

The Effects of an 8-week Judo Program on the Psychosocial Factors of Children Diagnosed with Autism Spectrum Disorder

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THE EFFECTS OF AN 8-WEEK JUDO PROGRAM ON THE
PSYCHOSOCIAL FACTORS OF CHILDREN DIAGNOSED WITH
AUTISM SPECTRUM DISORDER

by

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A thesis submitted in partial fulfillment of the requirements for Honors in
the Major Program in the School of Kinesiology and Physical Therapy
in the College of Health Professions and Sciences
and the Burnett Honors College
at the University of Central Florida
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Abstract

The purpose of this study was to analyze the effects of an 8-week judo program on self-competency, physical activity (PA) motivation, and enjoyment of PA in children diagnosed with Autism Spectrum Disorder (ASD). **METHODS:** The sample included 20 children (ages 8 – 17) with a primary diagnosis of ASD. The participants completed an 8-week judo program that occurred once a week for 45 minutes. Participants were instructed to complete a series of questionnaires that measured athletic self-competency, PA motivation, and PA enjoyment at baseline and at the end of the 8-week judo program. Paired t-tests were conducted to examine differences in psychosocial factors from baseline and post-judo. Additionally, correlational analyses were conducted to examine the association between the psychosocial variables and attendance during the 8-week program. **RESULTS:** Although increases in psychosocial factors were observed following the cessation of the judo program, these changes were not statistically significant for any of the psychosocial factors following the 8-week program. There was a significant, positive association between PA motivation and judo attendance ($r=.43$, $p=.05$), however, neither athletic competency nor PA enjoyment were correlated with judo attendance. **CONCLUSION:** Although not significant, improvement in psychosocial factors were observed post-judo program. Future studies should consider increasing the duration and frequency of the judo program to potentially elicit greater changes in psychosocial factors related to PA.

Dedication

I decided to dedicate this thesis to my cousin Christopher and his family. I love you Chris, all this hard work is in honor of you.

Acknowledgments

I would like to thank my thesis professors; Dr. Jeanette Garcia and Dr. David Fukuda for helping me through the extensive thesis process and also my parents, sister and Tracey for being my number one supporters.

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List of Acronyms/ Abbreviations

ASD	Autism Spectrum Disorder
CARD	Center of Autism and Related Disabilities
PA	Physical Activity
UCP	United Cerebral Palsy

Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopment disorder that affects an individual's communication, social, behavioral skills, and learning ability. Autism typically is detected at infancy up to three years old (Lord, 2000). According to the Centers of Disease Control and Prevention (CDC), currently in the United States, 1 in 42 adolescent males and 1 in 189 adolescent females have autism spectrum disorder, estimating that 1 in 59 children are affected by ASD (CDC, 2017). Children with ASD may experience several behavioral and physical impairments such as difficulties with peer relationships, impaired balance and coordination, communication deficits, crippling anxiety, and low self-confidence (Dickerson, Calhoun, Murray, Ahuja, & Smith, 2011). Unfortunately, these impairments may severely limit these children's overall quality of life.

Several behavioral interventions have been explored to improve ASD-related symptoms in youth with ASD, like occupational and speech therapy to help with communication and performing everyday tasks or cognitive behavioral therapy for conditions such as anxiety or attention hyperactivity disorder (ADHD) (Case-Smith & Arbesman, 2008; Mandak & Light, 2018). Recently, there has been interest in the use of PA to improve both physical and psychosocial health in youth with ASD. Children with ASD have fewer opportunities to engage in physical activities because of their difficulty with social and communicative skills (Zhao & Chen 2018). These children tend to only participate in isolated play and are less active compared to typically developing children (Zhao & Chen 2018). However, children with ASD could highly benefit from some form of physical activity. Physical activities may help overcome many challenges that children with ASD face. PA allows them to have fun and experience interacting with other children with ASD and typically developing kids (Zhao & Chen, 2018). Furthermore, PA allocates the development of interpersonal

skills, positive self-esteem, the growth of social and behaviors skills, and happiness (Zhao & Chen 2018).

A recent study examined how martial arts, like judo and taekwondo, affect behavioral and social communications of children with ASD (Bell, Palace, Allen, & Nelson, 2016). After completing a 13-week intervention using mixed martial arts training, individuals with ASD experienced diminished social dysfunction, better self-control, and less impulsive problem solving (Bell, Palace, Allen, & Nelson, 2016). Parents also reported that their child's persistence, drive, and willingness to overcome challenges enhanced through martial arts participation (Bell, Palace, Allen, & Nelson, 2016). Additionally, improvements in social performance and physical activity were seen, with some improvements being maintained at least one month following the martial arts intervention (Bell, Palace, Allen, & Nelson, 2016). By utilizing the intervention of martial arts, children with ASD now have the opportunity to partake in social activities with other children with ASD and typically developing children, allowing them to feel belonged and welcomed to a social group, improve their self-efficacy and develop interpersonal skills which can help them succeed as adults with ASD in the future (Bell, Palace, Allen, & Nelson, 2016).

Judo training can provide many psychosocial developmental skills for children with ASD, including increased self-esteem, confidence, and improved social skills (Movahedi et al., 2013). Additionally, children may begin to look forward to attending their martial arts training and gain a positive perspective on physical activity (Kim, 2018). Therefore, the purpose of the current study is to examine the effects of an 8-week modified judo program, including typically developing children and children with ASD, on psychosocial factors, such as self-competency, perceived barriers to PA, and enjoyment of PA.

Methods

Study Design

The proposed study was a part of a larger, ongoing study examining the effects of an 8-week judo intervention in youth with Autism Spectrum Disorder (ASD). The current study focused specifically on changes in psychosocial factors related to PA following the 8-week program.

Recruitment

The original sample included 33 children (ages 8 – 17) with a primary diagnosis of Autism Spectrum Disorder (ASD). Participants were recruited through the Center for Autism and Related Disabilities (CARD), an organization that provides resources and support for individuals with ASD and their families. Children who have severe physical limitations or display violent behaviors, as confirmed by CARD staff, were excluded from the study due to safety concerns. The University of Central Florida's Institutional Review Board approved all procedures, and parental consent/assent were collected prior to any testing measures.

Judo Intervention

Participants were taught the proper procedures for caring for their judo uniform (judo gi). Each judo session began with a formal opening and description of the class and closed with a few minutes of mindfulness to reflect on the practice. With the progression of the sessions, participants learned how to safely fall, move with partners, balancing/unbalancing strategies and other important judo techniques. Each practice taught morals and foundations of Judo to promote self-awareness, mindfulness and non-combative or fighting techniques. All sessions took place on a clean training mat for safety of participants. Additionally, the judo instructor was a USA Judo certified coach with

prior experience teaching judo in school settings. Experienced CARD counselors and facilitators monitored sessions to assist in any behavior specific dilemma. Sessions were held once a week and each practice lasted approximately 45 minutes.

Demographic Information

Parents were given a series of demographic questions to be filled out on behalf of their child. The questionnaire consisted of a series of items regarding the child's family background, health information and the child's diagnosis. A copy of this questionnaire is provided in the Appendix C.

Questionnaires

It is important to note that it was intended that participants would complete the questionnaires themselves, however, due to age and severity of ASD-related impairments, parents were permitted to assist with filling out the questionnaires.

Self-reported Physical Activity and Screen Time.

Participants were given a Physical Activity and Screen Time Survey to assess the number of days per week participants completed 60 minutes of MVPA and the number of minutes of screen time accumulated per day. Participants completed this survey at baseline and at the end of the 8-week intervention. A copy of this questionnaire is provided in the Appendix C.

Psychosocial Factors

Physical Activity Enjoyment

PA enjoyment was measured using a 14- item questionnaire adapted from a previously validated scale for adolescents (Motl et al., 2002). Items on this questionnaire contain statements such as "When I am active...." followed by the items "I feel bored," "I dislike it," and "It frustrates me." The 5-point

scale contains responses that range from 1 (“Disagree a lot”) to 5 (“Agree a lot”), with a higher score indicative of more enjoyment related to PA. Participants completed this survey at baseline and at the end of the 8-week intervention. A protocol of the questionnaire is provided in the Appendix C.

Exercise Motivation

Exercise Motivation was assessed using a shorter form of the 51-item Exercise Motivation Inventory (Markland, 1997). This 8-item scale contains statements that suggest why a child might exercise, such as “... because it makes me feel good” and “...it gives me space to think”. Response options range from 0 (not true at all for me) to 3 (very true for me). A higher score was indicative of a greater amount of exercise motivation. Participants completed this survey at baseline and at the end of the 8-week intervention. A copy of the questionnaire is provided in the Appendix C.

Perceived Self-Competency

Perceived Athletic Self-Competency was measured using a 5-item scale adapted from the Athletic Competence subscale from Harter’s Self-Perception Profile for Children (Harter 1992). This 5-item scale begins with statements such as “I do very well at all kinds of sports”, followed by a 5-item response options that range from “Really Agree” to 4“Really Disagree”. Participants completed this survey at baseline and at the end of the 8-week intervention. A copy of the questionnaire is provided in the Appendix C.

Statistical Analysis

Descriptive statistics were run to examine distribution patterns. Paired samples t-tests were conducted to compare changes in psychosocial factors (motivation, enjoyment, self-competency) baseline to post-judo assessments. Additionally, Pearson correlations were conducted to examine associations between attendance at judo sessions, self-reported physical activity, screen time, and psychosocial factors post-judo. All analyses were conducted in SAS Version 9.4.

Results

Participants

Twenty out of the thirty-three participants who registered for the Judo Program were included in these analyses. Thirteen participants were excluded due to failure to complete both pre and post judo surveys. Descriptive characteristics of this sample are provided in Table 1. Average age of participants was 12.32 ± 3.04 with males representing 85% ($n = 17$) of the sample. Participants attended an average of 7.2 ± 1.06 (out of 8 total) sessions during the 8-week intervention.

Changes in Psychosocial Factors

Paired t-tests revealed no significant changes in PA enjoyment (46.85 vs. 48.2, $p = .63$), exercise motivation (11.6 vs. 12.95, $p = .35$), or athletic self-competency (10.65 vs. 11.4, $p = .33$) from baseline to following the 8-week program.

Correlations between Psychosocial Factors, Activity Levels, & Judo Attendance

There was a significant, positive correlation found between judo attendance and self-reported motivation to exercise ($r = .43$, $p = .05$). Additionally, there was a positive correlation found between judo attendance and the number of MVPA days per week ($r = .51$, $p = .03$). No other significant relationships were observed. A correlation matrix is presented in Table 3.

Discussion

The purpose of this study was to examine changes in psychosocial factors associated with physical activity following an 8-week judo intervention in youth with ASD. Additionally, associations between changes in psychosocial factors and parent-reported physical activity and screen time were assessed following the 8-week program. Although improvements were observed in self-competency, PA enjoyment, and a reduction in perceived barriers, there were no statistically significant changes in PA-related psychosocial factors following the 8-week judo program. Therefore, our hypothesis that the 8-week judo intervention will improve psychosocial factors related to PA in youth with ASD was not upheld.

The lack of significant findings in the proposed study could be due to a variety of factors. First, the sample size was relatively small. Second, an 8-week intervention may not be long enough to elicit significant changes in psychosocial factors associated with exercise. A review of martial arts interventions, by Bell et al. (2016), found that interventions needed to be at least 12+ weeks in duration to elicit significant changes in behavioral and psychosocial factors. Initially, investigators of the primary judo study intended to hold the intervention over 12 weeks, with a frequency of twice a week, however, limited facility use and the start of a new school semester forced investigators to shorten the duration and frequency of the intervention. Although Bell et al (2016) provides recommendations regarding the duration of martial arts interventions in this population, there are no specific guidelines for optimal dose of sessions. More work is necessary to better determine the frequency, duration, and intensity of martial arts programs, such as judo, that may be most beneficial to youth with ASD.

Judo attendance was associated with exercise motivation and greater PA levels, which suggests that attending a higher number of judo sessions could be linked with greater motivation to exercise, as well as a greater number of days that participants engaged in PA. Due to the cross-sectional nature of this analysis, it cannot be concluded that increased attendance *causes* greater exercises motivation and participation in PA. Further research is warranted to better understand the relationship among attendance of intervention sessions, psychosocial factors related to PA, and actual levels of PA.

Despite the lack of significant findings, the current study had several strengths. This was one of the first studies to examine a judo intervention in youth with ASD. Secondly, the investigators in this study worked closely with the Center for Autism and Related Disabilities (CARD), which was instrumental in recruitment and screening procedures. All children had been previously diagnosed with ASD, by a physician, therefore, eliminating the screening procedure for ASD.

Several limitations should be noted from this study. The sample size was limited to 20 participants. As previously noted, the duration and frequency of the intervention may have been too short to elicit changes. Bell et al (2016) reported that a twice a week intervention over a minimum of 12 weeks is necessary in order to observe any significant benefits. Unfortunately, the study team was limited to use of the university gymnasium to once per week, and the intervention was held over the summer, and could not extend into the start of the fall school semester. The psychosocial factors were assessed via self-report which may be prone to bias. Additionally, parents may have assisted some of the participants which could also have biased results.

These initial findings provide support for the need for future studies in this area of martial arts, especially judo, for youth with ASD. It would be of interest to better determine whether judo specifically is more beneficial for youth with ASD, compared to other forms of martial arts. There

are a wide variety of martial arts, such as judo, tai chi, taekwondo, and karate. Although there may be similar elements each discipline shares, several other elements may be specific to the style of martial arts. For example, tai chi tends to be practiced at a lower intensity, while judo may alternate between periods of low and high intensity exercise throughout a session (Bu, 2010). Additionally, some disciplines require more social interaction with a partner, while others may focus more on solo techniques (Bu, 2010). It would be important to further investigate whether specific martial arts styles may be more beneficial for youth with ASD.

Conclusion

Despite the lack of significant findings regarding change in psychosocial factors, this study presented a novel PA intervention that appeared to be well accepted in this sample. Additionally, attendance appeared to be associated with greater exercise motivation and participation in PA. Future work should examine optimal dosage of judo that would be most beneficial to this population.

Appendix A: Tables

Table 1: Participant Demographics at Baseline

Factors	Mean (SD)	N (%)
Age	12.32 (3.04)	
Male		17 (85%)
Caucasian*		10 (63%)
Number of classes attended	7.2 (1.06)	

*4 parents opted to not answer this question.

Table 2: Pre-Post Psychosocial Factors and Activity Levels

Factor	Baseline	Post-Judo
PA Enjoyment	46.85 (11.39)	48.2 (11.47)
Athletic Self-Competency	10.65 (4)	11.4 (3.55)
Exercise Motivation	11.6 (3.04)	12.95 (4.47)
60+ min of MVPA (days/week)	3.03 (2.01)	3.56 (2.01)
Screen time (min/day)	136.25 (77.25)	127.89 (60.9)

Table 3 Correlation Matrix

Factor	Attendance	PA enjoyment	PA Motivation	Athletic SC	MVPA	Screen Time
Attendance	—	-.19	.43*	-.23	.51*	.23
PA enjoyment	.19	—	.57*	-.19	.07	.08
PA motivation	.43*	.57*	—	-.11	.29	.17
Athletic SC [†]	-.23	-.19	-.11	—	-.16	-.17
MVPA	.51*	.07	.29	-.16	—	-.12
Screen Time	.23	.08	.17	-.17	-.12	—

[†]Athletic SC: athletic self-competency

*p<.05

Appendix B: IRB Form and Approval



University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Human Research

From: UCF Institutional Review Board #1
FWA00000351, IRB00001138

To: Jeanette Garcia and Co-PIs: David Fukuda, Jeffrey Ray Stout, Jennifer E Tucker,
Justine M Renziehausen, Kayla Baker, Paola Rivera

Date: June 07, 2018

Dear Researcher:

On 06/07/2018 the IRB approved the following modifications to human participant research until 03/15/2019 inclusive:

Type of Review: IRB Addendum and Modification Request Form
Expedited Review

Modification Type: Additional Instruments Added, Change to Personnel, Updated
Population, Revisions to the Protocol and Consent

Project Title: The Effects of a Modified Judo Program on Physical and
Psychological Health in Children: A Mixed-Methods Approach

Investigator: Jeanette Garcia

IRB Number: SBE-17-12999

Funding Agency: Research and Commercialization

Grant Title: Mixed Methods Evaluation of a Modified-Judo Training Program
for Children with Autism Spectrum Disorder

Research ID: N/A

The scientific merit of the research was considered during the IRB review. The Continuing Review Application must be submitted 30 days prior to the expiration date for studies that were previously expedited, and 60 days prior to the expiration date for research that was previously reviewed at a convened meeting. Do not make changes to the study (i.e., protocol, methodology, consent form, personnel, site, etc.) before obtaining IRB approval. A Modification Form **cannot** be used to extend the approval period of a study. All forms may be completed and submitted online at <https://iris.research.ucf.edu>.

If continuing review approval is not granted before the expiration date of 03/15/2019, approval of this research expires on that date. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

Use of the approved, stamped consent document(s) is required. The new form supersedes all previous versions, which are now invalid for further use. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Participants or their representatives must receive a copy of the consent form(s).

All data, including signed consent forms if applicable, must be retained and secured per protocol for a minimum of five years (six if HIPAA applies) past the completion of this research. Any links to the identification of participants

Appendix C: Psychosocial Questionnaires

PA Enjoyment Scale

For the next set of questions, please circle your answers to finish the sentence about how exercise makes you feel. Try to answer how it really makes you feel, not how you think it should make you feel.

When I exercise	Disagree a lot	Disagree a little	Neither agree or disagree	Agree a little	Agree a lot
2. ... I enjoy it.	1	2	3	4	5
3. ... I feel bored.	1	2	3	4	5
4. ... I dislike it.	1	2	3	4	5
5. ... I find it fun.	1	2	3	4	5
6. ... it makes me sad.	1	2	3	4	5
7. ... I get something out of it.	1	2	3	4	5
8. ... it's very exciting.	1	2	3	4	5
9. ... it frustrates me.	1	2	3	4	5
10. ... it's not fun at all.	1	2	3	4	5
11. ... it gives me energy.	1	2	3	4	5
12. ... it's not at all interesting.	1	2	3	4	5

13. ... it gives me a strong feeling of success.	1	2	3	4	5
14. ... it feels good.	1	2	3	4	5
15. ... I feel as though I would rather be doing something else.	1	2	3	4	5

PLEASE CONTINUE ON THE NEXT PAGE

Harter's Self-Perception for Children

Now, please circle your answers of how much you agree with the following statements. Try to answer how you really feel, not how you think you should feel.

	Really Agree	Sort of Agree	Sort of Disagree	Really Disagree
16. I do very well at all kinds of sports.	4	3	2	1
17. I think I could do well at just about any new athletic activity (like a game or new skill you are learning).	4	3	2	1
18. I feel that I am better than others my age at sports.	4	3	2	1
19. I don't do well at new outdoor games.	4	3	2	1
20. I do not feel that I am very athletic.	4	3	2	1

Exercise Motivations Inventory: Now, please read the following statements about WHY you might exercise. Circle the number below the trueness of each statement for you.

Personally, I exercise...	Not at all true for me	Not very true for me	Kind of true for me	Very true for me
21. ...because it makes me feel good.	0	1	2	3
22. ...to give me space to think.	0	1	2	3
23. ...to spend time with friends.	0	1	2	3
24. ...because I like trying to win.	0	1	2	3
25. ...to give me goals to work towards.	0	1	2	3
26. ...because it helps to reduce tension (helps you relax).	0	1	2	3
27. ...to help manage stress.	0	1	2	3
28. ...to blow off steam.	0	1	2	3

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