

Exploring the Therapeutic Value of Martial Arts for Neurodevelopmental Disabilities

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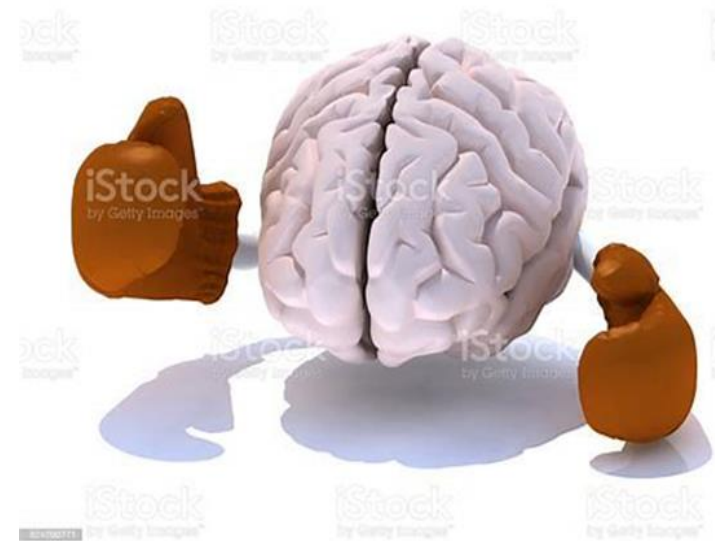
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Bottom Line Up Front

- **Executive function (EF) appears to be key in the relationship between martial arts and improvement in those with neurodevelopmental disabilities (NDs)/Autism Spectrum Disorder (ASD)**
- **EF deficits in those with NDs are near identical to areas of EF improvement in exercise studies**
- **Physical activity of therapeutic value for those with NDs/ASD, via effects on EF, is likely activity featuring sequential patterns/ordered movements.**

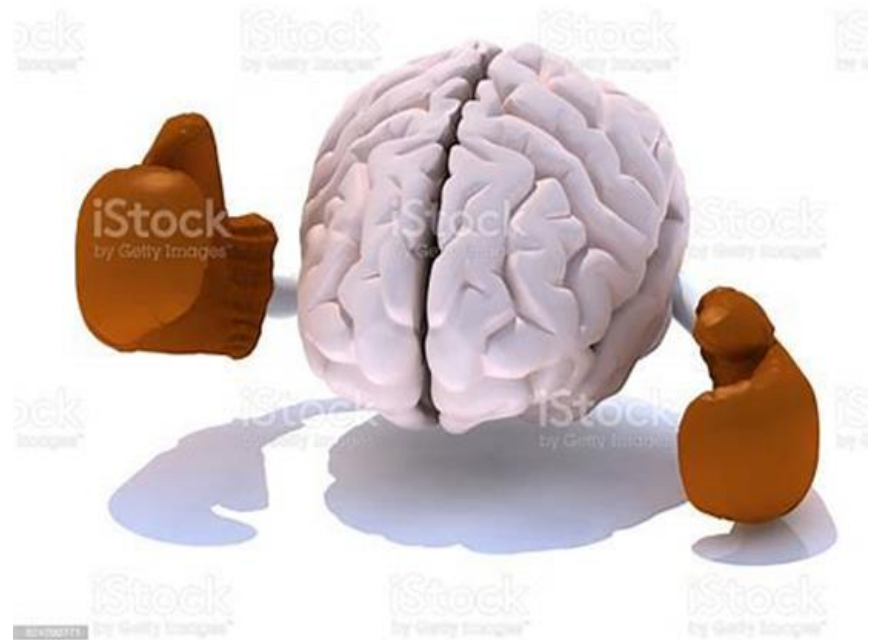
Martial Arts and Functional Health

- **Martial Arts can be helpful for those with disabilities**
 - **Rehabilitative effects**
 - **Adaptive outcomes**
- **Working w/Adaptive Martial Arts Association & Kentucky Inclusive Health Collaborative to develop national guidance**



Martial Arts and Functional Health

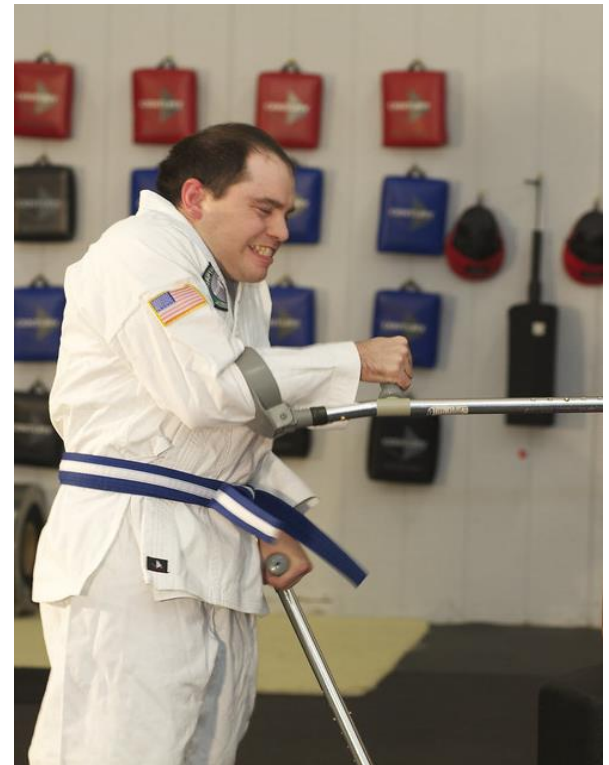
- Exercise improves aspects of mental processes:
 - Anxiety, Depression, & Mood
 - Think/Feel/Do
- VIA dopamine, serotonin, & noradrenaline pathways



Martial Arts Impacts

Psychological Function

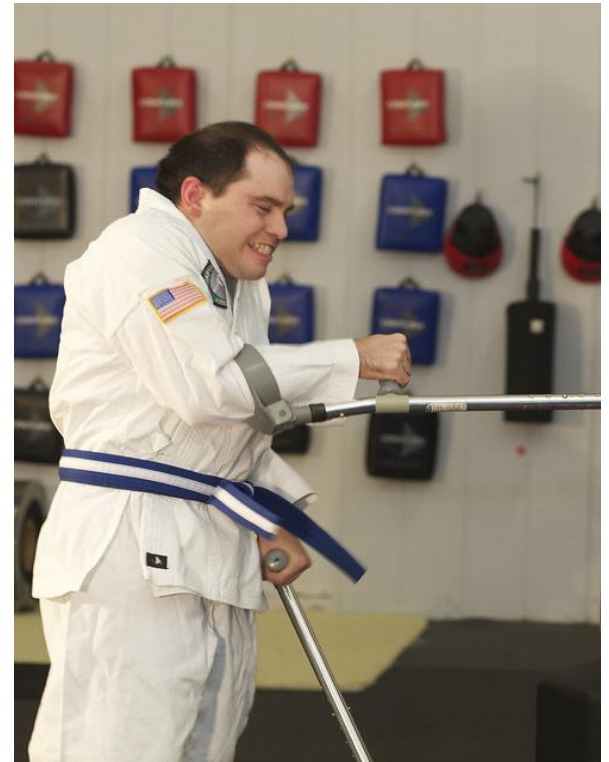
- Parents/teachers/trainers/scholars note those practicing martial arts improve beyond physical fitness:
 - Anxiety/depression/mood
 - Social/behavioral/adaptive
 - Self-control
 - Impulsivity/hyperactivity



Martial Arts Impacts

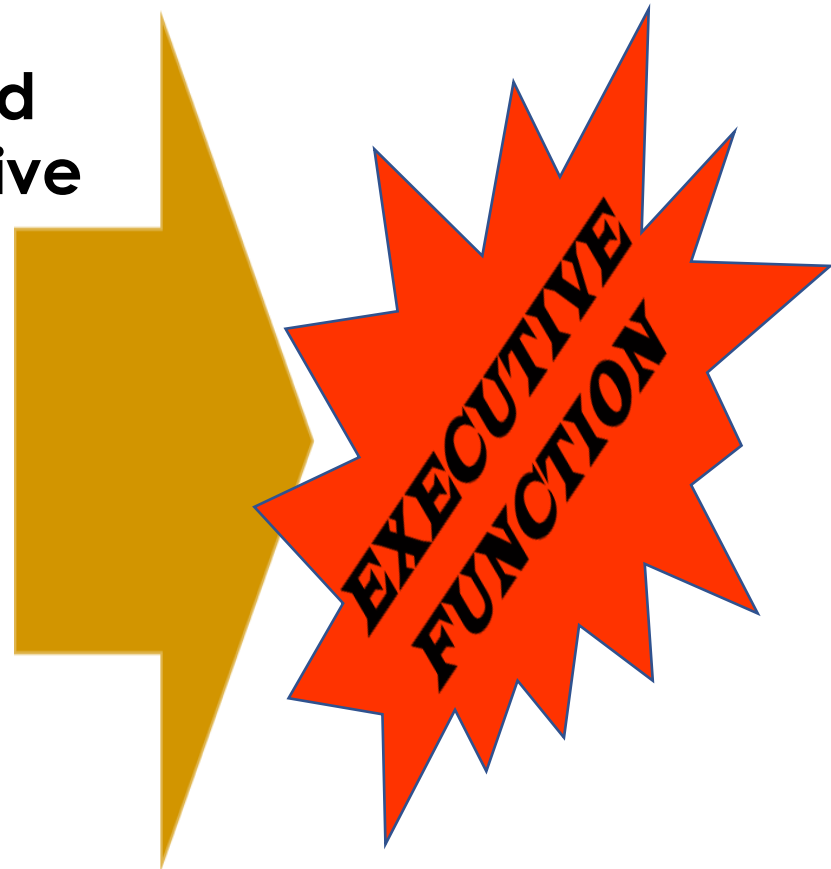
Psychological Function

- Parents/teachers/trainers/scholars note those practicing martial arts improve beyond physical fitness:
 - Communication
 - Focus
 - Self-esteem
 - Academic performance
 - Attention



Martial Arts Impacts Psychological Function

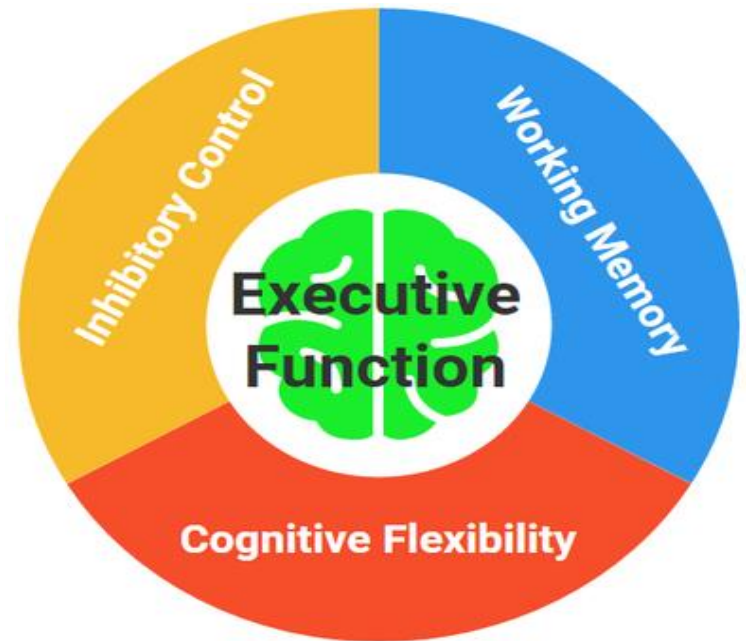
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Key Role for Executive Function

- Executive function (EF) aids planning and engagement in:

- Goal-directed activities
- Sequenced behavior
- Cognitive flexibility
- Inhibitory control
- Effective working memory with distractions



- Disabilities displaying EF deficits and their impact(s) include, but are not limited to...

Disabilities Displaying EF Deficits

- **Anxiety & Depression**
- **Neurodevelopmental disabilities: ADHD, ASD, disruptive behavior disorder(s), varied intellectual disabilities**
- **Varied cognitive disabilities and dysfunction**



Disabilities Displaying EF Deficits

- Cerebral palsy
- Self-regulation deficits
- Language skills/reading/math/
- Other learning disabilities



Exercise-related benefits for executive function in healthy youth

Higher cognitive benefits in those with decreased executive function

Higher cognitive benefit in males vs. females

Improved cognitive control/appropriate allocation of attentional resources

Improved brain/neural connectivity

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Cognitive impairment and decreased executive function

Higher prevalence/symptom severity in males vs. females

Impairment of cognitive control/inappropriate allocation of attentional resources

Brain/neural underconnectivity

ASD, ADHD, Communication Disorder, Intellectual Disabilities, Specific Learning Disorder

Insights from Autism Fitness

FITNESS IS A LIFE SKILL! --> Critical need for long-term fitness development in autistic youth

Youth with ASD have:

- Lower motivation towards physical activity**
- Often overlooked gross & fine motor skill deficits**
- Limited access to appropriate, tailored fitness**

Use/acquisition of basic activities, then sequencing:

- Grab Ball Complex**
- Hurdle Step-Overs**
- Med Ball Throws/Slams**
- Resistance Band Rotations**
- Ball Tap Complex**
- Bear Crawls**
- "Scramble" X-cise**
- Star Jumps**

Expanding the Aperture...

- From Martial Arts, Dance, Autism Fitness, and Adaptive Climbing
 - Virtual instruction fails those with NDs
 - Let's go live!
 - Patience for progression



Expanding the Aperture...

- From Martial Arts, Dance, Autism Fitness, and Adaptive Climbing
 - Solo to social
 - Less to more
 - Repetition: Create, repeat, master, extend
 - Generalized adaptations



An eye towards...

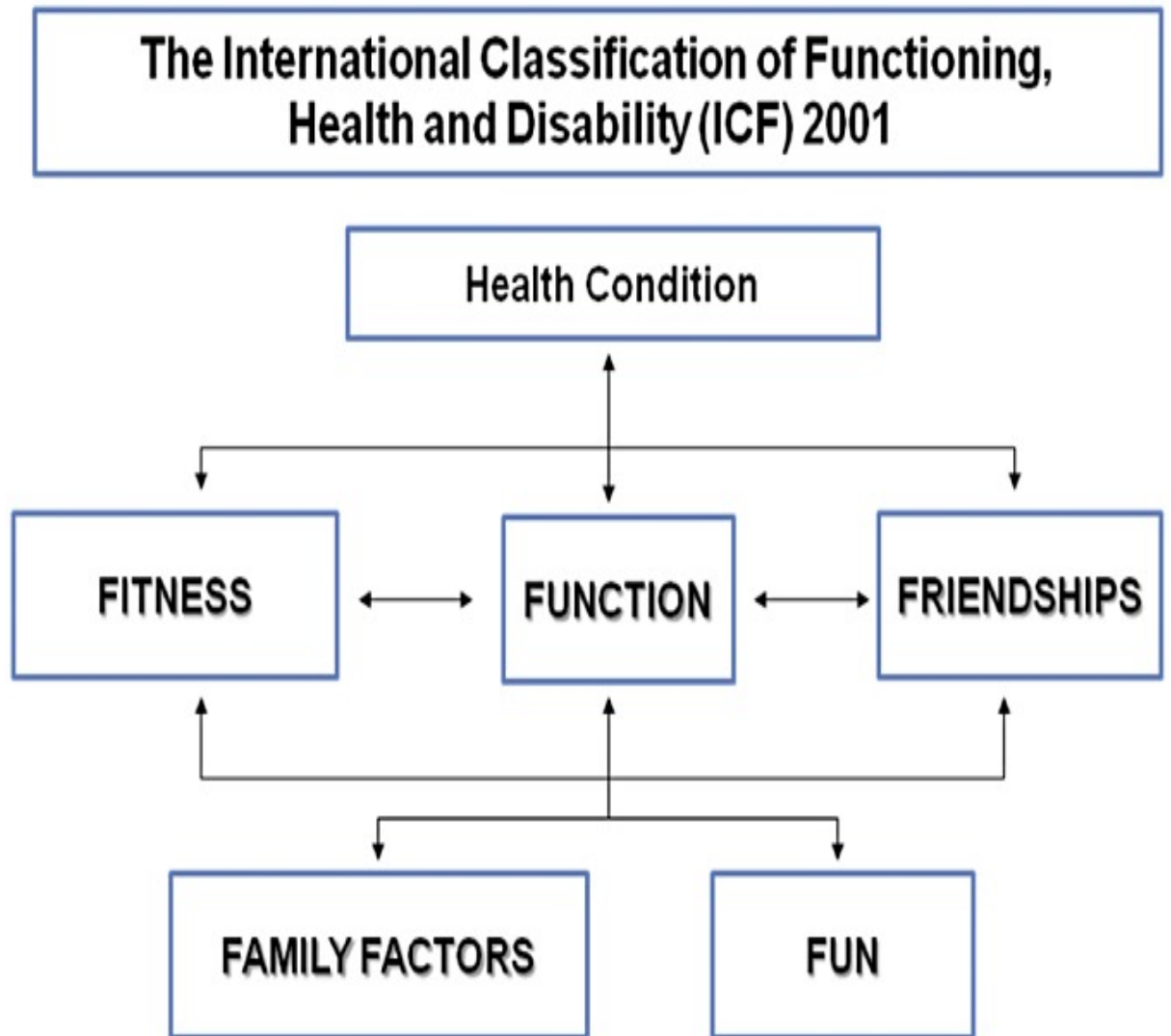
Promoting:

- **Function**
- **Fitness**
- **Fun**

With:

- **Family**
- **Friends**

**For better,
more
independent
futures**



Questions for Feedback

- **#1: What other sequenced physical activities might you suggest for future research?**
- **#2: Have you seen, in your research, practice, or experience, impacts from the pandemic that might deserve our teams' research attention?**
- **#3: Would you be interested in receiving a copy of our initial adaptive martial arts guidance for distribution, sharing, and provision of feedback?**

THANK YOU!