

State College Area School District
Jason C. Perrin, Assistant Superintendent for Secondary Education

VI-A

To: Dr. Robert O'Donnell

From: Dr. Jason Perrin

Date: August 4, 2016

Subject: Research Proposal "The Relationship Between Music Aptitude and Phonological Awareness in Elementary Students With Speech Sound Disorders"

Enclosed please find a research proposal submitted by Mara Culp a Ph.D. candidate in the Music Education Department at Penn State University. This research proposal has been received by Penn State University's Institutional Review Board (IRB) and been determined to not require a formal IRB review because the research met the criteria for exempt research according to the policies of Penn State University and the provisions of applicable federal regulations..

The purpose of this study is to determine the relationship between music aptitude and phonological awareness in elementary students with speech sound disorders.

Dr. Sharon Salter, Director of Special Education as well as Donnan Stoicovy, Principal of Park Forest Elementary School are in support of this project. Dr. Salter will be in attendance at the School Board Meeting on August 8, 2016, should you have any questions. We recommend approval of this research proposal.

Attachment

c: Sharon Salter
Donnan Stoicovy

April 22, 2016

Michael Hardy
Assistant Superintendent
State College Area School District
131 W. Nittany Avenue
State College, PA 16801

Hello Mr. Hardy:

My name is Mara Culp and I am a Ph.D. candidate studying music education. I am very interested in the relationship between students' potential to achieve in music (musical aptitude) and their ability to understand and manipulate speech sounds (phonological awareness). Previous research, including my own, has connected music aptitude and ability to phonological awareness. Researchers have also identified that music may be a useful therapeutic and remediation tool for students with speech sound disorders. I hope my research will shed further light on the relationship between musical abilities and phonological abilities.

To understand this relationship, a vocabulary, brief intelligence, music aptitude, and phonological awareness test will be administered to 37 students who receive services for a phonological process disorder or phonological delay. Speech-language pathologists (SLPs) will distribute consent forms designed by the researcher to students in first, second, and third grade. The primary researcher will work together with SLPs to administer all tests to participants and score the measures. Students will be tested on a rolling basis as consent forms are returned and each student will complete his/her tests within one month. If approved to collect data in the State College Area School district, data collection will begin in September 2016 and continue as needed until May 2017. For privacy purposes, all participants will be kept anonymous when and if results from the study are reported.

In addition to the potential benefits the results of this study could offer to other students with speech sound disorders, the information collected may also serve to improve instruction for each child. With parental permission, information collected from this study can be provided to the speech-language therapist.

I have had very pleasant experiences conducting research in the SCASD in the past and am excited at the opportunity to work with members of the faculty and staff once again. Please be in touch if you would like me to clarify anything and I look forward to hearing from you.

Sincerely,

Mara E. Culp



EXEMPTION DETERMINATION

Date: April 22, 2016

From: Courtney Whetzel, IRB Analyst

To: Mara Culp

Type of Submission:	Initial Study
Title of Study:	the relationship between music aptitude and phonological awareness in elementary students with speech sound disorders
Principal Investigator:	Mara Culp
Study ID:	STUDY00004505
Submission ID:	STUDY00004505
Funding:	Beels-Dunikowski Fund
Documents Approved:	<ul style="list-style-type: none"> • Beels Dunikoski SSD Study.xlsx (0.01), Category: Sponsor Attachment • HRP-591 - Protocol for Research - SSDs - Version 3.pdf (0.05), Category: IRB Protocol • Kaufman Brief Intelligence Test, Second Edition.pdf (0.01), Category: Data Collection Instrument • KBIT sample test items.pdf (0.01), Category: Data Collection Instrument • KBIT test form.pdf (0.01), Category: Data Collection Instrument • PAT-2 Test Form.pdf (0.01), Category: Data Collection Instrument • Peabody Picture Vocabulary Test, Fourth Edition.pdf (0.01), Category: Data Collection Instrument • PMMA - Tonal and Rhythm.pdf (0.01), Category: Data Collection Instrument • PPVT sample test items.pdf (0.01), Category: Data Collection Instrument • PPVT test form.pdf (0.01), Category: Data Collection Instrument

The Office for Research Protections determined that the proposed activity, as described in the above-referenced submission, does not require formal IRB review because the research met the criteria for exempt research according to the policies of this institution and the provisions of applicable federal regulations.

Continuing Progress Reports are **not** required for exempt research. Record of this research determined to be exempt will be maintained for five years from the date of this notification. If

your research will continue beyond five years, please contact the Office for Research Protections closer to the determination end date.

Changes to exempt research only need to be submitted to the Office for Research Protections in limited circumstances described in the below-referenced Investigator Manual. If changes are being considered and there are questions about whether IRB review is needed, please contact the Office for Research Protections.

Penn State researchers are required to follow the requirements listed in the Investigator Manual ([HRP-103](#)), which can be found by navigating to the IRB Library within CATS IRB (<http://irb.psu.edu>).

This correspondence should be maintained with your records.



HRP-591 - Protocol for Human Subject Research

Protocol Title:

The Relationship Between Phonological Awareness and Music Aptitude in Students with Speech Sound Disorders

Principal Investigator:

Name: Mara Culp
Department: Music Education
Telephone: 517.403.9811
E-mail Address: mec334@psu.edu

Version Date:

4.22.16

Clinicaltrials.gov Registration #:

n/a

Important Instructions for Using This Protocol Template:

1. Add this completed protocol template to your study in CATS IRB (<http://irb.psu.edu>) on the “Basic Information” page, item 7.
2. This template is provided to help investigators prepare a protocol that includes the necessary information needed by the IRB to determine whether a study meets all applicable criteria for approval.
3. **Type your protocol responses below the gray instructional boxes of guidance language. If the section or item is not applicable, indicate not applicable.**
4. **For research being conducted at Penn State Hershey or by Penn State Hershey researchers only, delete the instructional boxes from the final version of the protocol prior to upload to CATS IRB (<http://irb.psu.edu>). For all other research, do not delete the instructional boxes from the final version of the protocol.**
5. When making revisions to this protocol as requested by the IRB, please follow the instructions outlined in the Study Submission Guide available in the Help Center in CATS IRB (<http://irb.psu.edu>) for using track changes.

If you need help...**University Park and other campuses:**

[Office for Research Protections Human Research Protection Program](#)
The 330 Building, Suite 205
University Park, PA 16802-7014
Phone: 814-865-1775
Fax: 814-863-8699
Email: irb-orp@psu.edu

College of Medicine and Hershey Medical Center:

[Human Subjects Protection Office](#)
90 Hope Drive, Mail Code A115, P.O. Box 855
Hershey, PA 17033
(Physical Office Location: Academic Support Building Room 1140)
Phone: 717-531-5687
Fax number: 717-531-3937
Email: irb-hspo@psu.edu

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1.0 Objectives

1.1 Study Objectives

The purpose of this study is to examine the relationship between phonological awareness and music aptitude in early elementary students with speech sound disorders.

1.2 Primary Study Endpoints

Understand the nature of the relationship between music aptitude and phonological awareness in 1st-3rd grade students with phonological process disorders.

1.3 Secondary Study Endpoints

n/a

2.0 Background

2.1 Scientific Background and Gaps

- Phonological awareness and music aptitude (music discrimination) has been positively correlated among K and 1st grade students (Peynirciog˘lu, Durgunog˘lu, & ˘ney-K˘sefog˘lu, 2002).
 - Typical and dyslexic (often associated with language disability) students (Forgeard, et al., 2008)
 - Previous study found tonal aptitude more correlated with phonological awareness (Forgeard, et al., 2008).
- Students with speech sound disorders may have deficits in phonological awareness (Kleeck, Gillam, & McFadden, 1998)
 - Speech sound disorders:
 - Articulation (oral motor disability)
 - Phonological Processing (cognitive, language disability)
- Not all students with speech sound disorders have difficulty distinguishing between phonemes in spoken language (Bauman-Waengler, 2012)
 - Studies have correlated poor speech perception abilities and/or relatively poor receptive vocabulary skills with lower phonological awareness for pre-K students with speech sound disorders, articulation was not significant (Rvachew, & Grawburg, 2006)
- No study has examined the relationship between music aptitude (music discrimination) with phonological awareness for students with phonological processing errors

2.2 Previous Data

In 2013-2014 the primary researcher conducted a preliminary study to examine the relationship phonological awareness and music aptitude in 2nd grade students (IRB #45672) (Culp, 2015b). The purpose of this study was to discover the relationship between phonological awareness and music aptitude. To examine this relationship, *The Phonological Awareness Test 2 (PAT-2)* and the *Intermediate Measure of Music Audiation (IMMA)* were administered to second-grade students in a rural elementary school in Pennsylvania ($N= 17$). Speech-language specialists administered a hearing screening and the PAT-2 individually to participants and scored the measures.

Correlations. Findings indicate a positive relationship was found between PAT-2 standardized composite scores and IMMA raw tonal subtest scores ($r = .485, p = .048$).

Predictions. A linear regression helped the researcher determine IMMA raw tonal subtest scores were reasonable predictors of PAT-2 standardized composite scores ($R^2 = .236, F(1,15) = 4.624, p = .048, SE = 6.560$). The predictive potential of IMMA scores for PAT-2 scores may indicate improving music aptitude early in life may naturally improve phonological awareness.

2.3 Study Rationale

Results from previous studies indicate a relationship between music aptitude and phonological awareness, a skill that is closely related to speech and reading skills (Culp, 2015b; Forgeard et al., 2008). Students who receive services for phonological disorders are more likely to have deficits in phonological awareness (Bauman-Waengler, 2012; Kleeck et al., 1998) and, therefore, have difficulties with reading. Results of this investigation could help demonstrate that musical skills and language skills are related in students with SSDs.

Understanding this relationship could support the development of musical remediation methods that SLPs can use. Results could also encourage schools to allow students to remain in music classrooms to further develop musical skills. Additional emphasis on the student's musical development in these ways could help students improve verbal communication and cultivate musical ways of expression simultaneously.

3.0 Inclusion and Exclusion Criteria

3.1 Inclusion Criteria

- **Students**
 - 1st grade, 2nd and 3rd grade students
 - Attend school in a research location
 - Receive speech services for only phonological process disorders
 - Gender: Males and Females
 - Have no impairments that could negatively influence success on assessments
 - Score within acceptable ranges for screenings (vocabulary, intelligence)
 - Speak English fluently
 - Have normal hearing
 - Have normal oral motor function

3.2 Exclusion Criteria

- **Students**
 - Not in 1st grade, 2nd and 3rd grade
 - Do not attend school in a research location
 - Receive speech services for conditions more complex than phonological process disorders
 - Fail screenings
 - Receive educational support services for conditions that could negatively affect their success on assessments
 - Do not speak English fluently
 - Do not have normal hearing
 - Do not have normal oral motor function

3.3 Early Withdrawal of Subjects

3.3.1 Criteria for removal from study

- **Students**
 - Dismissed from speech services before data collection ends
 - Does not complete all assessments in timeframe
 - Begins receiving education services for conditions that could negatively affect scores on assessments

3.3.2 Follow-up for withdrawn subjects

Subjects will be withdrawn immediately when and if the above conditions are met. They will be notified in writing.

Subjects may be replaced in order to meet desired numbers (37 students)

Speech-language pathologists (SLPs) will be asked to identify new potential participants. When additional potential participants are identified, study procedures for recruiting and consenting the students will be followed.

4.0 Recruitment Methods

4.1 Identification of subjects

SLPs the researcher has contact with will identify students to whom they provide services for phonological processes in grades 1-3 with no additional impairments that may influence scores on measurements; who are proficient in English; have normal hearing and oral motor function.

4.2 Recruitment process

Speech-language pathologists will distribute consent forms to 1st-3rd grade students to whom they provided services for phonological disorders at the research sites. The consent form will include a first-round due date (two weeks from the first distribution date). On the first-round due date, a second consent form will be distributed containing a final due date (two weeks from the second distribution date). The primary researcher will collect consent letters from SLPs.

4.3 Recruitment materials

Student recruitment letter: attached

4.4 Eligibility/screening of subjects

SLPs the researcher has contact with will identify students to whom they provide services for phonological processes in grades 1-3 with no additional impairments that may influence scores on measurements; who are proficient in English; have normal hearing and oral motor function. Students will be included in the study if they do not fall below normal ranges (no more than 2 SD below standardized mean scores) on two measures:

1. Receptive vocabulary: Peabody Picture Vocabulary Test (PPVT-4) (Dunn & Dunn, 2007)
2. Intelligence: Kaufman Brief Intelligence Test (KBIT-2) (Kaufman & Kaufman, 2004)

5.0 Consent Process and Documentation

5.1 Consent Process

5.1.1 Obtaining Informed Consent

5.1.1.1 Timing and Location of Consent

Speech-language pathologists will distribute consent forms to 1st-3rd grade students to whom they provided services for phonological disorders at the research sites. The consent form will include a first-round due date (two weeks from the first distribution date). On the first-round due date, a second consent form will be distributed containing a final due date (two weeks from the second distribution date). The primary researcher will collect consent letters from SLPs.

5.1.1.2 Coercion or Undue Influence during Consent

Students are not receiving grades or credit for participation in the study. Therefore, that should minimize the likelihood of coercion.

5.1.2 Waiver or alteration of the informed consent requirement

n/a

5.2 Consent Documentation

5.2.1 Written Documentation of Consent

- Consent letters and return envelopes will be distributed by SLPs
- Students will return consent letters in envelopes to SLPs
- SLPs will give the letters to primary researcher who will store letters in her locked office
- Letter uploaded in the IRB submission

5.2.2 Waiver of Documentation of Consent (Implied consent, Verbal consent, etc.)

n/a

5.3 Consent – Other Considerations

5.3.1 Non-English Speaking Subjects

n/a

5.3.2 Cognitively Impaired Adults

5.3.2.1 Capability of Providing Consent

n/a

5.3.2.2 Adults Unable To Consent

n/a

5.3.2.3 Assent of Adults Unable to Consent

n/a

5.3.3 Subjects who are not yet adults (infants, children, teenagers)

5.3.3.1 Parental Permission

Speech-language pathologists will distribute consent forms to 1st-3rd grade students to whom they provided services for phonological disorders at the research sites. Parents will fill out the consent forms and give them to the students to return to the SLPs. The consent form will include a first-round due date (two weeks from the first distribution date). On the first-round due date, a second consent form will be distributed containing a final due date (two weeks from the second distribution date). The primary researcher will collect consent letters from SLPs.

5.3.3.2 Assent of subjects who are not yet adults

n/a

6.0 HIPAA Research Authorization and/or Waiver or Alteration of Authorization

6.1 Authorization and/or Waiver or Alteration of Authorization for the Uses and Disclosures of PHI

Check all that apply:

- Not applicable, no identifiable protected health information (PHI) is accessed, used or disclosed in this study.** *[Mark all parts of sections 6.2 and 6.3 as not applicable]*
- Authorization will be obtained and documented as part of the consent process.** *[If this is the only box checked, mark sections 6.2 and 6.3 as not applicable]*
- Partial waiver is requested for recruitment purposes only (Check this box if patients' medical records will be accessed to determine eligibility before consent/authorization has been obtained).** *[Complete all parts of sections 6.2 and 6.3]*
- Full waiver is requested for entire research study (e.g., medical record review studies).** *[Complete all parts of sections 6.2 and 6.3]*
- Alteration is requested to waive requirement for written documentation of authorization (verbal authorization will be obtained).** *[Complete all parts of sections 6.2 and 6.3]*

6.2 Waiver or Alteration of Authorization for the Uses and Disclosures of PHI

n/a

6.2.1 Access, use or disclosure of PHI representing no more than a minimal risk to the privacy of the individual

6.2.1.1 Plan to protect PHI from improper use or disclosure

6.2.1.2 Plan to destroy identifiers or a justification for retaining identifiers

6.2.2 Explanation for why the research could not practicably be conducted without access to and use of PHI

6.2.3 Explanation for why the research could not practicably be conducted without the waiver or alteration of authorization

6.3 Waiver or alteration of authorization statements of agreement

n/a

7.0 Study Design and Procedures

7.1 Study Design

The study will utilize a correlational design. Data will be obtained from standardized measures: Primary Measures of Music Audiation (PMMA) (Gordon, 1986) and The Phonological Awareness Test – 2 (PAT-2) (Robertson & Salter, 2007), Peabody Picture Vocabulary Test (PPVT-4) (Dunn & Dunn, 2007), and Kaufman Brief Intelligence Test (KBIT-2) (Kaufman & Kaufman, 2004).

7.2 Study Procedures

Speech-language pathologists will distribute consent forms to 1st-3rd grade students to whom they provide services for phonological disorders. Participants will be pulled from classrooms, complete assessments during therapy sessions, or meet before/after school to complete all assessments on an individual, rolling basis as consent forms are returned. Receptive vocabulary and intelligence tests will be completed first. Participants will complete all other measures within one month and no more than four measures will be completed on a given day.

Speech-language pathologists can administer phonological assessments as well as intelligence and receptive vocabulary screenings as part of their typical work with students. All assessments used in the study may be commonly used by SLPs for assessing students on their caseloads and are within their scope of practice. For that reason, data generated from the study will be able to be used in the future or current treatment of the student participants.

The PAT-2 will be administered and scored by SLPs. The primary researcher will administer and score the tonal and rhythm subtests of the PMMA on separate days. Either the SLP or the primary researcher will administer the PPVT-4 and/or the KBIT-2, depending on the SLP's availability and preference. All testing will take place in either the speech-language space, music space, or other designated and private area.

Order of testing (upon consent):

1. PPVT-4 or KBIT-2
2. KBIT-2 or PPVT-4
3. PAT-2, PMMA Tonal, or PMMA Rhythm
4. PMMA Tonal, PMMA Rhythm, or PAT-2
5. PMMA Rhythm, PAT-2, or PMMA Tonal

7.2.1 EXAMPLE: Visit 1 or Day 1 or Pre-test, etc. (format accordingly)

Visit	Test	Length in Minutes	Test Administrator
1	PPVT-4 (vocabulary)	10	SLP or PI
	KBIT-2 (cognitive screen)	15	SLP or PI
	PMMA Tonal (music aptitude)	20	PI

7.2.2 EXAMPLE: Visit 2 or Day 2 or Post-test, etc. (format accordingly)

Visit	Test	Length in Minutes	Test Administrator
2	PMMA Rhythm (music aptitude)	20	PI
	PAT-2 (phonological awareness)	30	SLP

7.3 Duration of Participation

Students can expect to spend approximately 95 minutes in testing.

8.0 Subject Numbers and Statistical Plan

8.1 Number of Subjects

37 will be included in the study. If students fall below normal ranges on receptive vocabulary (PPVT-4) and intelligence (KBIT-2) measures, additional subjects will be recruited to reach 37.

8.2 Sample size determination

In a previous investigation phonological awareness was correlated with music aptitude at $r = .485$ (Culp, 2015a). A power analysis revealed 37 students would be sufficient to produce statistically significant correlations, where $\alpha = .05$, $\beta = .80$, and $r \geq .4$.

8.3 Statistical methods

Age (year;months; birth date) will be gathered so that scores can be compared to age-based norms. Data pertaining sex, languages spoken, race, ethnicity, and SES as determined by zip code of school will be gathered to further define the sample. Reporting such data is standard practice in literacy and speech investigations.

Pearson product-moment correlation coefficients will be computed between composite and subtest scores obtained from the PMMA and the PAT-2. Evidence of correlational agreement between measures of musical aptitude and phonological awareness will be evaluated as a means of providing support for the notion that the constructs occur simultaneously to similar degrees.

Speech-language specialists will score the PAT-2. Standardized scores on the PAT-2 subtests and the composite score will be determined for each participant. The primary researcher will score the PMMA, yielding raw numerical scores for subtests as well as a composite score for each participant. Speech-language specialists and/or the primary researcher will administer and score the PPVT-4 and/or the KBIT-2, yielding standardized scores. Data from participants score at or more than 2 standard deviations below the standardized mean on the KBIT-2 (intelligence); more than 2 standard deviations below the standardized mean for students with language delay or impairment on the PPVT-4 will not be used in the final analysis. A linear regression using PMMA (i.e., rhythm, tonal), PPVT-4, and KBIT-2 will be used to develop a mathematical model for predicting PAT-2 composite and subtest scores.

9.0 Confidentiality, Privacy and Data Management

9.1 Confidentiality

9.1.1 Identifiers associated with data and/or specimens

- Classroom Teacher
- Student Name (first and last)
- Grade in school
- Sex (male, female, other)
- Age (in years and months)
- Languages spoken in the home (listed)
- Languages spoken by child fluently (listed)
- Ethnicity (Not Hispanic or Latino ; Hispanic or Latino)
- Race (indicate all appropriate)
- School name
- School city
- School zip code for SES
- SLP name
- Parent's name, phone number, and email

9.1.1.1 Use of Codes, Master List

All information will be stored on a master spreadsheet. The first spreadsheet will include all information, including test scores, and will not be coded. A second master spreadsheet will be derived from the raw data in order to de-identify participants. A key for the codes will be stored separately. All information will be stored on the primary researcher's password protected computer. Data will be stored for 5 years and then destroyed. Only Mara Culp (primary researcher) will have access to the full list.

Data included on spreadsheet without codes

How the data will be coded for spreadsheet

- Classroom Teacher
 - (code number)
- Student Name (first and last)
 - (research number)
- Grade in school
 - (number = 1, 2, 3)
- Sex (male, female, other)
 - (code number = 1, 2, 3)
- Age (in years and months)
 - (numeric in months)
- Languages spoken in the home (listed)
 - (coded: 1 = 1 (English only); 2 = More than 1 (English and more))
- Ethnicity (Not Hispanic or Latino ; Hispanic or Latino)
 - (coded 1 = Not Hispanic or Latino; 2 = Hispanic or Latino)
- Race (indicate all appropriate)
 - (coded 1 = majority; 2 = minority)
- School name
 - (pseudonym or code number)
- School city
 - (code number)
- School zip code for SES

- (coded, each zip code will receive a code)
- SLP name
 - (pseudonym or code number)
- Parent's name, phone number and email –
 - Not included on the coded spreadsheet
- Numeric test scores

9.1.2 Storage of Data and/or Specimens

Paper assessments will be stored by the primary researcher in her locked office or home desk. Information that can be beneficial for treating students SLPs see for therapy (i.e., KBIT-2, PPVT-4, PAT-2) will be stored by the SLP for as long as the student is receiving treatment from them and in line with their school's policy for maintaining student records. It is anticipated this information will not be stored by SLPs for longer than 5 years. Documents maintained by the primary researcher will be destroyed after 5 years. Master lists will be stored as password-protected files on Box.com in the even the primary researcher's hard drive fails.

9.1.3 Access to Data and/or Specimens

Only the primary researcher will have access to all student data. SLPs will have access to the data of their students that could be beneficial for therapy for the student and may be collected as part of their scope of practice therapy (i.e., KBIT-2, PPVT-4, PAT-2)

9.1.4 Transferring Data and/or Specimens

n/a

9.2 Subject Privacy

- Information about disabilities will not be obtained from student school files by the primary researcher. SLPs have access to this information as part of their regular contact with students. Students SLPs identify for participation in the study will not have additional relevant impairments and have normal hearing and oral-motor function. By recommending a student for participation, that information is implied to the primary researcher; however, specifics regarding hearing ability or the presence of other disabilities unrelated to the study will not be disclosed. By consenting to allow their child to participate, guardians recognize this information will be shared because it is contained in the consent letter.
- Letters will be sent home to parents for consent.
- Student names will not be reported as part of the study

10.0 Data and Safety Monitoring Plan

n/a

10.1 Periodic evaluation of data

n/a

10.2 Data that are reviewed

n/a

10.3 Method of collection of safety information

n/a

10.4 Frequency of data collection

n/a

10.5 Individuals reviewing the data

n/a

10.6 Frequency of review of cumulative data

n/a

10.7 Statistical tests

n/a

10.8 Suspension of research

n/a

11.0 Risks

Students may be pulled from regular class time for assessments.

Students may not be familiar with the primary researcher, who will administer some tests.

Loss of confidentiality is a risk. These risks will be minimized on electronic documents via password protections on master lists and the researcher's password-protected computer. Regarding hard copies, the researcher keeps her home and office locked when she is not present.

12.0 Potential Benefits to Subjects and Others

12.1 Potential Benefits to Subjects

Knowledge gained as a result of this study could improve the treatment for student participants by providing more information about their current levels of achievement.

Student participants could feel happy to know that their time spent in this research could help improve instruction for other students in the future.

12.2 Potential Benefits to Others

Results from previous studies indicate a relationship between music aptitude and phonological awareness, a skill that is closely related to speech and reading skills. Students who receive services for phonological disorders are more likely to have deficits in phonological awareness (Bauman-Waengler, 2012; Kleeck et al., 1998) and, therefore, have difficulties with reading. Results of this investigation could help demonstrate that musical skills and language skills are related in students with SSDs. Understanding this relationship could support the development of musical remediation methods that SLPs can use. Results could also encourage schools to allow students to remain in music classrooms to further develop musical skills.

13.0 Sharing Results with Subjects

Parents will be able to obtain results of student's scores. Once the consent forms have been returned, parents will be contacted to arrange a testing schedule. At that time, they will be able to provide a mailing address in order to have the results mailed or they will be able to choose to have results emailed with identifiers removed.

14.0 Subject Stipend (Compensation) and/or Travel Reimbursements

n/a

15.0 Economic Burden to Subjects

n/a

15.1 Costs

n/a

15.2 Compensation for research-related injury

n/a

16.0 Resources Available

16.1 Facilities and locations

All testing will take place in private areas of the student participant's school location (e.g., speech-language space, music space), depending on the availability of the school's resources.

16.2 Feasibility of recruiting the required number of subjects

SLPs treat approximately 21 students with articulation and phonological errors on their average caseload (ASHA, 2014). It is expected that approximately half of that number is comprised of students with phonological disorders. Therefore, each SLP will have approximately 10 students on their caseload that could be included in the study. The primary researcher's previous work with SLPs yielded a 75% participation rate for the student's they contacted to be involved in the research (Culp, 2015a). If only 50% of the student's contacted participate, approximately 80 students through 8 SLPs will need to be recruited.

Therefore, it is expected that 60 participants will be recruited in the hopes of having 37 participate.

16.3 PI Time devoted to conducting the research

The PI will not be completing coursework next year and will solely be gathering data and writing up the dissertation. Therefore, up to 40 hours per week will be available for data collection between May 1, 2016 and May 1, 2017.

Over the course of those 12 months, it is expected that approximately 60 hours will be spent recruiting, (10 hours per week until completed), 74 hours will be spent testing (5 hours per week until completed), 200 hours will be spent traveling to research locations (10 per week until completed), and 40 hours will be spent analyzing data.

16.4 Availability of medical or psychological resources

n/a

16.5 Process for informing Study Team

The study team consists of the primary researcher and her dissertation advisor. The dissertation advisor will receive updates as needed regarding the number of SLPs who have agreed to test within their scope of practice, participants recruited, and participants tested. Such communications are expected to occur approximately once per month.

17.0 Other Approvals

17.1 Other Approvals from External Entities

When an SLP agrees to consider identifying participants for the study, the SLP will determine the protocols and permissions needed to conduct research in the given school district and inform the PI before consent letters are sent home in that district. The primary research will adhere to all parameters set forth by the given school district.

17.2 Internal PSU Committee Approvals

n/a

Check all that apply:

- Anatomic Pathology – Hershey only – Research involves the collection of tissues or use of pathologic specimens. Upload a copy of the Use of Human Tissue For Research Form on the “Supporting Documents” page in CATS IRB. This form is available on the IRB website at: <http://www.pennstatehershey.org/web/irb/home/resources/forms>
- Animal Care and Use – All campuses – Human research involves animals and humans or the use of human tissues in animals
- Biosafety – All campuses – Research involves biohazardous materials (human biological specimens in a PSU research lab, biological toxins, carcinogens, infectious agents, recombinant viruses or DNA or gene therapy).
- Conflict of Interest Review – All campuses – Research has one or more of study team members indicated as having a financial interest.
- Radiation Safety – Hershey only – Research involves research-related radiation procedures. All research involving radiation procedures (standard of care and/or research-related) must upload the Radiation Review Form on the “Supporting Documents” page in CATS IRB. This form is available on the IRB website at: <http://www.pennstatehershey.org/web/irb/home/resources/forms>
- IND/IDE Audit – All campuses – Research in which the PSU researcher holds the IND or IDE or intends to hold the IND or IDE.
- Scientific Review – Hershey only – All investigator-written research studies requiring review by the convened IRB must provide documentation of scientific review with the IRB submission. The scientific review requirement may be fulfilled by one of the following: (1) external peer-review process; (2) department/institute scientific review committee; or (3) scientific review by the Clinical Research Center Advisory committee. NOTE: Review by the Penn State Hershey Cancer Institute Scientific Review Committee is required if the study involves cancer prevention studies or cancer patients, records and/or tissues. For more information about this requirement see the IRB website at: <http://www.pennstatehershey.org/web/irb/home/resources/investigator>

18.0 Multi-Site Research

n/a

18.1 Communication Plans

n/a

18.2 Data Submission and Security Plan

n/a

18.3 Subject Enrollment

n/a

18.4 Reporting of Adverse Events and New Information

n/a

18.5 Audit and Monitoring Plans

n/a

19.0 Adverse Event Reporting

19.1 Reporting Adverse Reactions and Unanticipated Problems to the Responsible IRB

In accordance with applicable policies of The Pennsylvania State University Institutional Review Board (IRB), the investigator will report, to the IRB, any observed or reported harm (adverse event) experienced by a subject or other individual, which in the opinion of the investigator is determined to be (1) unexpected; and (2) probably related to the research procedures. Harms (adverse events) will be submitted to the IRB in accordance with the IRB policies and procedures.

20.0 Study Monitoring, Auditing and Inspecting

20.1 Auditing and Inspecting

The investigator will permit study-related monitoring, audits, and inspections by the Penn State quality assurance program office(s), IRB, the sponsor, and government regulatory bodies, of all study related documents (e.g., source documents, regulatory documents, data collection instruments, study data etc.). The investigator will ensure the capability for inspections of applicable study-related facilities (e.g., pharmacy, diagnostic laboratory, etc.).

21.0 Future Undetermined Research: Data and Specimen Banking

21.1 Data and/or specimens being stored

Data from assessments and participant information will be stored for future use.

21.2 Location of storage

Hard copies of the assessments and demographic sheets that include student names will be kept by the primary researcher in her home in a locked cabinet. Data on excel master spreadsheets will be stored only on the primary researcher's password-protected computer and also as password-protected files on Box.com in the event the hard drive on the PI's computer fails.

21.3 Duration of storage

Up to 5 years for all hard copy and electronic data.

21.4 Access to data and/or specimens

Only the primary researcher will have access to stored data.

21.5 Procedures to release data or specimens

Schools and school personnel will not be given the option of requesting the data after it has been disseminated to them as a part of the current research study. Only the primary researcher will have access to stored data. SLPs who administered screenings and identified students as part of the current study may have access to their student scores and affiliated language tests if they are affiliated with a follow-up study.

21.6 Process for returning results

Data from the assessments will be reported to the parents and SLPs at the completion of the study via a hard copy of the assessment data in numeric form mailed to them through the post office or electronically mailed to them with identifiers removed. The SLPs and parents will not have access to the data via the primary researcher again after that.

22.0 References

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- Rvachew, S., & Grawburg, M. (2006). Correlates of phonological awareness in preschoolers with speech sound disorders. *Journal of Speech, Language, and Hearing Research*, 49(1), 74-87. doi:10.1044/1092-4388(2006/006)

Hello,

I hope this letter finds you well. My name is Mara Culp and I am a Ph.D. candidate at Penn State. I received your name from _____ because she thought you may be interested in participating in a study set to commence in September 2016, but as early as May 2016. This study, to understand the relationship between music aptitude and phonological awareness, is being conducted through The Pennsylvania State University. **The procedures for the study have been approved by the Institutional Review Board (IRB# 4505) at Penn State.**

I have worked closely with SLPs in previous studies and look forward to potentially working with you. Currently, SLPs are being sought to help identify potential participants and to administer and score some testing materials. The attached letter outlines the study procedures, timelines, and data collection tools. You will be asked to administer two measures - a hearing screening and the phonological assessment. A music professional will administer the music aptitude test. The remaining tests (i.e., receptive vocabulary and cognitive assessment) can be administered by you or a music professional.

As a speech-language professional, you will likely be familiar with the measures. If you choose to participate with the study, I can meet with you personally to discuss data collection procedures and set up a schedule that works for you and your students. If you agree to participate, the study will take about 1 hour of your time for each child. Please review the materials and contact me if you are interested in identifying potential participants and collecting data for the study. I look forward to working with you.

All the best,

Mara E. Culp

Information Form for Social Science Research

Human Subjects Approval has been granted by: The Pennsylvania State University (IRB# 4505)

Title of Project: **The relationship between music aptitude and phonological awareness in students with speech sound disorders**

Principal Investigator:

Mara Culp

The Pennsylvania State University

251 Music Building 1

University Park, PA, 16802

Mec334@psu.edu; 814.867.0114

1. Purpose of the Study: The purpose of this study is to determine **the relationship between music aptitude and phonological awareness in elementary students with speech sound disorders.**

2. Procedures to be followed:

Students will be removed from classes, stay after school or come to school early to complete tests. Parental and family preferences will be considered when tests are scheduled as well as school schedules and room availability. All testing will be completed in private areas of the school such as, the music space, speech-language space. All times are approximate and all tests will be completed within one month.

A. Student Selection and Consent

1. Student Participants

- a. SLPs will select students in 1st, 2nd or 3rd grade with:
 - i. phonological disorders (e.g., phonological processes) (8 or above) or language delay (7 or below) who have
 - ii. no additional disabilities or impairments that could negatively influence their success on assessments (e.g., hearing loss, Down syndrome, cerebral palsy, cleft palate, autism, cognitive impairments, neurological disorder)
 - iii. normal hearing and oral-motor function
- b. A maximum of 37 students will be used in this study, recruited on a rolling basis. The first 37 students to return consent forms will be included in the study. Thereafter, students will be placed on a list and contacted should more participants be needed.

2. Consent form

- a. SLPs will distribute and collect consent forms
- b. Consent forms will be collected from the SLPs by the primary researcher

C. Study Procedures:

1. Peabody Picture Vocabulary Test (PPVT-4) (Receptive Vocabulary Test)

- a. The primary researcher or SLP administer to students in the speech-language space, or other private area

2. Kaufman Brief Intelligence Test (KBIT-2) (Basic Cognitive Screen)

- a. The primary researcher or SLP administer to students in the speech-language space, or other private area

3. **Primary Measures of Music Audiation (PMMA) (Music Aptitude Test)**
 - a. The primary researcher will administer the music aptitude test to students in the music room, speech-language space, or other private area
4. **The Phonological Awareness Test 2 (PAT-2) (Phonological Awareness)**
 - a. SLP will administer in the dedicated speech-language space or other private area

3. Duration/Time:

1. PPVT-4 (Receptive Vocabulary) (10 minutes)
2. KBIT-2 (Cognitive Screen) (15 minutes)
3. PAT-2 (Phonological Awareness) (30 minutes)
4. PMMA (Music Aptitude) (40 minutes)
 - a. Tonal Music Aptitude (20 minutes)
 - b. Rhythm Music Aptitude (20 minutes)

Example of a Potential Testing Schedule

Day	Test	Length in Minutes	Test Administrator
1	PPVT-4 (vocabulary)	10	SLP or PI
	KBIT-2 (cognitive screen)	15	SLP or PI
	PMMA Tonal (music aptitude)	20	PI
2	PMMA Rhythm (music aptitude)	20	PI
	PAT-2 (phonological awareness)	30	SLP

Note. PI = Primary Investigator

Note. All tests will be completed within one month. Students will be removed from classrooms or meet before or after school for testing. Final scheduling of testing will be determined by the schedule of the research site, SLP, and student.

4. Statement of Confidentiality: The student’s participation in this research is confidential. Students will be assigned a number for research purposes. Parents and the child’s speech-language pathologist, if indicated by parents, will have access to student results through the primary researcher. However, parents and students will not be made aware of the student’s assigned number for research purposes. In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared.

5. Right to Ask Questions: Please contact Mara Culp at 814.867.0114 or mec334@psu.edu with questions or concerns about this study.

6. Voluntary Participation: The decision to participate in this research is voluntary. The student can stop participating in the study at any time. A legal guardian at least 18 years of age or older will consent for student’s to participate in this research.

7. The **guardian’s signature** implies that s/he has read the consent form and consent for the student to take part in the research and will provide demographic information to be used as part of the study. A copy must be returned to the student’s SLP and will be kept by the primary researcher for five years. A copy of the consent form will be provided families for future reference.

8. **Obtaining student results:** Student scores on test measures will be made available to parents through the primary researcher. After consent forms are returned, parents will be contacted by the primary researcher to schedule testing times. At that time, arrangements will be made for supplying student scores. It is intended that scores will be made available upon each student's completion of all measures and no later than March 31, 2017.

9. The **signed consent forms** and the **completed parental questionnaire sheet** should be placed in a sealed envelope and hand-delivered by the student to the speech-language therapist. Mara Culp (primary researcher) will collect them.



[Date]

Greetings Parents and Guardians,

You are receiving this letter because your child is being invited to participate in a research study conducted through Penn State. My name is Mara Culp and I am a Ph.D. candidate studying music education. I am very interested in the relationship between students' potential to achieve in music (musical aptitude) and their ability to understand and manipulate speech sounds (phonological awareness).

Previous research, including my own, has connected music aptitude and ability to phonological awareness. Researchers have also identified that music may be a useful therapeutic and remediation tool for students with speech sound disorders. I hope my research will shed further light on the relationship between musical abilities and phonological abilities.

To understand this relationship, vocabulary, brief intelligence, music aptitude, and phonological awareness tests will be administered to students who receive services for a phonological process disorder or phonological delay. The speech-language therapist at your child's school will be involved in the project and has identified your student as a potential participant.

In addition to the potential benefits the results of this study could offer to other students with speech sound disorders, the information collected may also serve to improve instruction for your child. With your permission, information collected from this study can be provided to the speech-language therapist.

Please review the information included to determine if your student will be able to participate.

I look forward to working with you and your child,

Mara Culp

Implied Informed Consent Form for Social Science Research

Human Subjects Approval has been granted by: The Pennsylvania State University
(IRB# 4505)

Title of Project: **The relationship between music aptitude and phonological awareness in students with speech sound disorders**

Principal Investigator:
Mara Culp
The Pennsylvania State University
251 Music Building 1
University Park, PA, 16802
Mec334@psu.edu; 814.867.0114

1. Purpose of the Study: The purpose of this study is to determine **the relationship between music aptitude and phonological awareness in elementary students with speech sound disorders.**

2. Procedures to be followed:

Students will be removed from classes, stay after school or come to school early to complete tests. Parental and family preferences will be considered when tests are scheduled as well as school schedules and room availability. All testing will be completed in private areas of the school such as, the music space, speech-language space. All times are approximate and all tests will be completed within one month.

A. Student Selection and Consent

1. Participants

- a. A maximum of 37 students will be used in this study. Therefore, students will be recruited on a rolling basis. The first 37 students to return consent forms will be included in the study. After the 37, students returning consent forms will be placed on a list and contacted should more participants be needed.
- b. Speech-language pathologists (SLPs) will select students in 1st, 2nd or 3rd grade with phonological process disorders or phonological delays who:
 - i. have no additional relevant disabilities or impairments (e.g., Down syndrome, cerebral palsy)
 - ii. have normal hearing
 - iii. have normal oral-motor function

2. Consent form

- a. Child's speech-language pathologist (SLP) will distribute consent forms. Return consent forms as soon as possible, and no later than _____

B. Study Procedures:

1. Vocabulary test

- a. The primary researcher or SLP will administer. Students who score below cutoff scores will not be included in the study.

2. Brief intelligence test

- b. The primary researcher or SLP will administer. Students who score below cutoff scores will not be included in the study.

3. Music Aptitude

- a. The primary researcher will administer

4. Phonological Awareness

- a. SLP will administer

3. Duration/Time:

1. Vocabulary Test (10 minutes)
2. Brief Intelligence Test (15 minutes)
3. Phonological Awareness Test (30 minutes)
4. Music Aptitude Test (40 minutes)
 - a. Tonal Music Aptitude (20 minutes)
 - b. Rhythm Music Aptitude (20 minutes)

4. Statement of Confidentiality: The student's participation in this research is confidential. Students will be assigned a number for research purposes. Parents and the child's speech-language pathologist, if indicated by parents, will have access to student results through the primary researcher. However, parents and students will not be made aware of the student's assigned number for research purposes. In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared.

5. Right to Ask Questions: Please contact Mara Culp at 814.867.0114 or mec334@psu.edu with questions or concerns about this study.

6. Voluntary Participation: The decision to participate in this research is voluntary. The student can stop participating in the study at any time. You must be the student's legal guardian and at least 18 years of age or older to sign this form and consent for your student to participate in this research.

7. Your **signature** implies that you have read the information in this form and consent for your student to take part in the research and will provide demographic information to be used as part of the study. Please sign and date the form at the bottom if you agree to these terms. A copy must be returned to the student's speech-language pathologist and will be kept by the primary researcher for five years. A copy of this form is also included for your records or future reference.

8. Obtaining student results: Student scores on test measures will be made available to parents through the primary researcher. After consent forms are returned, the primary researcher will contact you to schedule testing times. At that time, arrangements will be made for supplying student scores. It is intended that scores will be made available upon each student's completion of all measures.

9. The **signed consent form** should be placed in a sealed envelope and hand-delivered by your student to the speech-language therapist. Mara Culp (primary researcher) will collect them.

Check one:

_____ I grant permission for speech and language test results to be supplied to my child's speech-language pathologist

_____ I DO NOT grant permission for speech and language test results to be supplied to my child's speech-language pathologist

Guardian Signed Name

Date

Guardian Printed Name

Date

Phone Number: _____ Email: _____

Student Printed Name

Date

Student Grade in School: _____

Student Birth Date (month, day, year): _____

Student Sex: _____

Languages Spoken in the Home: (please list) _____

Languages Spoken by Student Fluently: (please list) _____

Ethnicity: (circle one) Not-Hispanic or Latino ; Hispanic or Latino

Race: (list all) _____

Name of Elementary School

Zip Code

Name of Speech-Language Pathologist



April 22, 2016

It is my distinct pleasure to enthusiastically support Mara E. Culp's request to gather data for her dissertation project in the State College Area School District. Ms. Culp is a Ph.D. candidate (ABD) in Music Education at The Pennsylvania State University and I am serving as chair of her committee. I first met Ms. Culp when she was a student of mine in 2005 through the *Summer Research Opportunity Program* (SROP) at The Pennsylvania State University. Since that time she was a K-12 music teacher in Michigan and then completed her M.M.E. degree at Penn State, followed by her enrollment in our Ph.D. program. I have advised many of her research projects and supervised her work as a teaching assistant and intern in undergraduate music education courses, which included supervising pre-service students' experiences with teachers in the SCASD.

Ms. Culp has great interest in speech and language and the relationship of these skills with music skills and music aptitude; her work integrating these fields is unique and cutting edge. She developed a cognate in Speech and Language, taking classes in that department. She has already conducted several research projects in this area, some in collaboration with faculty in the Speech and Language department, and has presented these projects at the Pennsylvania Speech-Language-Hearing Association (PSHA) State Conferences in addition to many state, regional, and national Music Education conferences. Her recent research was just accepted for presentation at the Seminar of the *Music in Special Education and Music Therapy Commission of the International Society for Music Education*, which will be held this summer in Europe. She has also shared the application of her work with teachers at conferences and has been invited to present to undergraduate students at several institutions of higher education. The quality and quantity of her professional activity is unusual for a Ph.D. student at her stage in the program. She is already a fine scholar whose unique and integrative work is receiving much attention from the speech-language and music education communities.

Ms. Culp's dissertation includes two studies she has already completed and a third, new, related study. Her proposal for this study has been accepted by her committee and approved by the Penn State IRB. Her work is consistently superb and her proposal the best I have seen yet from one of our students.

Ms. Culp is extremely bright, focused, organized, and dedicated. Based on my many experiences with her as a researcher and teacher I am confident that she will follow all her research protocols and your guidelines to the letter. I highly recommend that you approve her request. Thank you for your consideration.

Sincerely,

Joanne Rutkowski (electronic signature)

Joanne Rutkowski, Ph.D.
Professor Emeritus, Music Education
814-360-0119
rvi@psu.edu