

THE EFFECTS OF GROUP AND INDIVIDUAL BASED PHYSICAL
ACTIVITY ON MOOD IN CHILDREN WITH INTELLECTUAL
DISABILITIES

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ABSTRACT

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This case study examines the effect of group-based and individual-based physical activity participation on mood in individuals with disabilities. The participant was age 14 during the study and diagnosed with Autism Spectrum Disorder (ASD). The participant engaged in individual and group based physical activities as part of a one week adapted physical activity program. Mood states were reported using the Intellectual Disability Mood Scale [IDMS] (Argus, Terry, Bramston, & Dinsdale, 2004), which is adapted from the Profile of Mood States [POMS] (Droppleman, Lorr, & McNair, 1992). The participant exhibited the iceberg profile - characterized by above average mood scores in Vigor and below average mood scores in Tension, Depression, Confusion, Anger, and Fatigue. A participant exhibiting the iceberg profile is indicative of positive mental health (Rowley, Landers, Kylo, & Etnier, 1995). Results from pre- and post- intervention data was compared and showed no significant changes in mood scores following intervention. There were also no significant differences in mood scores between individual and group activity interventions. No significant evidence was found that supports individual-based or group-based interventions at improving mood states in the participant with ASD.

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INTRODUCTION

Physical activity participation promotes healthy muscle and bone development, improves cardiovascular health and social relationships, and promotes healthy affective development in children (Delaney, Crandell, & Barfield, 2014; Morgan, 1985; Murphy & Carbone, 2008). However, many children in the United States fail to meet the recommended amount of physical activity and engage in high rates of sedentary behavior (Centers for Disease Control and Prevention [CDC], 2017; U.S. Department of Health and Human Services [USDHHS], 2008). For children with disabilities, rates of sedentary behavior are higher than children without disabilities due to physical and emotional barriers (Bedell et al., 2013). Higher rates of sedentary behavior is a health concern that has been linked to an increased risk of developing cardiovascular disease, diabetes, depression, and anxiety (Janssen, 2012; Middlebeek & Goodyear, 2012; Murphy & Carbone, 2008).

It has been well documented that physical activity increases positive mood feelings and reduces negative mood feelings (Dubnoy & Berry, 2000; Penedo & Dahn, 2005). According to Lane and Terry (2000), mood is defined as a set of feelings, ephemeral in nature, varying in intensity and duration, and usually involving more than one emotion. Mood states tend to influence thought processes, which affects behavior across various situations (Forgas, 2001; Sedikides & Green, 2001). For example, how children feel during exercise and whether or not they enjoy physical activity are strong predictors of continued participation in physical activity (Deforche, De Bourdeaudhuij, &

Tanghe, 2006). Likewise, researchers have examined how physical activity influences mood states in athletes with and without disabilities using the Profile for Mood States (POMS).

As a result, previous research has been conducted to evaluate how the context in which physical activity is delivered can contribute to changes in affect (Burke, Carron, Eys, Ntoumanis & Estabrooks, 2006). Burke et al. (2006) found that exercising in group settings resulted in increased adherence and decreased sedentary behavior compared to individual physical activity settings. In a synthesis of 127 studies, Dishman and Buckworth (1996) found strong evidence that physical activity interventions delivered in group settings were more effective in increasing physical activity participation compared to interventions delivered individually. This is supported by a study that found participants in group-based programs were more likely to adhere to the physical activity program compared to individually-based programs (Carron, Hausenblas, & Mack, 1996).

A study looking into the effects of group-based exercise found an increase in positive affect and a reduction in depressive symptoms in older adults (Brown, Liu-Abrose, Tate & Lord, 2009). While previous research supports the use of group-based exercise in improving mood in multiple populations (Brown et al., 2009; Rector et al., 2015), little research has examined the effect of physical activity mode on children with disabilities.

Purpose

To this date, there are few studies that examine how group-based versus individual-based physical activity affects mood in children with disabilities. Therefore, the purpose of this study was to examine the effects of group-based versus individually-based physical activity interventions on mood in children with disabilities.

Research Hypothesis

The researcher hypothesized that children with disabilities would report improvements in mood after engaging in physical activity with larger improvements following group based physical activity compared to individual physical activity.

Literature Review

Benefits of Physical Activity for Individuals Who Experience Disabilities

Regular physical activity participation has been shown to reduce and prevent lifestyle related conditions such as heart disease, diabetes, stroke, and depression (Centers for Disease Control and Prevention, 2014). Besides the physical benefits of physical activity, health professionals believe regular exercise can be effective at preventing the onset of emotional distress and improving mental health for both people who experience disabilities and those who do not (Johnson, 2009; Reed, Maslow, Long & Hughey, 2013; U.S. Department of Health and Human Services, 2008).

Studies have examined how mood states are affected by physical activity participation in individuals with disabilities. Campbell and Jones (1994) used the Profile of Mood States (POMS) to measure changes in mood states and found individuals who use wheelchairs that participated in physical activity showed significantly higher levels of psychological well-being compared to non-participants. Results indicated higher than average levels of vigor and lower than average levels of tension, confusion, depression, and anger and no differences in fatigue (Campbell & Jones, 1994). These results were consistent with previous studies which reported higher levels of psychological well-being among individuals with disabilities who engaged in physical activity compared to individuals with disabilities who did not engage in physical activity (Greenwood et al., 1990; Henschen et al., 1984, Horvat et al., 1986).

This is further supported in a study where Barak et al. (2016) examined the psychosocial effects of competitive Bocce in individuals with disability and found favorable improvements with moderate-to-large effects in psychosocial parameters within competitive groups compared to non-competitive and the control group. In that study, Barak et al. (2016) studied four groups: independent competitive, non-independent competitive (grouped with an aide), recreational group, and a nonparticipating control group. The competitive group, regardless of independent or partnered competition, showed improvement in mood scores following intervention. It was concluded that physical activity has psychosocial benefits for both individuals with and without disabilities (Barak et al., 2016). There is a wealth of evidence that documents the benefits of physical activity; however, participation rates for children that experience disabilities are lower compared to typically developing peers (Altman & Bernstein, 2008).

Factors That Influence Physical Activity in Children who Experiences Disability

For children, it is recommended they receive at least 60 minutes of moderate to vigorous physical activity per day to gain health benefits (U.S. Department of Health and Human Services, 2008). However, the Centers for Disease Control and Prevention (2014) estimate four in five adults and youths fail to meet those recommendations. For individuals who experience disability, it is reported that they are significantly less likely to participate in any physical activity compared to the general population (National Center for Health Statistics, 2017), and have higher rates of sedentary behavior compared to peers without disabilities (Rimmer & Rowland, 2008; Wilson, Haegele, & Zhu, 2016). They experience barriers that make regular physical activity participation a challenge.

Research by Carbonneau, Roul, Duquette, & Belley-Ranger (2017) found four common themes when researching factors that promote and encourage an active lifestyle in students with disabilities: adapted environment and universal accessibility, help and support, social interactions, and quality of the experience. In that study, Carbonneau et al. (2017) evaluated the impact of the physical and social environment on students with disabilities and found when students with disabilities are provided an accessible environment that is socially enriching, they were more likely to continue participation. This was supported by Deforche, De Bourdeaudhuij, & Tanghe (2006) who concluded that how children feel during exercise and whether or not they enjoy physical activity were strong predictors of continued participation in physical activity. This presents an opportunity to explore physical activity factors that influence psychological states.

Factors that Influence Mood States

There is research that has examined how physical activity affects mood states in participants using the Profile for Mood States (POMS) to determine if participants exhibit the “iceberg profile” which indicates positive mental health. The iceberg profile is characterized by above average scores in vigor and below average scores in anger, confusion, depression, fatigue, and tension. Previous research using POMS on physical activity participants have compared competitive and noncompetitive participants, abled-bodied and individuals who experience disability, as well as wheelchair participants and wheelchair nonparticipants.

Campbell and Jones (1994) compared the psychological well-being of wheelchair athletes and non-athletes and found wheelchair athletes reported more positive mood than

nonparticipants and exhibited the iceberg profile. Similar results were reported for wheelchair tennis participants and non-tennis players with disabilities (Greenwood, Dziewaltowski, & French, 1990). Tennis participants exhibited the iceberg profile and scored higher than average on vigor and lower than average on confusion, anger, tension, fatigue, and depression compared to non-tennis players (Greenwood et al., 1990). This is supported by an earlier study where Horvat, Roswal, Jacobs, & Gaunt (1989) found wheelchair athletes exhibited desired positive mood states and the iceberg profile; however, wheelchair athletes in that study scored lower in mood scores compared to their able-bodied counterparts. Research suggests wheelchair users who participate in physical activity generally have positive mood states that exhibit the iceberg profile.

In a more recent study, Carbonneau and associates (2017) measured how the environment, both physical and social, affected physical activity in students with disabilities. Although not part of their measured variables, it was documented whether students were participating in group-based activities or individual-based activities. Researchers found a strong relationship that the quality of interactions students with disabilities have with others while participating in physical activity had a direct affect on their level of interest and participation (Carbonneau et al., 2017). Researchers in that study concluded there is strong evidence that students who experience disabilities and participate in quality group physical activities are more likely to continue participation.

Limitations

Limitations included the participants' interpretation of moods from the IDMS. Participant in the study has an intellectual disability and may not fully understand test item questions. The IDMS is adapted from the POMS to specifically address potential misinterpretation from the participant. Data from the study included reports from one participant. Although this case study can provide valuable information and inform future research, the results from this study cannot be extrapolated for the larger populations.

Delimitations

To maintain the validity of the mood scale (IDMS), participants included were ages 10-18 during the study. However, the FitFam program only included participants age 6-14. For the study, only participants ages 10-14 at the time were included in the data analysis.

Assumptions

It was assumed that participants understand can accurately identify their mood.

METHODS

Participants

Five individuals met the requirements for inclusion in the study. Two of the five consented to participation in the study and one participant completed the measurements during the program. Therefore, the case study focused on the experience and data from one participant. The participant in this study was a 14 year-old with Autism Spectrum Disorder. He participated in all five days of the FitFam Program and was able to verbally communicate in English.

Procedures

Prior to engaging in the study, written consent was collected from a parent and written assent was collected from the participant. The participant engaged in a community based adapted physical activity program, the FitFam program, which consisted of sport, fitness, and motor skill development activities and games. Skill and motor development activities were individually-based. Group-based activities included small-sided and cooperative games. Prior to beginning individually-based activities, the participant completed a pre-assessment to measure his current mood state using the Intellectual Disability Mood Scale (IDMS), which was previously adapted from the Profile of mood states for adolescents (POMS-A). The IDMS is a shortened version of the POMS-A assessment containing 12-items, two assessment questions for each of six mood subscales (i.e. anger, confusion, depression, fatigue, tension, and vigor). The

participant was read the IDMS by researchers and asked to rate the items within the subscales on a 5-point scale, from 0 = not at all, 1 = a little, 2 = moderately, 3 = quite a bit, or 4 = extremely. The participant also used pictorials to help identify their self-selected responses to each item. Five cups were pictured, the first cup was empty and represented 0 = not at all, the second cup was shaded a small amount and represented 1 = a little, the third cup was shaded just less than halfway and represented 2 = moderately, the fourth cup was shaded about $\frac{3}{4}$ of the way and represented 3 = quite a bit, and the last cup was completely shaded and represented 4 = extremely. Two alternate synonymous words were used when participant did not comprehend the original word. Scores for both questions in each mood state were summed to provide a total mood score between zero and eight. Researchers recorded responses for the participant. At the end of individually-based activities, the participant completed the IDMS following the same protocol. Following individually-based skill and motor development activities, the participant took a recess break between physical activity interventions. Before beginning group-based activities, the participant completed a pre-assessment of their mood followed by a post-assessment after the activity following the same protocol utilized with the individual activity sessions.

Data Analysis

Data was organized into tables with corresponding score for each mood state. The max score for each mood state is 8. Results from the assessments were compared between each other. Within each intervention, pre- intervention data was collected and

compared with post-intervention data. Differences in results were also compared between group-based and individual-based interventions.

RESULTS

Table 1 Reported mood scores during day one.

Day 1	<u>Anger</u>	<u>Confusion</u>	<u>Depression</u>	<u>Fatigue</u>	<u>Tension</u>	<u>Vigor</u>
Pre-Individual	0	0	0	0	0	5
Post-Individual	0	0	0	1	0	8
Pre-Group	0	0	0	0	0	5
Post-Group	0	0	0	0	0	5

Table 2 No report in Anger, Confusion, Depression, Fatigue, or Tension. Reports of Vigor were high and unchanged following intervention.

Day 2	<u>Anger</u>	<u>Confusion</u>	<u>Depression</u>	<u>Fatigue</u>	<u>Tension</u>	<u>Vigor</u>
Pre-Individual	0	0	0	0	0	5
Post-Individual	0	0	0	0	0	5
Pre-Group	0	0	0	0	0	5
Post-Group	0	0	0	0	0	5

Table 3 No report in Anger, Confusion, Depression, Fatigue, or Tension. Reports of Vigor showed an increase following individual intervention and remained the same during group intervention

Day 3	<u>Anger</u>	<u>Confusion</u>	<u>Depression</u>	<u>Fatigue</u>	<u>Tension</u>	<u>Vigor</u>
Pre-Individual	0	0	0	0	0	5
Post-Individual	0	0	0	0	0	8
Pre-Group	0	0	0	0	0	8
Post-Group	0	0	0	0	0	8

DISCUSSION

Researchers have shown that greater physical activity participations improve physiological and psychological markers of health in both people who experience disability and those who do not (Reed et al., 2013; U.S. Department of Health and Human Services, 2008). The purpose of this investigation was to examine the effects of group-based and individually-based interventions on mood in children with disabilities. It was hypothesized that participants would see an improvement in mood scores following physical activity and that group-based interventions would be superior to individual-based interventions at improving mood. Results did not support either hypothesis.

As shown in Table 1, following the individual-based intervention on the first day, the participant reported an increase in vigor and a small increase in fatigue. There were no changes in mood score for the other mood states. Following the group-based intervention on the first day, the participant reported no changes in mood scores. On Table 2, there were no changes in mood states from baseline following individual-based or group-based interventions; nor were there differences between the two interventions. The third day yielded similar results with some improvements in Vigor following individual-based activity, as shown in Table 3. One trend noted was the athlete exhibited the iceberg profile. The iceberg profile visually represents the raw scores on POMS with the test norms as the “water line” (McNair, Lorr, & Doppleman, 1981). It is characterized by above average scores in Vigor and below average scores for Tension, Confusion, Anger, Depression and Fatigue. Results were consistent of the iceberg profile for the

participant during individual and group interventions; however, there were no significant differences between the two interventions. Although not part of the original investigation, it was observed that the participant executed motor movements and motor patterns with a high level of success. This can explain the above average scores in vigor and below average scores in the negative mood states. The findings are consistent with Morgan's (1985) study which found athletes, particularly successful ones, exhibit the iceberg profile.

Improvements in vigor was reported two out of three days; however, the minor increases in vigor following individual-based activities was not significant and would be difficult to attribute the positive moods solely to the intervention. This is in contrast to previous studies that found favorable improvements in mood scores in individuals with disabilities following physical activity participation (Campbell & Jones, 1994; Greenwood et al., 1990; Horvat, et al., 1989). Although improvement in mood scores was not significant, the changes in mood were observed following individual-based activities. Previous findings found group-based physical activity to be superior to individual-based activities (Dishman & Buckworth, 1996). Carbonneau and associates (2017) supports those findings and reported the positive physical and psychological impact of physical activity is greater when students with disabilities participate in a group setting compared to in isolation. However, this was not evident in the present study.

A second hypothesis was tested for this investigation. It was hypothesized that group-based interventions would be superior to individual-based interventions in positively affecting mood. Researchers wanted to examine if the context in how the

physical activity is delivered has an effect on mood. Specifically, researchers wanted to examine the differences in mood scores between individual and group interventions. There were no significant differences in mood observed between individual and group interventions. However, the intervention that noticed change was following individual-based interventions. This finding is in contrast with literature that recommends group-based activities (Burke et al., 2016) and positive social experiences for participants with disabilities (Carbonneau et al., 2017). It was interesting to note that changes only occurred following individual interventions. This is somewhat consistent with research conducted by Atienza's (2001) who found home-based exercise programs to be superior to group-based programs. The results are inconclusive on the effectiveness between individual-based and group-based physical activity interventions at improving mood. One difference to note is the disability experienced by the participants. The majority of studies conducted were on wheelchair participants in physical activity. The participant in the present study experiences Autism Spectrum Disorder (ASD). There was no reason to suggest the participant did not comprehend the POMS.

CONCLUSIONS, SUMMARY OR RECOMMENDATIONS

Research supports the use of physical activity participation to improve mood states in individuals with disabilities. Results from the current case study do not conclusively support previous findings. Previous literature focused on physical disabilities with wheelchair participants, whereas the participant in the current study experiences Autism Spectrum Disorder. The iceberg profile was observed in the participant following reports on the IDMS. Although no significant differences were observed between pre- and post- intervention, individuals who exhibit the iceberg profile is said to have positive mental health. This was a common observation from other studies examining mood in individuals who experience disabilities that participate in physical activity. This should be further explored to determine what factors of physical activity participation could contribute to positive increases in mood states.

One factor of physical activity explored in the current study was the context in how physical activity was delivered. There were no differences noted between individual-based and group-based interventions. Few studies have explored the context of physical activity and its effect on mood in individuals with disabilities. Although results contrast from previous studies, there is value in the results and future research can reexamine the hypothesis and further explore how different participation interventions affect mood in individuals who experience disabilities. The context in how physical activity is delivered can influence outcome results. Furthermore, factors within individual-based and group-based activities may attribute to different outcomes. In the present study, improvements

observed were most consistent following individual-based interventions. This is interesting as previous studies contrast the findings in this study. Future studies should examine how factors within individual and group based interventions may influence continued participation in physical activity. In addition, recruitment of a larger sample and a control group would strengthen the validity of the study.

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