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Psychological Testing and Assessment of the Martial Arts

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Abstract

This paper seeks to explore the problems inherent in the psychological research of martial arts. Some background is presented along with problems that are both general in nature and specific to the martial arts. Research questions are provided as examples to illustrate potential issues in psychological assessment of martial arts.

Psychological Testing and Assessment of the Martial Arts

In an earlier paper (Price, 2002) I argued that theoretical research could profit from researching the martial arts. In that paper, I presented a number of interesting problems that would profit from investigating theoretical notions from the perspective of one or more aspects of the martial arts. In this paper I wish to explore some of the problems that would be associated with a program of theoretical research based on martial arts.

It is certainly appropriate to study the martial arts from a psychological viewpoint. Martial arts are only recently – in the last 25 years or so – becoming acceptable in the west as a nonviolent tradition. Even so, there are detractors within the scientific community. Shaler (as cited by Weiser and Kutz (1995)), for instance, posits that the martial arts are “... naught but [a] killing present, anger past, and misery to come in the course of one who studies these arts.” Weiser and Kutz (1995) have disputed this claim quite effectively in their paper that details the similarities between martial arts and psychotherapy, and the interested reader would undoubtedly find this article of value.

The main problem with studying martial arts, whether psychologically or historically, is the scope of the topic. “Martial Arts” is a vague notion and ranges from traditional western sports such as fencing and shooting to traditional and exotic Asian martial arts such as Chinese Chuan Fa (often called Kung Fu) and Japanese Jujutsu. At first it may appear that dividing the subject into topics that are both manageable and meaningful would be difficult, however many martial arts practitioners will note the number of general similarities between the arts. Indeed, finding a more scientific means of categorizing the arts may prove to be a useful endeavor in itself, and this endeavor could benefit from testing.

Nevertheless, it must be accepted that all testing of martial arts must be in some context. Three general contexts that are available are researching a specific martial art or related set of martial arts (i.e. all Okinawa derived Karate), researching a specific aspect of a martial art, or researching martial arts in general. Further, the style and origin of the martial art practiced by the individual becomes important for meaningful results. For instance, Weiser and Kutz (1995) posit that aggression management is a benefit of martial arts – which is true for most martial arts. However there are several arts where aggression is encouraged, so this statement would not necessarily be true for all of them.

In Price (2002) I claim that “it is my intention to add ‘theoretical research’ to this ever-expanding list of non-combat uses for the martial arts, specifically research into the cognitive aspects of martial arts” and I note six specific areas of research in cognitive psychology - pattern matching, problem solving, prototype creation, perception, consciousness, and creativity – and later mention another (general intelligence). While having areas to research is a good thing, one must be able to properly test and/or assess the results of the study for it to have any meaning. The reader should note that I do not intend to limit potential research to cognitive areas – quite the opposite in fact. Cognitive psychology does pose one advantage, however, in that it is abstract enough for me to present a case for the value of martial arts research. Please be aware that there are numerous research areas in psychology that I do not cover, and that these areas of research would undoubtedly encounter similar problems.

Specific aspects of martial arts may be the easiest to generate tests for. Cai (2000), for instance, did a study on the effects of the meditative properties of martial arts. In his study, he compared students of Tai Chi, those who took self-defense and added a guided imagery component, and those who only took self-defense (the control group). He discovered specific

similarities in the two non-control groups (lower anxiety and depression). This context of research, then, may be the best place to begin if one can determine a number of appropriate martial arts properties to study.

The questions of generalizability and reliability take on a new context with martial arts. While there are some studies where generalizability is not impacted in a significant fashion, there are others where standard norms become an issue. The standard tests of intelligence are generally normed across a sample that is representative of the population of a given country (c.f. Cohen & Swerdlik, 2002, p. 261). This may be fine if the population of the martial art(s) that the individual is studying is similar in composition to the country in which one is studying, however it may not apply to an art with a significantly different population makeup. Also, one must be aware of the importance of cross-cultural and multi-cultural norms in studying martial arts. Many arts are taught in either the same or a sufficiently similar manner from one nation to another to be called the same art. Appropriate standardizations must be available if the art(s) is to be studied with any reassurance of validity and reliability (c.f. Cohen & Swerdlik, 2002, pp. 179 – 186).

As an example, let's take Japanese Jujutsu. As one may imagine, it is fairly popular in Japan and it also has a fair following in the United States, however these cultures, however, are significantly different. Applying the norms for one of the cultures (say, only applying the norms of Japan) to a given study without taking into account the relevant language(s) and culture(s) of the sample population of Jujutsu practitioners would give biased results. For a test of General Intelligence among practitioners of Jujutsu to be valid, the population norms must be carefully examined. What are the effects of multi-culturalism among those who are not multi-lingual? What are the effects of the multi-lingual? How does the population of multi-cultural and multi-lingual individuals compare to the standardization sample? How does the education level of

martial artists compare to the standard sample? What are the cultural and racial percentages and how do they compare to the standard sample? If there are multiple languages involved, do the tests in different languages correlate well to each other?

This by no means exhausts the evaluation process of standardized tests for our martial arts population, however once we can be assured that the standard tests of intelligence will accurately compare our martial arts sample with a standard sample, the standard tests can be quite useful in exploring aspects of martial arts. “Solso (2001, p. 469) indicates that human intelligence includes at least the following abilities: to classify patterns, to reason deductively, to modify behavior adaptively, to reason deductively, to reason inductively - to generalize, to develop and use conceptual models, to understand” (Price, 2002). Each of these sub-abilities is used in martial arts training, often in a unique fashion. Forms (“kata” in Japanese) train the martial artist to recognize patterns in combat, free response drills teach the ability to modify behavior adaptively, and so forth. This note can be generalized to other standard tests as well. If one wanted to test specific areas of psychotherapy (for instance, if one hypothesized that martial arts was particularly effective or ineffective in treating post traumatic stress disorder), the researcher(s) would be able to use a standard test if and only if the norms were validated for the population.

The first of the interesting areas of research that I mention (Price, 2002) is pattern matching. “The martial arts offer us a unique perspective to the pattern-matching problem” (Price, 2002). It is common for Asian martial arts to teach the art using choreographed forms. The practitioner is taught the specific situation and movements of the form, and they practice it until the instructor believes the student has sufficiently mastered the form. A test may be associated with the form as well, and often the student is required to pick one form out of several

candidates. Depending on the art, the student may also do free form (non-choreographed) training in addition to set forms. In all three of these cases, the student is required to keep track of a bewildering array of information – the position of the body, the “attitude” (or apparent attitude) of their partner, the position of limbs and torso, and so on.

This may give us an interesting window into the pattern matching process if a proper test can be formulated. One possible test involves eye tracking. The technology can be developed without too much difficulty that would allow the researcher to track the movements of the subject’s eyes, their position and movements, and the partner’s position and movements. These could then be correlated to the subject’s experience, and used in analyzing the pattern matching processes. Does a more experienced practitioner fixate more steadily than a less experienced practitioner? If so, what can this tell us about their pattern matching process? In this case, the test would be simpler than the assessment. Norming could easily be done by experience level of the practitioner, with comparisons between levels giving us an insight into the cognitive processes.

Another possible test would be visual pattern matching. One could make a sequence of pictures of individuals (and groups) in various poses that are supposed to exemplify various attitudes. This would then need to be normed appropriately, taking the population of martial artists to be studied into account so a valid comparison could be made. The question could then be asked: “does an individual with (specific) martial arts training do better at recognizing attitudes than one who is not trained?”

Problem solving is the next area of research that I would like to consider. In my previous paper I posited that:

Martial artists typically have a number of responses to choose from as well, including striking, grappling, and exotic moves. The question of what goes

into a successful problem response under these conditions is interesting, as is the nature of the solution and the conditions that it was derived under. Typically, there is a very small window of time, and the solution must be determined and executed within that window. Also it is generally expected that the solution is will be arrived at while in a Mushin (“chatterless”) state. In typical problem solving examples (c.f. Solso, 2001, ch. 15) the verbal thoughts are important to the solution. How is the problem solving process different when verbal thoughts are limited or disallowed completely? (Price, 2002).

The concept of “Mushin” requires a little explanation if one is to understand the testing requirements. “Mushin” is a Japanese word that is often translated as “no thought”, though “no verbal thought” or “chatterless” may be a better translation. Under a Mushin state, self-talk (“chatter”) is reduced or eliminated so as to create a more efficient and effective response. Simply put, by the time one can think “a punch is coming, what shall I do?” the strike has already landed.

I should note that one does not require movement to enter the Mushin state. Zen meditation, for instance, provides exercises that are designed to train the practitioner to enter this state. For our purposes, the testing question is two fold: how do we determine that the individual being tested is in Mushin, and what effect does this state have on problem solving. Since Mushin can be created without movement, tests can be created and validated on non-moving subjects.

For instance, if one hypothesizes that the brain wave pattern of a person in Mushin is different compared to an individual who is not, one can test this hypothesis relatively easily. If the test is successful, it can then be verified on moving subjects (one must confirm the

generalization of the method, as well as the accuracy of any equipment with moving subjects) in a non-problem solving environment, such as during Tai Chi (a martial art well known for its moving meditations that emphasizes a “chatterless” state). If this test is successful, one can test the more stressful “combat” conditions, first validating the assumption that the non-stressful conditions generalize to the stressed conditions. If that test is successful, one can then use the now verified assumption about brainwave patterns to correlate brainwave patterns and effectiveness of response.

This example illustrates one of the major difficulties regarding researching the psychological aspects of the martial arts. In many cases, new techniques must be created to test our hypotheses. These new techniques will need to be validated progressively to ensure that the results of the study are, in actuality, valid and not artifacts of the methodology employed.

Prototype formation is an interesting problem in and of itself. Solso (2001, p. 132) defines a prototype as “an abstraction of a set of stimuli that embodies many similar forms of the same pattern.” There are certainly a wide variety of stimuli in similar forms, and kata are often described as patterns. Some standard tests, such as canonic perspectives, are relatively straightforward. Solso (2001, pp. 118 – 121) notes several pictorial studies that could be modified for martial arts. One such test could be taking pictures of forms or postures from various angles and testing the amount of time it takes to recognize the form.

Other questions are not so straightforward, however. One hypothesis that could be studied is that “the prototyping structures within the body-mind are available for other functions as well – such as problem solving” (Price, 2002). One would have to carefully consider the testing parameters for this study, likely verifying the procedure at numerous levels. One test might be to test reaction times for various combat scenarios. The question of whether to prime or

not prime a small number of kata would have to be addressed, and the methodology of timing would also need to be addressed (a high speed video camera, for example). Furthermore, the assumption that a given reaction constitutes a non-visual prototype (prototypical movement, for example) would have to be examined in theoretical detail before an experiment could begin. This type of study would be quite valuable, but it would also be time consuming.

One of my favorite topics in martial arts training is that of perception. I have been told that my martial studies have enhanced my sensory perceptions – that is, that I have become more aware of or attuned to sensory events that I was not attuned to prior to the training – but this would be, at best, a case study and as such represent one data point. When one asks the question does “martial arts training improves the recognition of sensory signals in a meaningful way. That is, does training in martial arts allow one to more easily integrate the several sensory perceptions for more of a ‘total picture’?” (Price, 2002), the type of testing required becomes murkier. Standardized physical tests, such as the standard hearing test, provide one data point, but they may not be useful. Standardized physical sensory tests concentrate on a single sense in a non-stressful environment, and generally do not consider integration of the sensory data. Obtaining meaningful norms for the data would also be an issue.

Consideration for these types of tests must be thorough from the theoretical angle and the validity and generalization angle as well. How does one approach testing the population on sensory integration? How does one validate the test on a general population? How does one validate the test on the martial arts population? Would brainwave analysis give us anything useful? How does one limit testing artifacts? If one were to create a video based test, for example, and test the person’s memory of sensory events later this would likely test long term memory and memory malleability more than the actual perception (see Solso, 2001).

There are also concepts and tests in perception that would have a strong impact on our understanding of psychology. In the Bujinkan martial arts organization, there is a well-known test for fifth degree black belt (the “godan test”, required for all full instructors). The subject sits in front of the grandmaster with his or her back to him. The grandmaster has a training sword made of split bamboo, and at a random point in time he strikes at the candidate with full force. The successful candidate will get out of the way with timing that demonstrates that he or she perceived the intended blow at some level rather than demonstrating paranoia. In other words, if you don’t get hit, you pass.

This test has been successfully passed over a thousand times, and administered more times than that. And “while there is much public debate (within the organization at any rate) as to the ‘how’, no definitive answer has been proffered. How this occurs is an interesting question that involves perception. Assuming that one discounts mystical explanations, one is left with only some sort of ‘subliminal perception’” (Price, 2002). This question deserves to be answered, and may hold keys to understanding cognitive processes as well as interactions between processes, however developing a test is not a trivial matter. The test clearly involves perception and problem solving at a non-conscious level, and this would be intriguing to study. The question of how to study this phenomenon is a complex one that would require a lot of theorizing as well as test creation and validation.

“Consciousness is another potential ... area of research within the martial arts. ... Solso (2001, p. 144) defines consciousness as ‘the awareness of environmental and cognitive events such as the sights and sounds of the world as well as one’s memories, thoughts, feelings, and bodily sensations’” (Price, 2002). The tests of Mushin noted above cross over into tests of consciousness, as do the tests of perception. Awareness of cognitive events, thoughts, feelings,

and memories are interesting in and of themselves. How does this awareness change in a Mushin state? Does our current research assume a state where self-talk is active? Self-reporting could be useful here, however these self-reports would contain the same difficulties as noted in Cohen and Swerdlik (2002).

The study of creativity is somewhat problematic in general, but at least there are standardized tests available for this area (Cohen & Swerdlik, 2002, pp. 285 - 86). These tests are generally written tests, so the question of generalizability becomes an important one here as well. Does a test of intellectual creativity measure physical creativity? Does training in the martial arts enhance general creativity, physical creativity, or both? These questions (and more) must be answered before any serious research into creativity enhancement through martial arts training can occur.

It would also be appropriate to address how martial arts could benefit from psychological testing. Weiser and Kutz indicate that martial arts training would not benefit everyone, and in fact is contraindicated in some cases. What kinds of personality assessment would be appropriate for a conscientious martial arts instructor to administrate potential students, and what kind of training would he or she require to administer the test? How can the instructor realistically screen out individuals who may harm themselves or others with the training? This, too, is a psychological testing issue in the martial arts. The test would have to be reliable, valid, and easy to administer and score by a trained layman.

This paper covered an overview of testing issues in the martial arts. Generalization, reliability, validation, the need for theoretical soundness, and the need to research and validate new testing methodologies were discussed with supporting examples. This paper did not cover all possible research angles, nor does it claim to be complete. Some interesting research

problems that create unique testing problems for the researcher were discussed, and one may presume that other situations not considered exist. It does, however, give an overview of the requirements for psychological testing and assessment of the martial arts.

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