated in more martial arts training sessions reported a lower frequency of aggression and greater frequency of helpful "bystanding" (i.e., helpful behavior toward victims of bullying) over time, relative to boys with less frequent participation. The effect of participation on aggression was partially mediated by empathy, and empathy fully mediated the participation effect on helpful bystanding. No significant results were found for girls.

Twemlow, Biggs, et al. (2008) stated that the study provided preliminary support for the use of martial arts-based interventions to address bullying in schools for boys by teaching empathy, self-control, and peaceful strategies to resolve conflicts. The authors suggested that traditional martial arts-based training works because it allows students to role-play in a violent situation (getting grabbed or being punched) and decide to react nonviolently and not reciprocate the violence. The authors stated that specific skill training is more effective than didactic instruction. Practicing skills in a safe environment allows students to experience the kinds of emotions that they would face in a real-life confrontation and prepares them to react appropriately in that situation. Thus, mastery of

a student's body and development of associated self-control are critical aspects of traditional martial arts training.

### Hoi Jeon Moo Sool Internal Techniques

The Korean martial art of Hoi Jeon Moo Sool is a traditional martial art that teaches students techniques of self-defense, hand-to-hand combat, kicking techniques, weapon (i.e., *external*) techniques, and breathing and meditation (i.e., *internal*) techniques (Myung, 2012). Internal techniques help the student focus, gain self-control, and decrease their heart rate through breathing techniques and predetermined movements. External techniques focus on conditioning the hands and feet to strike as well as conditioning the body to withstand blows. External techniques include strikes, throws, and self-defense moves such as escapes from grabs and defense against punches and kicks (H. Lozano, personal communication, August 16, 2012). Although internal and external techniques may blend with each other at times, it is appropriate to consider the techniques as two different categories.

To understand how internal and external training techniques can psychologically affect the individual who is practicing them, it is useful to consider them as environmental "inputs" that impact the individual. In the next section, we describe a current model of aggression that provides a framework about how training practices can influence the learner's psychological experiences and behaviors.

### The General Aggression Model (GAM)

The GAM (Anderson & Bushman, 2002) suggests that person and situation variables can increase hostile thoughts, feelings, and/or physiological arousal, which can then affect how a person perceives a situation and impulsive or thoughtful decisions about whether to aggress. If the person responds aggressively, this behavior may then act as a provocative stimulus toward another person, which can then affect another person's behavioral reaction and recursively act as another situational input variable that again affects the original person (see Figure 1).

The present experiment tested the GAM. We hypothesized that participants who trained in external techniques would feel higher state hostility following training than those who trained in external and internal techniques. Further, participants training in only external techniques

were anticipated to assign more punitive exercises (push-ups, leg-lifts, and sit-ups) to other students than those who trained in external and internal techniques. Using the GAM as a framework, a person variable in this experiment was how aggressive they tend to feel, think, and act across situations, which we will refer to as trait aggression. Two situation variables were included in the present experiment: internal techniques (e.g., breathing deeply) and external techniques (e.g., punching and kicking) used in traditional martial arts. Learning internal techniques was expected to decrease subsequent hostility and aggression more than those who did not practice internal techniques.

## Method

### Participants

Participants were students from two martial arts studios in San Antonio, TX. Fifty-two individuals participated. A 6-year-old participant was excluded from the analysis because she provided little data, and another participant was removed from the sample who did not complete many of the questionnaires and did not provide demographic information. Of the 50 resulting total participants, 35 were boys or men and 15 were girls or women. Participants' ages ranged from 6 (one participant, to whom the questionnaires were read) to 58, with the mean age of 18.10 ( $SD = 12.63$ ). Most participants identified their ethnicity as Hispanic ( $n = 22$ ) and Mexican American ( $n = 16$ ); six participants identified as European American, and six participants did not provide an ethnicity. The number of months that our participants studied martial arts ranged from 1 month to 168 months ( $M = 37.64$ ,  $SD = 45.69$ ).

### Procedure

The Our Lady of the Lake University Institutional Review Board approved the experiment in May 2012. The first author received approval from the directors (senseis) of two dojos to conduct the experiment at their studios. Two weeks before the experiment, participant and guardian consent forms and a description of the general purpose and procedures were made available to the guardians of the dojo students. The first author invited students of each dojo to participate and explained the general purpose of the study. The students and parents were told that they could wait until the day of the experiment to sign the consent form, and we offered to answer any questions. The voluntary nature of the experiment was emphasized both

FALL 2015

PSI CHI  
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before and on the days that the experiment was conducted. All of the students (with their parents' written consent) who attended lessons on the two days of the experiment, at the two dojos, elected to participate.

After all questions were answered and consent forms were collected, participants were asked to complete the Trait Aggression Questionnaire. Participants then received their regular external training, which included punching and kicking, and a series of exercises provided by their regular instructor for about 20 min. Through random assignment, half of the participants (the external-only group;  $n = 25$ ) were moved to another room in the studio where they waited for 5 min for the experimenter. Participants in this condition then completed the State Hostility and Self-Discipline questionnaires and debriefing form. All questionnaires were presented orally to the 6-year-old participant.

The internal and external group ( $n = 25$ ) then received the internal training of deep, diaphragmatic breathing coupled with arm and leg movements. The regular instructor provided the internal training in one dojo, and the first author provided it in the other dojo. The content of the internal training provided was identical in both dojos. Participants were instructed to breathe in through their noses and allow their abdomens to extend while inhaling. They then exhaled through their mouths and contracted their stomach muscles while exhaling. After practicing this breathing, participants were shown how to move their bodies to assist the breathing techniques. Participants were led in inhaling quickly, then slowly, and breathing out forcefully (called a *kiyup*, which means *yell* in Korean). These internal techniques were explained and demonstrated two times. Then, the participants were led in performing the techniques for approximately 7 min. The internal techniques used in the present experiment were those taught to beginner students of Hoi Jeon Moo Sool. After completing the internal training for 7 min, the participants in this group completed the State Hostility and Self-Discipline questionnaires, and the debriefing form.

### Measures

A demographic questionnaire was administered that included questions for ethnicity, age, and participant sex, as well as the number of months or years that the person had engaged in martial arts training.

**Trait aggression.** Trait aggression of the

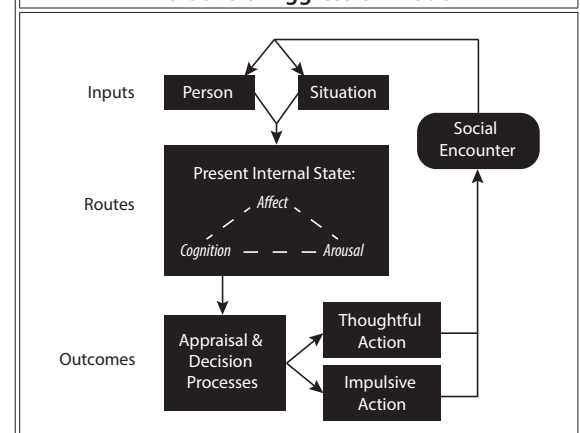
participants was measured with the 29-item Aggression Questionnaire (Buss & Perry, 1992). Participants rated the extent to which each statement was characteristic of them (1 = *uncharacteristic* to 7 = *extremely characteristic*). A sample item was "If somebody hits me, I hit back." This measure contains four subscales: Physical Aggression, Verbal Aggression, Anger, and Hostility. Two items on the scale are phrased in a nonaggressive fashion and were reverse-scored, and mean variables were calculated for the whole scale, as well as the four subscales. The scale was found to be high in internal consistency in the present sample, Cronbach's  $\alpha = .92$ , as well as for each subscale (Physical Aggression (.76), Verbal Aggression (.78), Anger (.76), and Hostility (.86).

A median split variable was created for Trait Aggression in order to test for interaction effects with type of technique on the state hostility and aggression measures. All participants who reported a trait aggression score at or above the median of 2.95 on the Buss Perry Aggression Questionnaire were labeled *high-trait aggression* ( $n = 26$ ) and all who scored below were labeled *low-trait aggression* ( $n = 24$ ) for this variable.

**State hostility.** Following martial arts training (see Procedure section), current hostile affect was measured with the 35-item State Hostility Questionnaire (Anderson, Deuser, & DeNeve, 1995). Participants rated agreement with "I feel" statements such as "I feel outraged" using a Likert scale with the anchors of (1 = *strongly disagree* to 5 = *strongly agree*). Three participants voiced confusion regarding the item "I feel vexed." Therefore,

FIGURE 1

### The General Aggression Model



Note. Figure 1 from "Human Aggression" by C. A. Anderson and B. J. Bushman, 2002, *Annual Review of Psychology*, 53, p. 34. Copyright by Annual Reviews. Reprinted with permission.



that item was removed from the analyses. Eleven items were reverse worded, and thus were reverse scored. A mean state hostility variable was created. The Cronbach's alpha for this measure was .91.

**Aggressive behavior.** We created a Self-Discipline Questionnaire that asked participants to imagine that they were the instructor of a martial arts class and that it was their job to help the student learn more self-discipline. They were then asked "how many push-ups would you have the student do?" Participants then circled a number between 1 and 50 push-ups, or wrote in the number if greater than 50. They then completed the same question for sit-ups and leg-lifts. This assignment of exercises (which can cause discomfort) was the operationalization of aggression. This is similar to measures of aggression that involved delivery of unpleasant stimuli in a laboratory context such as allocating the amount of hot sauce that a target is to ingest (White-Ajmani & Bursik, 2014).

### Design Overview

The experiment utilized a 2 x 2 between-subjects design. The experimental independent variable was the type of technique taught with the levels of (a) external-only and (b) internal and external training. A correlational personality independent variable of trait aggression (with 4 subscale measures of Physical Aggression, Verbal Aggression, Anger, and Hostility) was also measured. The trait aggression measure was a continuous variable and was dichotomized into high and low categories for two-way Analyses of Variance (ANOVAs) to test for interaction effects with technique type. The dependent variables were (a) state hostility and (b) the number of push-ups, leg-lifts, and sit-ups allocated to another student in the class (as a measure of aggression).

### Results

We conducted a frequency analysis to ensure that all data were entered correctly, and we looked for outliers using stem-and-leaf plots. No *far* outliers (Tukey, 1977) were found. Descriptive statistics for the measures were as follows: Trait Aggression ( $M = 3.30$ ;  $SD = 1.21$ ), State Hostility ( $M = 2.01$ ;  $SD = 0.64$ ), push-ups ( $M = 35.82$ ;  $SD = 18.94$ ; range 10–100), sit-ups ( $M = 41.26$ ;  $SD = 21.01$ ; range 20–100) and leg-lifts ( $M = 33.38$ ;  $SD = 16.65$ ; range 10–99).

To test how the continuous variables and subscales of the trait aggression measure were related to each other, correlational analyses were

first conducted. Then the effects of the type of martial arts technique and the Trait Aggression x Technique Type interaction were tested with two-way ANOVAs.

### Correlational Analyses

Bivariate correlations were conducted with all continuous variables including age, number of months in martial arts, mean responses on the Buss Perry Aggression Questionnaire, and its four subscales, state hostility mean ratings, and three aggression dependent variables of number of push-ups, leg-lifts, and sit-ups allocated to another student. All of the trait aggression subscales were significantly positively correlated with each other, all  $ps < .001$ . Trait aggression was significantly positively correlated with state hostility,  $r(48) = .65$ ,  $p < .001$  (see Table 1). As predicted, trait aggression, state hostility, and all trait aggression subscales were each significantly positively correlated with at least two of the aggression measures of number of push-ups, sit-ups, and leg-lifts allocated to a peer student (see Table 2). Thus, participants with more aggressive personalities and those who felt higher state hostility inflicted more discomfort through exercise in a hypothetical situation than did those with less

**TABLE 1**

**Correlations Between Trait Aggression, State Hostility, Months in Martial Arts (MA), and Push-Ups, Sit-Ups, and Leg-Lifts Allocated**

	State hostility	MA months	Push-ups	Sit-ups	Leg-lifts
Trait aggression	.65***	-.16	.44**	.49***	.33*
State hostility	—	-.25	.32*	.32*	.22
MA months	—	—	-.32*	-.15	-.44***
Push-ups	—	—	—	.55***	.74***
Sit-ups	—	—	—	—	.48***

Note. \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

**TABLE 2**

**Correlations Between Trait Aggression Subscales, State Hostility, and Push-Ups, Sit-Ups, and Leg-Lifts Allocated**

Trait aggression subscale	State hostility	Push-ups	Sit-ups	Leg-lifts
Physical aggression	.64***	.37**	.31*	.19
Verbal aggression	.49***	.22	.44**	.29*
Anger	.59***	.32*	.51***	.27
Hostility	.45***	.39**	.38**	.38**

Note. \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

FALL 2015

PSI CHI  
JOURNAL OF  
PSYCHOLOGICAL  
RESEARCH

aggressive personalities and who felt lower state hostility. All of the allocated exercise aggression measures were also significantly positively correlated with each other, all  $ps < .01$ , which suggested that they measured similar constructs.

Interestingly, the number of months that participants had taken martial arts classes was significantly negatively correlated with assignment of push-ups,  $r(43) = -.32$ ,  $p = .034$ , and leg-lifts,  $r(43) = -.44$ ,  $p = .003$ . Perhaps students who had been in martial arts classes for a longer period of time better understood the pain associated with being assigned many push-ups and leg-lifts. Age was significantly negatively correlated with state hostility,  $r(47) = -.28$ ,  $p = .048$ . Younger participants felt more hostile after the training than did older participants. Age was marginally negatively correlated with trait aggression,  $r(47) = -.24$ ,  $p = .091$ , and the number of push-ups allocated,  $r(47) = -.25$ ,  $p = .089$ . Age was not related to any other variables, all  $ps > .170$ .

### Tests of Hypotheses: ANOVAs

Four two-way ANOVAs were conducted to test the main effects and interactions of type of technique and the dichotomous trait aggression variable on the dependent variables of state hostility and allocation of push-ups, sit-ups, and leg-lifts. Consistent with the correlational findings, a significant main effect of trait aggression was found for all dependent variables except for number of leg-lifts allocated. High-trait aggression was associated with more aggression than was low-trait aggression, all  $ps < .038$ . No significant interactions were found between trait aggression and technique type. However, the means were in the hypothesized direction. Participants in the external technique condition who were high in trait aggression reported more state hostility and allocated more exercises than the other conditions. Participants low in trait aggression who were randomly assigned to the internal and external technique condition were the least aggressive in their responses. The technique type main effects are described below.

**Technique type on state hostility.** A significant main effect of technique was found on state hostility,  $F(1, 46) = 4.37$ ,  $p = .042$ ,  $\eta_p^2 = .087$ . As hypothesized, participants in the external-only condition reported more state hostility ( $M = 2.17$ ,  $SD = 0.65$ ) than did those in the internal/external condition ( $M = 1.85$ ,  $SD = 0.61$ ; see Figure 2).

**Technique type on allocated push-ups, sit-ups, and leg-lifts.** A marginally significant main effect of

condition on push-ups was found,  $F(1, 46) = 3.49$ ,  $p = .068$ ,  $\eta_p^2 = .071$ . Participants in the external-only condition allocated slightly more push-ups ( $M = 40.56$ ,  $SD = 23.36$ ) than those in the internal/external condition ( $M = 31.08$ ,  $SD = 11.81$ ; see Figure 3).

A marginally significant technique type main effect was also found for allocated sit-ups,  $F(1, 46) = 3.19$ ,  $p = .081$ ,  $\eta_p^2 = .065$ . Participants with external-only training allocated significantly more sit-ups ( $M = 46.20$ ,  $SD = 23.46$ ) than those with internal/external training ( $M = 36.32$ ,  $SD = 17.33$ ; see Figure 4). No main effect of condition on allocated leg-lifts was found,  $p = .296$ .

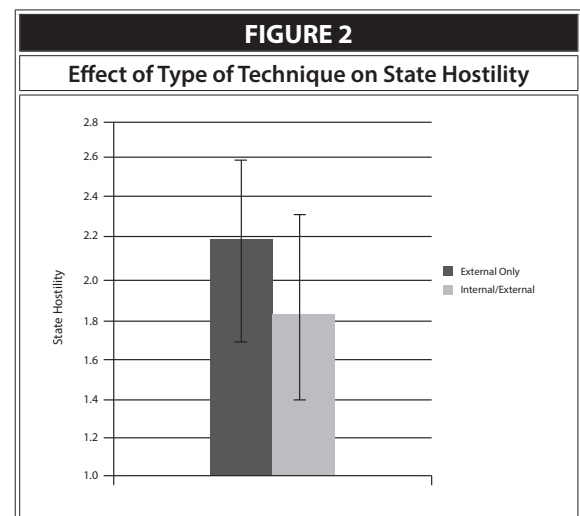
### Participant Sex and Ethnicity

No significant sex effects were found on any of the independent or dependent variables, all  $ps > .388$ . Meaningful comparisons could not be made across ethnicity because most participants self-identified as Hispanic or Mexican American (76%), and six participants (12%) did not indicate their ethnicity.

## Discussion

### Application of the GAM

As expected, participants who had more aggressive personalities were higher in trait aggression, reported more state hostility, and allocated more exercises to a peer student than did those lower in trait aggression. Consistent with the *person route* of the GAM, this finding provided further evidence that trait aggression predicts state hostility. It also extended the literature in demonstrating that trait aggression predicts *justified* aggression as measured by punitive exercise allocated to another person in order to build the target's self-discipline.



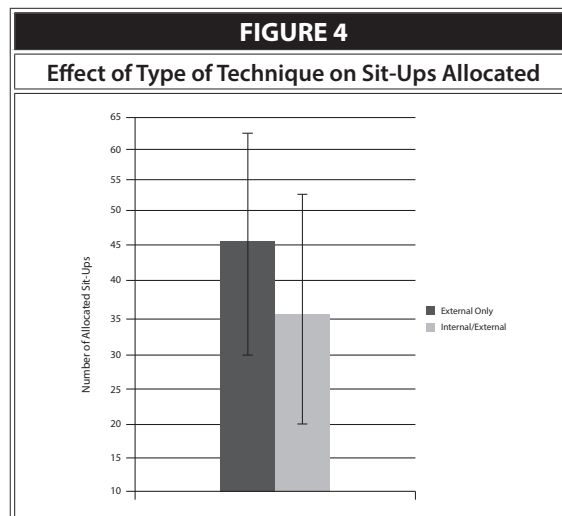
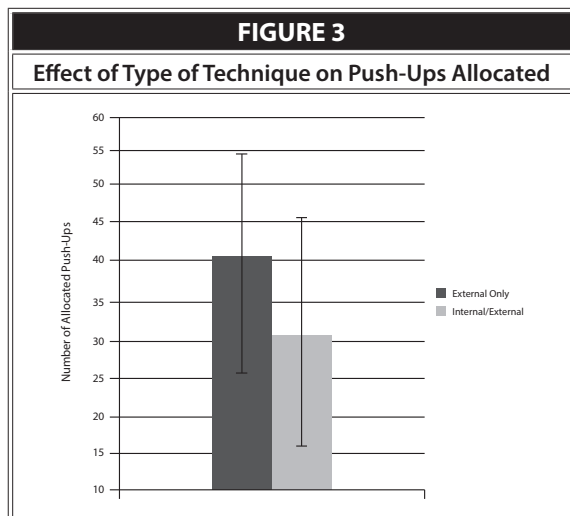
As hypothesized, participants who received internal training reported feeling slightly less hostile and allocated slightly fewer push-ups and sit-ups to another student after receiving the internal training than did participants who only received external training. This implied that martial arts training that includes internal breathing techniques may ameliorate the external training effects on aggressive motivation and behavior. Internal training may reduce actual and perceived physiological arousal and negative affect. According to the GAM, reducing physiological arousal and state hostility may increase the likelihood that a person will interpret an ambiguous action of another person as nonthreatening as opposed to someone who has not practiced internal techniques. Learning internal techniques may enable a person to make more thoughtful decisions when provoked because they may respond in a more relaxed and controlled fashion rather than in a fight or flight response to a potential threat. Consistent with Twemlow, Biggs, et al. (2008), integrating internal martial arts training into school physical education programs may therefore reduce bullying and overall aggression in students.

### Limitations and Suggestions for Future Research

An important limitation that could be rectified in future research pertained to a procedural difference in the administration of the conditions. Participants exposed to both the external and the internal training experienced two training types and had two more minutes after the training before completing the dependent variables than did those who experienced the external-only training. It is possible that the slight time difference prior

to completion of the dependent variables from the external training could have confounded the effects of the manipulation. Future experimental research could include a factorial design that tests the effects of internal and external training experienced separately and sequentially, compared to neither training type, on aggressive motivation and behavior. It would be important to ensure that the time between the training and when the dependent variables are administered is consistent. Physiological arousal following physical exertion associated with each training type should be strongly considered related to the timing of the subsequent completion of aggression measures. Arousal, particularly when a person is not aware of the arousal, has been associated with increased aggression (Zillmann & Bryant, 1974).

Our measurements were not based on real-world behavior but rather on self-reported behavioral intention measures that assessed what the participant would do as the dojo instructor. Another limitation was the small sample size, which might have reduced the likelihood of detecting interactions due to low statistical power. Furthermore, most of our participants were Hispanic, which makes the results difficult to generalize to members of other ethnic groups. Also, the specific internal breathing techniques used in the experiment were developed in the Hoi Jeon Moo Sool tradition so using techniques from other martial arts approaches may yield different results. The measures used were normed for college-aged students, thus the 6-year-old participant had a difficult time understanding the vocabulary and needed explanations of some words. Finally, participants from one dojo were less familiar with leg-lifts than



FALL 2015

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RESEARCH

those from the other dojo.

Future research could test responses in real-world martial arts situations such as by having students spar after the external and internal/external training to score the number of aggressive acts they perform on another person. Alternatively, it would be helpful to observe how people trained in internal techniques react to a realistic aggressive act or stressful situation such as a possible provocation while waiting in line in the heat. More long-term studies of self-control (or aggressive) behavior in aggressive situations following frequent internal versus external-only martial arts training would be interesting. Internal training may decrease trait aggression and other hostile cognitive propensities such as the hostile attribution bias over time.

In conclusion, parents who seek martial arts training in order to develop enhanced self-control in their children are encouraged to enroll them in traditional martial arts programs. Most of these programs emphasize personal mastery through coordinated breathing and movement as well as ethical decision making before inflicting harm on another person. In contrast, many modern martial arts programs foster aggressive striking competition in which the winner "takes the other person out."

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