



Jujutsu And Its Contributions To Brain Stimulation And Psychomotor Development In The Martial Arts

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Brief Summary

It is posited in this paper that a specialized form of jujutsu training (known as the JBSR¹ Method) helps enhance psychomotor efficiency by stimulating and retraining the brain, and by contributing to a superior quality of movement (among other outcomes).

¹Jujutsu Brain Stimulation and Reprogramming Method (JBSR)

This approach to retraining the brain to work more efficiently:

- (i) Stimulates the growth and enhancement of more Neural Pathways connecting the various Neural Centers in the brain, and:**
- (ii) Stimulates and revives Neural Centers (for our purposes you may view these as processors) which are responsible for controlling/influencing cognition, motor activity and decision-making/action.**

Together, Neural Pathways and Neural Centers make up the brain's Neural Network System. Efficient and more vibrant Neural Network Systems help improve the ability to perceive and process information quickly and efficiently, enhance various cognitive abilities and improve the quality and efficiency of psychomotor activity, a key factor in the martial arts.

The sum total of the effects that are achieved with such a specialized form of jujutsu training may be summarized thus:

Students experience enhanced cognitive and psychomotor abilities that are characterized by increased quality of movement; experience an increased ability to quickly perceive activity in combat situations and respond effectively, with superior timing, fluency, control and speed.

These benefits are accomplished by stimulating the brain and the body to work together more efficiently, by employing training activities that demand higher levels of psychomotor coordination, timing and response. The JBSR Method targets, stimulates, and challenges three key processors (or "chips"), in the brain.

These are:

- 1. The Cognition Processor (thinking and perceiving processor)**
- 2. The Motor Processor (control of physical movements), and,**
- 3. The Command Processor (executive processor responsible for decision-making and fast action).**

The JBSR Method contributes to neurogenesis, the stimulation and growth of neural pathways in the brain, including the three processors referred to above. While many activities (e.g., dance, chess, tennis, etc.) contribute to

brain neurogenesis, the demands and challenges of the JBSR Method help enhance psychomotor efficiency by engaging and stimulating growth in **all three key "processors" and their connecting neural pathways, simultaneously.**

Key Principles of the JBSR Method of Training

The JBSR method of training challenges participants to think and *simultaneously* problem solve by engaging, on the fly, all three processors referred to above while engaging in physical activity. Some activities such as chess only challenge the Cognition and Command processors but fail to engage the body in physical activity. Further, working out on a stationary bike, unlike chess, engages the motor processor but does little for the Command and Cognition processors.

The point is that the "best" activities that contribute to the growth and development of all three processors involve the **simultaneous engagement of all three processors in physical activities that require problem solving (e.g., thinking fast on the fly).**

While many physical activities stimulate simultaneous growth in all three processors, their benefits tend to be random, or haphazard, unless the instructor or coach employs theoretically driven training regimens (knowledge based). Some examples of activities that have the potential to stimulate growth in all three processors include:

1. Tennis
2. Basketball
3. Soccer
4. Rugby
5. Most martial arts
6. Martial Sports (e.g., wrestling, judo, BJJ)
7. Table Tennis, etc.

What these have in common is the ***simultaneous engagement of the body with all three processors in the brain.*** That is, they demand that a participant move and think (problem solve) at the same time, on the fly. The more a participant is challenged to engage all three processors and the body, the greater the benefits.

A major advantage of the JBSR Method of training in Wa Shin Ryu Jujutsu (unlike most other physical activities) is the fact that we **employ theoretically-guided training regimens in a systematic and deliberate way, in order to challenge and develop the brain and the body to work together simultaneously, in problem solving contexts.**

THE PRINCIPLES OF THE JBSR METHOD

This method of training employs activities and training regimens that include:

- 1. Tasks that stimulate psychomotor integration in which both the brain and the body are challenged to work together in solving complex psychomotor tasks (problem solving on the fly).**
- 2. Innovation and discovery on the move (we ask students to begin with a particular technique and then transition, on the move, to several other techniques of their choosing). In this process, we encourage them to innovate, experiment and discover. This process of training challenges both the brain and the body to function in complex ways, on the move.**
- 3. Tasks that demand fluency, continuity and smooth transitioning from one technique to another (e.g., standing finger and wrist locking sequences) that continue across different contexts of fighting (e.g., Distance, Close Quarter and Ground).**
- 4. Tasks that require, and help bring together, superior forms of coordination, timing and control (e.g., moving from Shiho Nage or Irimi Nage to a ground sequences of techniques). These change the context of training and encourages students to think in non-linear ways.**
- 5. Employing Bi-Lateral Forms of Training: Tasks that challenge and integrate both hemispheres of the brain (these involve training regimens that require the use of both sides of the body in various complex ways. These open up more neural pathways and stimulate the formation of new and more vibrant Neural Systems.**

Bi-Lateral forms of training can be broken down into the following five sub-categories:

(i) Bilateral-Symmetrical involves using both sides of body in a coordinated fashion

For example, activities that involve the use of both arms or legs performing the same pattern, while moving in the same direction. A double frontal strike with both fists is an example of bi-lateral symmetrical training.

(ii) **Cross-Lateral**: Bi-lateral alternating movement patterns where the limbs on each side of the body perform a coordinated movement together, as in walking, in which the left arm and the right leg (and of course the same action is repeated on the other side) move together.

One example of this type of exercise involves getting down on all fours and simultaneously extending the right arm forward and the left leg back. An example of this in jujutsu involves alternating left and right hand punches in which one strikes with the right fist and, at the same time, draws back and chambers the left fist.

(iii) **Contra-Lateral**: This type of movement involves crossing the midline of the body with the arms or legs, as in touching your right knee with your left elbow or your left knee with your right elbow (or hand). Tiger Walks the Elephant, an exercise that we practice in Wa Shin Ryu Jujutsu, is particularly effective in improving contra-lateral movement.

Contra-lateral movements are extremely important because they challenge both hemispheres of the brain (more so than bilateral symmetrical and cross-lateral) to work together in a coordinated fashion.

(iv) **Bi-Lateral Independent**: Movement that involves, for example, patting your head with one hand and rubbing your stomach with the other. In jujutsu, for example, a parry with one arm and a kick or punch with the other is an example of bi-lateral independent form of training.

(v) **Pattern Deviation**: Establishing a pattern and then unexpectedly changing it (a type of improvisation on the fly). For example one attack combination that I teach involves feigning a punch to the face and then following up with a kick to the groin. Improvisation occurs when we deviate from the established learned pattern **on the fly**, and switch from a kick to the groin (the already learned pattern) to, for example, a strike to the stomach with the fist. This may happen when the jujutsuka is presented with a better opportunity, and is able to quickly deviate from the established learned pattern of striking high and then kicking low.

- 6. Tasks that help develop fast reactions to complex attack situations, on the move. (e.g., Tori attacks Uke on both the left and the right side with Jodan, Chudan and Gedan techniques). To be able to respond quickly in the martial arts is essential, especially in life threatening situations. For this to occur all three processors must be able to work together, very quickly, in a harmonious and integrated fashion.**
- 7. Tasks that require the application of multiple principles in different Contexts of Fighting (e.g., sequences of techniques that link Distance, Close Quarter and Ground forms of fighting).**
- 8. Challenging tasks that are intrinsically motivating (such activities tend to grab a student's attention to the full and their successful resolution is intrinsically satisfying). This helps void boredom and encourages students to persevere.**
- 9. Rich training environments are more motivating, challenging and productive in terms of stimulating and reprogramming the brain (and in achieving superior neurogenesis), than poor ones. Such environments incorporate many, if not most of the principles alluded to in items 1-8, above.**

In summary, what the reader should take away from this paper is, that for maximum benefit, the training regimen one employs must be deliberate, systematic, focused, challenging and theoretically grounded. That is, it must be grounded in a knowledge base. Sports and other martial arts that challenge all three processors (e.g., judo, tennis, basketball, etc.) do so randomly, or in a haphazard way, unless the instructor understand the theory behind the process of brain stimulation and the development of superior quality of movement, and builds it into his/her students' training. In Wa Shin Ryu we have a system that guides how we train, that is based on sound theoretical principles.

THE BENEFITS OF THE JBSR METHOD

When a training program is structured based on the principles of the JBSR Method, the results that we achieve are not random or haphazard, but planned for. We know what our training regimens are doing, and how they

affect the brain and the body. Training using the JBSR Method contributes to:

- 1. The development of superior levels of coordination, timing, fluency and control result in a superior quality of movement, an essential component in the martial arts.**
- 2. The JBSR Method helps enhance levels of decision-making (Kime) and response times, especially under pressure.**
- 3. The JBSR Method contributes to neurogenesis, the stimulation and building of neural pathways in the brain among the Command Processor, the Cognition Processor and the Motor Processor. This form of training enhances how the brain communicates with the body.**
- 4. JBSR training is a more effective method of arresting, or slowing down the aging process by enhancing key brain functions and neural connections within the body. It is well known that aging is primarily a function of cell degeneration/regeneration (external factors also contribute to aging such as drugs, poor diet, smoking, stress, and lack of sleep, among others). And, as we get older the process of cell renewal tends to begin to slow down, resulting in what we call aging (genetic factors notwithstanding).**

However, it is suggested that the process of cell degeneration may be arrested, or slowed down, by stimulating and enhancing the brain's Neural Network System (those centers in the brain, and neural connections and delivery systems), so that brain continues to function more efficiently well into our advanced years. That is, by having a healthier and more efficient brain it may be possible to enhance the cell renewal process and keep us looking, and feeling younger, considerably longer than what is considered "normal".

- 5. By enriching neural pathways in the brain, and enhancing synaptic activity, the process mitigates against memory loss as one gets older.**

- 6. An enriched and efficiently functioning brain keeps one sharp and helps enhance the learning process, both cognitively and physically, an essential factor for the martial arts.**
- 7. The bilateral forms of training inherent in the JBSR System stimulate neurogenesis and connectivity between both hemispheres of the brain, and help the individual to use more of his/her brain capacity. This process helps make the brain a more efficient and powerful tool which may be used in more spheres of life, not just in the martial arts.**
- 8. A more efficient psychomotor system, coupled with jujutsu combat skills, contributes to superior forms of empowerment and confidence.**
- 9. By arresting, or significantly slowing down the aging process, the JBSR Method enables jujutsuka to continue to remain active into their later years, and enjoy more of the benefits of a healthy lifestyle.**
- 10. In addition to developing increased levels of coordination, timing, reaction time, fluency and control, the JBSR Method contributes to cardiovascular efficiency, strength and flexibility, all of which are essential components of good health, and a major requirement in the martial arts.**
- 11. By stimulating the brain to function more efficiently, and at a higher level, the JBSR Method also helps alleviate moderate and mild forms of depression and anxiety, helps lower blood pressure and contributes to more efficient blood circulation.**
- 12. Superior quality of movement is a function of efficient and powerful brain activity; one in which the body, and the three processors alluded to earlier, are challenged to work together simultaneously in order to solve complex decision-making problems and overcome obstacles. In the martial arts, as is the case with most strategy-demanding sports (e.g., tennis, basketball, soccer, etc.), solving problems on the fly (e.g., feigning a move to the left and then moving to the right to get past an opponent) requires that the brain and the body work together quickly and efficiently; that is, the athlete must think fast on the fly. And it is**

this method of stimulating the brain and the body to work together that contributes to neurogenesis and mind-body harmony. And, mind-body harmony is an essential precondition for developing a superior quality of movement in the martial arts.

Finally, it should be noted that physical activities that fail to promote problem solving on the fly (for example, training on a stationary bike, and other activities of a mostly mindless, repetitive nature), also fail to stimulate brain activity, and neurogenesis, and do not contribute to a superior quality of movement. Conversely, activities that only challenge the brain (e.g., chess), while they contribute to neurogenesis and superior cognitive activity, fail to engage the motor processor and the body, and thus fail to contribute to mind-body integration and superior quality of movement.

Thus, to achieve superior quality of movement and the total range of benefits I've discussed in this paper, our training must engage both the brain and the body simultaneously, in problem-solving training environments (e.g., sparring with a partner or engaging in bi-lateral contra-lateral and cross-lateral forms of training, among others).

Some Applications for Martial Arts Instructors

The JBSR Method helps explain why we train the way we do. It helps us better understand that desirable specific outcomes in the dojo must be planned for in ways that tie together methods of training with desired outcomes. If the principles outlined in this paper are ignored when developing lesson plans, then the outcomes of training may well be random and haphazard. Using such a haphazard approach makes it difficult for an instructor to accurately assess and evaluate what he/she taught in class to achieve the observed results in the students.

By employing the principles of the JBSR Method, and using them to help instructors develop their lesson plans, we are better able to determine (and predict) how our training regimens impact our students. This approach also helps us establish clearer connections between what we teach, and the areas our students respond to best. That is, we **develop deeper understandings among the principles we employ in our teaching and how these affect our students.**

NOTE: The development of this paper is based on the available research literature that speaks to exercise and neurogenesis. Additional insights and understandings derive from the author's over fifty years experience as an active participant and teacher in judo and jujutsu

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I wish to acknowledge the contributions of Linda Yiannakis, MS, CCC-SLP, on the topic of bi-lateral training.

CAUTIONARY NOTE

Excessive emphasis on skills and techniques that stimulate the brain to function at peak levels for prolonged periods can "super-energize", and hype up students. Such high levels of excitation may last for several hours after a workout is over and may interfere with sleep, and other functions. Instructors should, therefore, employ cooling off exercises at the end of class in order to bring students back down to a more normal functioning level.