A Predictive Validity Comparison Between Domestic and International Students

INTRODUCTION

The COVID-19 pandemic has presented unique challenges to college students. The following hypotheses were examined:

- Higher levels of family conflict will be associated with higher levels of both depressive symptoms and sleep disruptions.
- Higher levels of depressive symptoms will be related to greater sleep disruption.
- Higher levels of individuation will be associated with a greater incidence of family conflict.
- Higher levels of impact and exposure to COVID-19 will be associated with higher levels of sleep disruption, depressive symptoms, and family conflict.

METHODS

Participants

113 College students from Marquette University

Measures

- The Pittsburgh Sleep Quality Index (Buysse et al., 1989)
- The Late Adolescent Individuation Scale (Baik, 1997)
- The Patient Health Questionnaire - 9 (Kroenke et al., 2001)
- The Young Adults’ and Parents’ Reports of Family Conflict and the Young Adults’ Reports of Parent Intrusiveness measure (Stormshak et al., 2017)

RESULTS

Higher levels of family conflict were not significantly associated with depression, but higher family conflict was associated with greater college student sleep disturbance.

Student reports of more depressive symptoms were associated with poorer sleep quality, more sleep disturbance, more sleep medication use, and greater daytime dysfunction.

Greater reports of family conflict were associated with lower levels of feeling connected with parents and higher levels of parental control.

Greater exposure to COVID-related events and impacts were associated with more symptoms of depression and greater daytime dysfunction. More COVID-related exposures, but not impacts, were associated with greater family conflict and more sleep medication use. More COVID-related impacts, but not exposures, were associated with more sleep disturbances and poorer overall sleep quality.

DISCUSSION

Students’ experiences during the pandemic were associated with family interaction difficulties.

Students struggled significantly with depression and sleep over the pandemic, which may have impacted their academic success and personal lives.

Universities should continue to offer resources and programs for their students as they cope with the pandemic since it has had such a profound impact on their levels of depression, sleep disruptions, and family conflict.

REFERENCES


How do physical activity level and participation in active games and sports vary based on motor abilities in children with typical and disordered communication?

Qualtrics software was used to develop and administer a parent-survey. Questions examined motor skills, physical activity levels, parental concerns, and functional and recreational activities. Current aim: Determine if physical activity involvement differs between children with communication impairments and typical communication, who are grouped by motor ability.

## Research Questions

### Difficulties with Motor Skills

- Children with childhood apraxia of speech (n=250)
- Children with typically developing communication (n=157)
- 550 parent responses (ages 5-18)

### Motor Abilities As Reported By Parents (%)

- Minimal difficulties
- Moderate difficulties
- Extensive difficulties

#### Childhood apraxia of speech

<table>
<thead>
<tr>
<th>Motor Ability</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Minimal</td>
<td>22%</td>
</tr>
<tr>
<td>Moderate</td>
<td>21.4%</td>
</tr>
<tr>
<td>Extensive</td>
<td>56.6%</td>
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</tbody>
</table>

#### Typically developing communication

<table>
<thead>
<tr>
<th>Motor Ability</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimal</td>
<td>16.3%</td>
</tr>
<tr>
<td>Moderate</td>
<td>16.3%</td>
</tr>
<tr>
<td>Extensive</td>
<td>72.4%</td>
</tr>
</tbody>
</table>

- *Motor abilities based on response 7 general motor skills questions:
  - My child has difficulty balancing (e.g., standing on one leg)
  - My child often stumbles and falls
  - My child could be described as a “bull in a china shop” (that is, appears so clumsy that he or she might break fragile things in a small room).
  - My child runs as fast / in a similar way to other children of the same gender and age
  - My child jumps over obstacles found in their play environment easily
  - My child catches a small ball (e.g., tennis ball) thrown from a distance of 6 to 8 feet
  - My child throws a ball in a controlled and accurate fashion

### Significance

- Children with poor motor abilities are more likely to have poor physical fitness and less likely to reap the widespread benefits of exercise.
- The current research contributes to a “whole-child approach” in caring for children with communication disorders who have a high rate of motor impairments.
- Qualtrics software was used to develop and administer a parent-survey.
- Questions examined motor skills, physical activity levels, parental concerns, and functional and recreational activities.
- Current aim: Determine if physical activity involvement differs between children with communication impairments and typical communication, who are grouped by motor ability.

### Methods

- A substantially higher rate of moderate and extensive motor difficulties were reported for children with CAS relative to peers with typical communication.
- Both groups of children with moderate and extensive motor difficulties were reported to have similar limitations in activity level and participation.
- Limited participation potentially contributes to lower physical fitness and poorer social outcomes.

### Motor Difficulties and Physical Activity

- 22% of children with CAS (n=250) were reported to have extensive motor difficulties, compared to 1.3% of children with typical communication (n=157).
- Children with CAS and typical development with moderate and extensive motor difficulties reported less frequent vigorous physical activity and participation in sports and games.

### Conclusion

- Transdisciplinary assessment and treatment is needed for children with multi-systems deficits.
- Future research should examine physical and cognitive-linguistic benefits of exercise training for children with communication disorders.

### Advancing the Discipline

- Motor Difficulties and Physical Activity
- Difficulties with Motor Skills
- Survey Results: Functional outcomes of varying motor abilities in children with childhood apraxia of speech and typically developing communication

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**Marquette University Athletics & Human Performance Research Center**

**Marquette University** BE THE DIFFERENCE.
What is the physical and social-emotional experience of children with childhood apraxia of speech (CAS) and/or developmental language disorder (DLD) compared to typically developing peers?

**RESEARCH QUESTION**

**SIGNIFICANCE**

- Over 50% of children with CAS and DLD have fine and/or gross motor impairments (Iuzzini-Seigel, 2019), compounding effects of their communication deficits.
- Functional outcomes of these deficits are unknown.
- It is essential that we understand the extent to which bullying, mental health issues, and other social-emotional and physical challenges affect children with CAS and/or DLD relative to typically developing peers.

**INNOVATION**

- Comprehensive parent-survey series used to gather multifaceted data about physical (n = 1113) and social-emotional (n = 541) health in children with communication disorders.
- Extant research is largely limited to communication and academic outcomes in these populations—the current research breaks out of the siloed approach and considers the whole child.

**RESULTS**

- Children with CAS and DLD are reported to have fewer friends and experience bullying at twice the rate of typically developing peers.

**CONCLUSIONS**

1. Children with CAS and DLD are reported to have fewer friends and experience bullying at twice the rate of typically developing peers.

2. Children in these populations are also reported to demonstrate functional physical limitations consistent with developmental coordination disorder, a lifelong condition in which motor deficits and coordination challenges persist.

**ADVANCING THE DISCIPLINE**

Data inform the necessity for transdisciplinary assessment and treatment of children with CAS and DLD.

**Foundation for Future Studies**

- Experimental study of fitness levels and physical health in children with CAS and DLD.
- Treatment studies incorporating exercise to promote physical and social-emotional benefits in these vulnerable populations.
Validation of the dot blot technique to test for protein markers of skeletal muscle denervation

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BACKGROUND

• Human aging is accompanied by a progressive loss in mobility and physical function leading to a decreased quality of life for older adults.

• Important to the age-related loss in function is the loss of muscle mass and strength that is thought to occur, at least in part, from the denervation of skeletal muscle fibers (Sonjak et al. 2019) (Fig. 1).

• Denervated skeletal muscle may start to express specific protein markers, such as embryonic (MHCe) and neonatal myosin heavy chain (MHCn) or neural cell adhesion molecule (NCAM) (Soendenbroe et al. 2019).

KNOWLEDGE GAP & OBJECTIVE

• Knowledge Gap: Although skeletal muscle denervation is thought to increase with age, a method to test the innervation status of single isolated skeletal muscle fibers is not available.

• Objective: To identify a simple, cost-effective method to test for protein markers of denervation of isolated human skeletal muscle fibers.

RESEARCH QUESTION

Is the dot blot technique a valid method to test for protein markers of skeletal muscle denervation?

METHODS & RESULTS

• Single muscle fibers were pulled from both human muscle biopsy samples and rodent skeletal muscle samples to perform the dot blot technique (Fig. 2).

• Dot blot was practiced on rodent skeletal muscle fibers probed with an antibody specific for MHC protein (Fig. 3).

• Muscle fibers were pulled from human muscle biopsies from an old and young adult and probed with an antibody specific for the denervation protein marker, NCAM (Fig. 4).

• To verify protein detection, the same single fibers were tested on repeat dot blots (Fig. 5).

• A Western blot was performed to verify that the antibody used in the dot blot was detecting NCAM in the skeletal muscle samples.

FUTURE STUDY

• Test dot blot with rodent muscle fibers that are known to be denervated (e.g., spinal cord injury animals).

• If signal is detected from denervated rodent muscle, then testing may continue on human skeletal muscle samples.

REFERENCES

We programmed sounds, colors, menu bar, buttons, and cameras to create a WebGL Platform.

Images and animation improves learning science.

Exam Results

Scores before and after using the brain model: overall successes.

Exam Averages Compared Overtime

Average exam scores from the past four years compared to this year’s Spring 2021 exam average.

Impressions

“Do you find the quiz feature useful in solidifying your understanding of neuroanatomy and associated functions?”

Student Feedback

“I think the quizzes were really useful for preparing for our class’s lab practical…”

“I liked being able to consider the subcortical structures that are usually difficult to wrap my mind around.”

“I liked the quiz and the ability to move parts of the brain around.”

“I helped me to visualize 3D aspects of structures in their entirety that I had previously only learned to identify in either coronal or horizontal sections.”

Conclusions

• Brain model allowed students to develop a deeper understanding of brain anatomy and function.

• Students developed a greater interest in the subject due to the visual appeal and active learning feature.

• Students plan to use the tool as a resource and shows promise for improving exam scores and overall comprehension.

Previous evidence suggests it would....
Pain Assessments and Functional Characteristics of COVID-19 Survivors

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Introduction

• Coronavirus disease 2019 (COVID-19) is a severe acute respiratory syndrome that is transmitted by infected respiratory droplets between persons.
• Symptoms of COVID-19 include fever, cough, shortness of breath, fatigue, muscle and/or body aches, headache, and loss of taste or smell (www.cdc.gov).
• Long term effects of COVID-19 are unknown, especially regarding the development of chronic pain (Kemp et al., 2020).

Aim: To increase our understanding of how survivors of COVID-19 perceive pain, classify the type(s) of pain, and the impact of pain on function.

Methods

Eight COVID-19 survivors (5 male, 3 female, 38 years avg. age) completed three pain protocols: pain questionnaires, movement-evoked pain, and conditioned pain modulation.

1. Self-Report Pain Questionnaires
• Short-Form McGill Pain Questionnaire: multidimensional chronic pain assessment (Melzack, 1987)
• PROMIS Intensity Scale: 1) current pain intensity and 2) average and worst pain intensity during COVID-19; 1= no pain to 5= very severe pain.

2. Movement Evoked Pain
Participants were asked to rate their pain intensity (0 = no pain to 10 = worst pain) during the following activities:
• Maximal Isokinetic Leg Strength and Fatigue
• Spirometry (i.e., breathing function test)
• Aerobic Capacity

3. Conditioned Pain Modulation
The concept that “pain inhibits pain” and reflects the integrity of descending pain inhibition (Alsouhibani et al., 2019).
• Pressure pain thresholds (PPTs) are measured via a computerized pressure algometer at the quadriceps and upper trapezius muscles before and during the participant’s foot submersion in a cold-water bath (Figure 1)
• An increase in PPTs during the cold-water bath indicates a normal response (i.e., efficient conditioned pain modulation)

Preliminary Results

• Participants reported minimal chronic pain with the McGill Pain Questionnaire.
• Current pain intensity as well as worst and average pain during COVID-10 were all in the mild-to-moderate range.
• Movement-evoked pain during physical activity was reported as mild following leg strength and fatiguing exercise and spirometry, whereas with submaximal aerobic exercise the intensity was mild-to moderate.
• Conditioned pain modulation was normal at quadriceps muscle and inefficient at the upper trapezius muscle (Figure 2).

Clinical Implications

• COVID-19 survivors report minimal chronic pain; although the inefficient conditioned pain modulation in the upper extremity suggests that these individuals are at risk of developing chronic pain.
• From a functional perspective, pain intensity should be addressed during movement due to reports ranging from mild-to-moderate pain.

Acknowledgments
Exercise Science and Rehabilitation Program, AHPRC Student Research Initiative, Public Health and Equity Fellowship

References