Developing a Sight-Reading Pedagogy for the Brass Studio: The Use of Supplemental Material to Improve Sight-Reading Ability

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ABSTRACT

The purpose of this dissertation is to outline an effective pedagogical approach to advancing the sight-reading skills of brass musicians. Guided by the underlining cognitive mechanism of schema and the findings of Jennifer Mishra's meta-analysis, training of fundamental skills correlated to sight-reading ability is the most efficient method for improving sight-reading ability. Included within this study are practice techniques and supplemental materials that are conducive to the advancement of sight-reading ability. Rather than practicing sight-reading to advance that particular skill, the benefits of sight-reading training could include an accelerated learning process, a broadened knowledge of musical patterns, and a greater cognitive efficiency in music making. In this way, the musician is not just training one auxiliary skill, but improving themselves as a whole. In this sense, sight-reading training is the key for musicians to be successful in the competitive musical circuit.

CHAPTER I – INTRODUCTION

In an increasingly competitive musical world, college studios face the challenge of implementing a comprehensive curriculum with relatively limited face time. One vital area that subsequently becomes underrepresented in brass studio teaching is sight-reading. For most professors, this is not a direct oversight, but instead a result of the prioritization of essential skills. Although select situations include sight-reading, such as professional auditions, music reading by brass musicians today involves mostly prepared literature. This prioritization is not shared by all musicians.

For other instrumentalists, particularly pianists who work as accompanists, the demand for advanced sight-reading ability is apparent. Dr. Alex Maynegre-Torra, Austin Staff accompanist, describes the training that a pianist entering the field needs in order to be successful:

> *"…Extended study also gives pianists more time to immerse themselves in the western canon of music, which is essential since it will give the Accompanist a stronger, well-practiced repertoire he or she can draw upon when needed. The more experience you can get sight-reading the better, whether accompanying choirs, individual singers or instrumentalists, or four hands with another pianist… The more music you get exposed to, the better.*[1]*"*

What Dr. Maynegre is describing is not the use of sight-reading ability only for the initial reading, but for its practical benefits through the learning process. Sight-reading, in this instance, can be viewed as an initial stage of learning, with advanced

[1] Alex Maynegre-Torra, *Become an Accompanist,* Retrieved from https://www.careersinmusic.com/accompanist.

sight-readers being able to process music notation more efficiently and develop its realization in performance. This theory of the fundamental nature of sight-reading could allow for two very promising projections.

First, the advancement of sight-reading ability, especially early on, could allow musicians to read through a greater volume of literature, advancing their individual schema[2] of music, and subsequently improving reading ability in a positive feedback loop. The term schema refers to the building blocks of cognition and is the framework by which learning is theorized to function (see chapter 3 for more information).

Second, this advancement could lead to greater cognitive efficiency in reading, allowing musicians to focus on higher orders of music making, such as interpretation, expressivity, and audience-performer connection[3]. When viewing sight-reading training, not just for the primary skill, but for its auxiliary benefits, its place in the brass studio curriculum becomes much clearer. The awareness of this benefit has become more apparent in recent years, not just with the expansion of sight-reading literature for brass, but also from the influx of research into brass sight-reading, starting in the late 1980s (see literature review). The question now is how to best teach sight-reading performance.

In a straight-forward manner, the skill might be improved by its repetition, that is to refine sight-read ability by being constantly involved in the process of reading new literature. This approach could be seen as a "learn-by-doing" process. This method poses several problems, the first of which is how to continually obtain new and relevant literature to allow the repetition of this process? Secondly, assuming the first problem is

[2] David E. Rumelhart, "Schemata: The Building Blocks of Cognition," In *Theoretical Issues in Reading Comprehension,* edited by R. J. Spiro, Hillsdale, NJ: Lawrence Erlbaum, 1980.
[3] Thomas Wolf, "A Cognitive Model of Musical Sight-Reading," *Journal of Psycholinguistic Research* 5, no. 2 (1976).

solved, how should the music be implemented? Should the musician focus solely on the initial reading process or use the literature as both a technical exercise and for pattern recognition training. To address both of these concerns, refer to an innovative piece of literature in sight-reading, Jennifer Mishra's "Factors Related to Sight-Reading Accuracy: A Meta-Analysis" [4].

With the meta-analysis, Mishra examined previous research-variables and combined the data in order to determine their relationship to sight reading ability. This study examined 92 research studies that reported a correlation between sight-reading and other variables. These variables, as Mishra describes are divided into two categories: stable characteristics and learned behaviors. After analysis, the factors found to most often correlate with sight-reading ability were improvisation, ear-training ability, technical ability, and music knowledge, all of which are learned behaviors. Rather than using a traditional method of practicing sight-reading through its repetition, the results of Mishra's study suggests a more efficient path to sight-reading mastery.

This study uses the correlating variables as underlining mechanisms on which to outline effective practice techniques and music literature that is conducive to the advancement to sight-reading ability. All recommended exercises, practice techniques, and suggested literature proposed uses this concept of underlining mechanisms as a guiding philosophy of sight-reading education.

[4] Jennifer Mishra, "Factors Related to Sight-Reading Accuracy," *Journal of Research in Music Education* 61, no. 4 (2013).

Purpose of Research

The purpose of this study is to outline an effective pedagogical approach to advancing the sight-reading skills of brass musicians. Although sources for brass sight-reading do exist (refer to the latter half of the literature review), most of these materials focus mainly on the act or assessment of sight-reading and not the sight-reading education itself. "Elements of an Effective Sight-Reading Pedagogy", which is included in chapter 4, contains examples of suggested materials for sight-reading, as well as a guide to creating and identifying useful materials/techniques. This should not be seen as a complete list, but rather a starting point. Readers are encouraged to take these techniques and regularly implement them in their own studio, band, or in personal practice. Using this prescribed outline will, in theory, provide musicians with the opportunity of greater mastery of sight-reading with all its auxiliary benefits.

CHAPTER II – LITERATURE REVIEW

Music sight-reading is a complex collection of cognitive and physical processes. In reflection, the research about sight-reading is just as diverse in focus. There are studies examining factors that influence sight-reading ability, such as stable characteristics verses learned behaviors, as well as research on the physical phenomena recorded in the body and mind of a musician while sight-reading. There is a wide assortment of educational research on methods to improve sight-reading and the emerging technologies being developed to meet this education need.

This chapter of the paper is a comprehensive survey and examination of materials pertinent to sight-reading ability and education. This literature review does not include non-research articles, unpublished dissertation or theses, or online discussions of sight-reading as they do not fit within the scope of this paper. Future researchers could use these sources to examine the perception of sight-reading ability and its teachability by the larger community.

This literature review attempts to catalog all current writings on sight-reading into a coherent narrative, under digestible categories designed to lead the reader from homogeneous topic to topic. In order to allow the reader effective use of this document, this chapter is broken into two sections: “Research on sight-reading” and “Sight-reading performance literature”. These sections are further divided into categories with subsequent subcategories.

Research on Sight-Reading

This section of the literature review focuses on all available research materials written specifically about sight-reading. Articles found within are research-based and

cross a wide range of disciplines, cultures, and periods of time. Currently, one hundred and twenty-five dissertations and research articles are included within the scope of this section. Documents that are non-experimental or that are not published are outside the scope of this section. Perhaps in later writings, other researchers could cover these types of material, viewing the cultural perceptions of sight-reading pedagogy and its effect of the larger field. The following six tables outline the basic characteristics of these studies:

Qualitative Examination of Sight-Reading Research

Table 1

			Total No.	*Diss. No.*	*Journal No.*	*Earliest*	*Latest*
Factors Correlating to Sight-Reading Ability			**42**	**20**	**22**	**1953**	**2012**
Characteristic Factors of	Individual	Keyboard/Sting Sight-Reading	8	3	5	1978	2012
		Vocal Sight-Reading	10	5	5	1956	1995
		Wind Sight-Reading	10	5	5	1953	2009
	Ensemble	Vocal Sight-Reading	1	-	1	-	1986
Contextual Factors of	Individual	Keyboard/Sting Sight-Reading	4	1	3	1967	1995
		Vocal Sight-Reading	8	6	2	1962	2006
		Wind Sight-Reading	1	-	1	-	1972

Table 2

			Total No.	*Diss. No.*	*Journal No.*	*Earliest*	*Latest*
Characteristics of Sight-Reading Education			**53**	**36**	**17**	**1935**	**2016**
Instruction of	Individual	Keyboard Sight-Reading	13	9	4	1963	2009
		Vocal Sight-Reading	13	10	3	1946	1998
		Wind Sight-Reading	15	11	4	1980	2016
	Ensemble	Vocal Sight-Reading	3	2	1	1975	2004
		Wind Sight-Reading	3	2	1	1970	1992
Assessment of	Individual	Keyboard Sight-Reading	2	-	2	1935	1973
		Vocal Sight-Reading	3	2	1	1965	2001
		Wind Sight-Reading	1	-	1	-	1982

Table 3	*Total No.*	*Diss. No.*	*Journal No.*	*Earliest*	*Latest*
Developing Technologies in Sight-Reading	**8**	**8**	**-**	**1954**	**2010**
Research of Sight-Reading Technology	8	8	-	1954	2010

Table 4	*Total No.*	*Diss. No.*	*Journal No.*	*Earliest*	*Latest*
Perceptual, Psychological, and Neurological Research on Sight-Reading	**18**	**6**	**12**	**1929**	**2011**
Eye-Hand Span in Music	3	-	3	1974	1999
Eye Movement in Sight-Reading	8	5	3	1971	2011
Psychology and Sight-Reading	4	-	4	1929	1998
Sciences and Sight-Reading	3	1	2	1930	2002

Table 5	*Total No.*	*Diss. No.*	*Journal No.*	*Earliest*	*Latest*
The State of Literature in Sight-Reading	**4**	**-**	**4**	**1987**	**2013**
Literature Reviews on Sight-Reading	3	-	3	1987	2005
Meta-Analysis on Sight-Reading	1	-	1	-	2013

Table 6	*Total No.*	*Diss. No.*	*Journal No.*	*Earliest*	*Latest*
Total Results for Sight-Reading Literature	**125**	**70**	**55**	**1929**	**2016**

For most of the literature review, studies are broken into music production mode (keyboard, voice, wind, etc.). These areas have interareal differences in pedagogical methods and, as a result, use mostly individualized techniques for sight-reading pedagogy. Despite this, researchers have observed the effects of using these types of instruction in areas in which they did not originate.[5]

[5] Rochelle Mann, *The Use of Kodaly Instruction to Develop the Sight-Reading Skills of Undergraduate Flute Students*. Diss., Arizona State University, 1991.

For both of these reasons, the instrument production mode is grouped into three major categories: 1) keyboard/sting sight-reading [mostly visual/physical production], 2) Vocal sight-reading/singing [non-visual/physical production], 3) wind sight-reading [a combination of non-visual/physical and physical/visual elements]. Every effort has been made to break these researcher articles down by music production modes for the readers convinces. For further explanation, see Appendix A "Annotated Bibliography of Research Articles".

Factors Correlating to Sight-Reading Ability

This category focuses on the correlation between the measurable characteristics of the individual or ensemble and their sight-reading ability. The notation, context of reading, and external sensory input are grouped into a secondary focus, labeled "Contextual Factors", and filed under a later subcategory. The label "Factors…" implies that the researcher is changing select variables around the test subject, and not changing the educational environment, as this is covered in the following category "Characteristics of Sight-Reading Education". Additionally, all works contained in this category are written primarily by music researchers, educators, and performers. Interdisciplinary writings on sight-reading are covered in the latter category of "Perceptual, Psychological, and Neurological Research on Sight-Reading".

Characteristic Factors of Individual Keyboard/Sting Sight-Reading

This subcategory focuses on research that attempts to find possible correlating factors to sight-reading ability, specifically with pianists. Discussed in this section are eight different researchers, Alexander[6], Cox[7], Eaton[8], Kopiez[9], Kornicke[10], Lehmann[11], Meinz[12], and Montano[13]. Before discussing their results, it should be noted that the meta-analysis conducted by Jenifer Mishra has evaluated and synthesized the results from many of these sources.

In this subcategory of research, the following are examples of factors that were examined: “Pitch Ability”, “Sight-Reading Experience”, “Pattern Recognition”, “Pre-performance Analysis”, “Early Musical Training”, “Memorization”, “Aural Skills”, and “Improvisation”.

The results of this research found that “Pitch Ability”, “Sight-Reading Experience”, “Early Musical Training”, “Aural Skills”, and “Improvisation” was highly correlated with sight-reading ability. “Pattern Recognition” and “Memorization” had mixed results amongst different researchers, and “Pre-performance Analysis” showed no correlation to sight-reading ability. Comparing these results to that of Mishra, there are

[6] Michael Alexander and Michele Henry, "The Development of a Sting Sight-Reading Pitch Skill Hierarchy," *Journal of Research in Music Education* 60, no. 2 (July 2012).
[7] Buford Cox, *Factors Associated with Success in Sight Reading Four-Part Chordal Piano Music*, Diss., Auburn University, 2000.
[8] Jack Eaton, *Correlation Study of Keyboard Sight-Reading Facility with Previous Training, Note-Reading, Psychomotor, and Memorization Skills*, Diss., Indiana University, 1978.
[9] Kopiez, Reinhard, Claus Weihs, Uwe Ligges, and Ji In Lee, "Classification of High and Low Achievers in a Music Sight-reading Task," *Psychology of Music* 34, no. 1 (2006): 5-26.
[10] Eloise Kornicke, *An Exploratory Study of Individual Difference Variables in Piano Sight-Reading Achievement*, Diss., Indiana University, 1992.
[11] Andreas Lehmann, "Review of Component Skills Involved in Sight Reading Music." *Psychomusicology: A Journal of Research in Music Cognition* 19, no. 2 (2007).
[12] Elizabeth Meinz and David Hambrick, "Deliberate Practice Is Necessary but Not Sufficient to Explain Individual Differences in Piano Sight-Reading Skill," *Psychological Science* 21, no. 7 (2010).
[13] David Montano, "Effect of Improvising in Given Rhythms on Piano Students’ Sight Reading Rhythmic Accuracy Achievement," *Missouri Journal of Research in Music Education* 5, no. 1 (1985).

no direct conflicts, and interestingly enough, improvisation is the highest correlating factor in both this subcategory and Mishra's meta-analysis.

Characteristic Factors of Individual Vocal Sight-Reading

This subcategory focuses on research that attempts to find possible correlating factors to the sight-reading ability of vocalists. The nine researchers publishing in this area are Bolden[14], Demorest[15], Killian[16], Larson[17], Lueft[18], Ottman[19], Read[20], Thostenson[21], and Tucker[22].

In this subcategory of research, the following are examples of factors that were examined: "Music Experience", "Keyboard Training", "Aural Language Reading", "Recorder Training", "Private Instruction", "Pitch Systems", "Error Perception", "Dictation", "Standardized Test Results", "Aural Skills", "Music Interest", and "Memory".

The results of all this research found that "Aural Language Reading", "Private Instruction", "Movable Do Systems", "Error Perception", "Dictation", "Aural Skills", and "Memory" were widely considered highly correlating factors. "Music Experience",

[14] Joyce Bolden, *The Influence of Select Factors on Growth in Sight Singing and Rhythmic Reading*, Diss., Michigan State University, 1967.
[15] Steven Demorest and Michele Henry, "Individual Sight-Singing Achievement in Successful Choral Ensembles," *Update: Applications of Research in Music Education* 13, no. 1 (1994).
Steven Demorest and William May, "Sight-Singing Instruction in the Choral Ensemble: Factors Related to Individual Performance," *Journal of Research in Music Education* 43, no. 2 (1995).
[16] Janice Killian, "The Relationship Between Sightsinging Accuracy and Error Detection in Junior High Singers," *Journal of Research in Music Education* 39, no. 3 (1991).
[17] Richard Larson, "Relationships Between Melodic Error Detection, Melodic Dictation, and Melodic Sightsinging," *Journal of Research in Music Education* 25, no. 4 (1977).
[18] Lorraine Lueft, *The Effect of Keyboard Training on the Ability to Sightsing*, Diss., Indiana University, 1974.
[19] R. Ottman, *A Statistical Investigation of the Influence of Selected Factors on the Kill of Sight-Singing*, Diss., North Texas State College, 1956.
[20] Read, John W. *An Investigation of the Relationship of Selected Variables to Sight-Singing Ability*. Diss., North Texas State University, 1968.
[21] Martin Thostenson, "The Study and Evaluation of Certain Problems in Eartraining Related to Achievement in Sightsing and Music Dictation," *Bulletin of the Council for Research in Music Education* 11 (1967).
[22] David Tucker, *Factors Related to Musical Reading Ability of Senior High School Students Participating in Choral Groups*, Diss., University of California- Berkeley, 1969.

"Keyboard Training", and "Recorder Training" had mixed findings amongst the researchers, and "Standardized Test Results" and "Music Interest" were considered to have no correlation to sight-reading ability. Comparing these results to that of Mishra, "Private Instruction" is the only direct contradiction between the individual studies and the meta-analysis. All other categories are relatively close to their correlation factor in both sources.

Characteristic Factors of Individual Wind Sight-Reading

This subcategory focuses on research that attempts to find possible correlating factors to the sight-reading ability of wind instrumentalists. The ten researchers publishing in this area are Ciepluch[23], Elliott[24], Gromko[25], Hayward[26], Luce[27], McPherson[28], Miller[29], Thompson[30], Thompson[31], and Townsend[32].

In this subcategory of research, the following are examples of factors that were examined: "Music Aptitude", "Grade Point Average", "Achievements in Mathematics", "Achievements in Reading", "Technical Proficiency", "Rhythmic Proficiency", "Sight-

[23] Gary Ciepluch, *Sightreading Achievement in Instrumental Music Performance, Learning Gifts, and Academic Achievement: A Correlation Study*, Diss., The University of Wisconsin- Madison, 1988.
[24] Charles Elliott, "The Relationships Among Instrumental Sight-Reading Ability and Seven Selected Predictor Variables," *Journal of Research in Music Education* 30, no. 1 (1982).
[25] J. Gromko, "Predictors of Music Sight-Reading Ability in High School Wind Players." *Journal of Research Music Education* 52, no. 1 (2004).
[26] Carol Hayward, "Relationship Among Music Sight-Reading and Technical Proficiency, Spatial Visualization, and Aural Discrimination," *Journal of Research in Music Education* 57, no. 1 (2009).
[27] John Luce, "Sight-Reading and Ear-Playing Abilities as Related to Instrumental Music Students," *Journal of Research in Music Education* 13, no. 2 (1965).
[28] Gary McPherson, "Factors and Abilities Influencing Sightreading Skill in Music," *Journal of Research in Music Education* 42, no. 3 (1994).
[29] Ross Miller, *Contributions of Selected Music Skills to Music Sight-Reading Achievement and Rehearsed Reading Achievement*, Diss., the University of Illinois at Urbana-Champain, 1988.
[30] Albert Thompson, *An Analysis of Difficulties in Sight Reading Music for Violin and Clarinet*, Diss., University of Kentucky, 1953.
[31] William Thompson, *Sources of Individual Differences in Music Sight-Reading Skill*, Diss., University of Missouri-Columbia, 1985.
[32] Glenn Townsend, *Relationship Between Sight-Reading Ability of College Freshman Wind Instrumentalists and Music Experience, Band Experience, and Music Aptitude*, Diss., The Pennsylvania State University, 1991.

singing Ability", "Music Theory Grade Point Average", "Audiation", "Visual Field Articulation", "Spatial Orientation", "Aural Skills", "Eye-Hand Span", and "Experience".

The collective results of the research found a high correlation between sight-reading and the following factors: "Technical Proficiency", "Rhythmic Proficiency", "Audiation", "Spatial Orientation", "Aural Skills", "Eye-Hand Span", and "Experience". The only conflict in the research was on the factor "Achievements in Reading" which had two sources with conflicting findings. No correlation was found in the factors of "Music Aptitude", "Grade Point Average", "Achievements in Mathematics", "Sight-singing Ability", "Music Theory Grade Point Average", and "Visual Field Articulation".

Comparing these results to that of Mishra, "Spatial Orientation" is the only contradiction between the individual studies and the meta-analysis. This pertains to the degree to which the factor is correlating and not whether the factor is correlating or non-correlating . The remaining categories are relatively close to their correlation factor in both sources.

Characteristic Factors of Ensemble Vocal Sight-Reading

This subcategory of factors relating to sight-reading ability focuses on the vocal ensembles, and currently only contains one study by Daniels[33]. This study looks at both characteristic factors, such as the choir and the choir teacher, and contextual factors, in this case, the school. It also examines the curriculum for possible correlations to sight-reading ability. What separates this category from "Individual Vocal Sight-Reading" is that the assessment of sight-reading takes as a vocal ensemble during the study. When

[33] Rose Daniels, "Relationships Among Selected Factors and the Sight-Reading Ability of High School Mixed Choirs," *Journal of Research in Music Education* 34, no. 4 (1986).

the distinction between individual and ensemble is made, it refers to in what context is sight-reading is being measured, rather than the researchers intended benefits.

What the study finds is that all of the following correlated with choir sight-reading success: the ethnic makeup of the school, a large percentage of choir students with a piano in their home, a rural school, an occasional use of rote procedure to teach music, a large percentage of choir students who participate in all-state chorus, large proportion of choir students with experience playing a musical instrument, large high school, and a chorus teacher who believes in the importance of sight-reading instruction in the high school chorus. It is important to understand the relationship between correlation and causation with these findings. Even though two events are highly correlating, this does not mean that one event causes the other, directly or indirectly[34].

Contextual Factors of Individual Keyboard/String Sight-Reading

This subcategory focuses on how the context affects the musician's ability to sight-read, rather than measurements of the individual. The four researchers publishing in this area are Banton[35], Combs[36], Lehmann[37], and Salzberg[38]. The contextual factors examined throughout the research is "Visual Feedback", "Auditory Feedback", "Kinesthesis", "Accompanying", "Counting Aloud", and "Tapping the Beat". Of these

[34] Helfand, David J. "8. Correlation, Causation . . . Confusion and Clarity." In *A Survival Guide to the Misinformation Age : Scientific Habits of Mind*. Columbia University Press, 2016.
[35] Banton, "The Role of Visual and Auditory Feedback During the Sight-Reading Process," *Psychology of Music and Music Education* 23 (1995).
[36] Joseph Combs, *The Problems of Sight-Reading on Mallet-Played Instruments and Their Relationship to Kinesthetic Sensation*, Diss., The University of Oklahoma, 1967.
[37] Andreas Lehmann and K. Ericsson, "Sight-reading Ability of Expert Pianists in the Context of Piano Accompanying," *Psychomusicology: A Journal of Research in Music Cognition* 12, no. 2 (1993).
[38] Rita Salzberg and Cecilia Wang. "A Comparison of Prompts to Aid Rhythmic Sight-Reading of String Students," *Psychology of Music and Music Education* 17 (1989).

factors, “Visual Feedback” and “Counting Aloud” showed significant correlation while the other factors had low or no correlation.

Contextual Factors of Individual Vocal Sight-Reading

This subcategory focuses on how the context affects the musician’s ability to sight-read, particularly that of vocalists. The eight researchers publishing in this area are Denfelt[39], Fine[40], Hermann[41], Lucas[42], Marquis[43], O’Brien[44], Wollner[45], and Zimmerman[46]. The contextual factors examined in this research are “Composed Music”, “Contrived Music”, “Tonal Music”, “Atonal Music”, “School’s Organizational System”, “Harmonics Context”, “Interval Context”, “Use of Shape Note”, and “Auditory Feedback”. Of these factors, “Tonal Music”, “School’s Organizational System”, “Harmonics Context”, “Interval Context”, and “Auditory Feedback” showed a high correlation, while the remaining areas reported little to no correlation from the research.

[39] L. Danfelt, *An Experimental Study of Sight Singing of Selected Groups of College Music Students*, Diss., The Florida State University, 1970.
[40] Philip Fine, Anna Berry, and Burton Rosner, "The Effect of Pattern Recognition and Tonal Predictability on Sight-Singing Ability," *Music and Psychology Research* 34, no. 4 (2006).
[41] Evelyn Hermann, *A Comparison Study of the Sight-Reading Ability of Students Taught by the Music Specialist and of Students Taught by the General Teacher in a Self-Contained Classroom*, Diss., University of Oregon, 1962.
[42] Keitha Lucas, *The Effect of Contextual Condition on the Sightsinging Achievement of Middle School Choral Music Students*, Diss., University of Miami, 1991.
[43] James Marquis, *A Study of Interval Problems in Sight-Singing Performance with Consideration of the Effect of Context*, Diss., State University of Iowa, 1963.
[44] James O'Brien, *An Experimental Study of the Use of Shape Notes in Developing Sight Singing*, Diss., the University of Colorado, 1969.
[45] Clemens Wollner, Emma Halfpenny, Stella Ho, and Kaori Kurosawa, "The Effects of Distracted Inner Hearing While Sight-Reading," *Psychology of Music* 31, no. 4 (2003).
[46] Robert Zimmerman, *Relationship of Musical Environment to Choral Sight-Reading Ability*, Diss., University of Oregon, 1962.

Contextual Factors of Individual Wind Sight-Reading

This subcategory focuses on how the context effects a wind instrumentalist's ability to sight-read. There is only one study, written by Gregory[47], which focuses on the factor of "Rhythmic Notation". This study used different notation systems in order to find its correlating effects on sight-reading ability. Each of these notational styles had a distinct symbolic representation of rhythm, ranging from horizontal placement to note head shapes. The result is the first three notation systems, which were relatively traditional, had no correlation to sight-reading ability, but the fourth had a high negative correlation. This demonstrates the researcher's hypothesis that the more novel a notational system is, the more it is going to negatively impact sight-reading ability.

Characteristics of Sight-Reading Education

This category focuses on the correlation between educational techniques and change in sight-reading ability. The secondary focus is on the effectiveness of the sight-reading tests themselves, which are filed under the subcategories labeled "Assessment of…". When the assessments are used for the purpose of advancing sight-reading ability, this document is filed under the first subcategory, "Instruction of…". This is an example of practical learning or "learn-by-doing", which in itself is a type of instruction. Additionally, works contained in this category are written primarily by music researchers, educators, and performers. Interdisciplinary writings on sight-reading are covered below in the category of "Perceptual, Psychological, and Neurological Research on Sight-Reading".

[47] T. Gregory, "The Effect of Rhythmic Notation Variables on Sight-Reading Errors," *Journal of Research in Music Education* 20, no. 4 (1972).

Instruction of Individual Keyboard Sight-Reading

In this subcategory, the focus is on instructional methods to advance the sight-reading skills of pianists. The researchers working in this field are Beeler[48], Bozone[49], Dirkse[50], Fincher[51], Fjerstad[52], Hagen[53], Houston[54], Harding[55], Kostka[56], Pike[57], and Watkins[58].

This section tests the validity of the following instructional techniques: "Melodic Prestudy", "Rhythmic Cueing", "Sight-Singing", "Rote Instruction", "Metronomic Training", "Computer Assisted Instruction", "Reading Accelerators", "Error Detection Training", "Shadowing Prestudy", "Cognitive Chunking", and "Use of Recorded Soloist". Of these methods, the instructional techniques highly correlating with sight-reading ability were "Melodic Prestudy", "Sight-Singing", "Rote Instruction", "Cognitive Chunking", and "Use of Recorded Soloist". Of the remaining instructional techniques, little to no correlation to sight-reading ability was reported across the research.

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[48] Christian Beeler, *The Effects of Interval Prestudy and a Cue for Rhythmic Continuity on Piano Sight Reading Achievement of Group Piano Students*, Diss., The University of Texas at Austin, 1995.

[49] John Bozone, *The Use of Sight Singing as a Prestudy Aid for the Improvement of the Sight-Reading Skill of Second-Semester Class Piano Students*, Diss., The University of Oklahoma, 1986.

[50] Scott Dirkse, *A Survey of the Development of Sight-Reading Skills in Instructional Piano Methods for Average-Age Beginners and a Sample Primer-Level Sight-Reading Curriculum*, Diss., University of South Carolina, 2009.

[51] Betty Fincher, *The Effect of Playing the Melody by Rote During the Prestudy Procedure Upon Sight Reading Skill Development of Beginning Class Piano Students*, Diss., The University of Oklahoma, 1983.

[52] Clinton Fjerstad, *A Comparison of Tachistoscopic and Metronomic Training for Developing Sight-Reading of Harmonic Notation with Class Piano Instruction*, Diss., Indiana University, 1968.

[53] Sara Hagen, *The Effect of Computer-Assisted Instruction and Cognitive Style on Sight Playing Among University Group Piano Students*, Diss., The Florida State University, 2001.

[54] Dianne Hardy, *Teaching Sight-Reading at the Piano: Methodology and Significance*, Diss., Southwestern Oklahoma State University, 1992.

[55] Oliver Houston, *An Experimental Study of the Use of the Reading Accelerator in the Teaching of Keyboard Sight Reading*, Diss., the University of Colorado, 1963.

[56] Marilyn Kostka, "The Effects of Error-Detection Practice on Keyboard Sight-Reading Achievement of Undergraduate Music Majors," *Journal of Research in Music Education* 48, no. 2 (2000).

[57] Pamela Pike and Rebecca Carter, "Employing Cognitive Chunking Techniques to Enhance Sight-Reading Performance of Undergraduate Group-Piano Students," *International Journal of Music Education* 28, no. 3 (2010).

[58] Alice Watkins, *The Effect of the Use of a Recorded Soloist as an Aid to the Teaching of Sight Reading Accompaniments at the Piano*, Diss., The University of Oklahoma, 1984.
Alice Watkins and Marie A. Hughes, "The Effect of an Accompanying Situation on the Improvement of Students' Sight Reading Skills," *Psychology of Music and Music Education* 14 (1986).

Instruction of Individual Vocal Sight-Reading

The focus of this subcategory is instructional methods tested for their correlation to the advancement of sight-reading for vocalists. The researchers working in this field are Barnes[59], Buchanan[60], Cassidy[61], Demorest[62], Hammer[63], Helbing[64], Horton[65], Hutton[66], Justus[67], Kanable[68], Mayer[69], Parker[70], and Tucker[71]. This subcategory tests the validity of the following instructional techniques: "Interval Drills", "Fixed Do Training", "Movable Do Training", "Solfege Training", "Hand Sign Training", "Individual Testing", "Tachistoscopic Training", "Whole-Part Method", "Shape-Note", "Song Flute", "Sequential Structure", "Tap System", and "Rhythmic Drills". Of these methods, the instructional techniques highly correlating with sight-reading ability were "Interval Drills", "Movable Do Training", "Individual Testing", "Tachistoscopic Training", "Whole-Part Method", "Shape-Note", "Song Flute", and "Tap System". Of the remaining instructional techniques, little to no correlation to sight-reading ability was

[59] James Barnes, *Study of Interval Drill as It Affects Sight Singing Skill*, Diss., Indiana University, 1960.
[60] Walter Buchanan, *Comparison of Fixed and Movable Solfege in Teaching Sight Singing from Staff*, Diss., University of Michigan, 1946.
[61] Jane Cassidy, "Effects of Various Sightsinging Strategies on Nonmusic Major's Pitch Accuracy," *Journal of Research in Music Education* 41, no. 4 (1993).
[62] Steven Demorest, "Improving Sight-Singing Performance in the Choral Ensemble: The Effect of Individual Testing," *Journal of Research in Music Education* 46, no. 2 (1998).
[63] Harry Hammer, *An Experimental Study of the Use of the Tachistoscope in the Teaching of Melodic Sight-Singing*, Diss., the University of Colorado, 1961.
[64] Devon Helbling, *An Experimental Study of the Relative Effectiveness of "Whole" and "Part" Methods of Teaching Sight Singing*, Diss., Indiana University, 1965.
[65] Johnathan Horton, *The Relative Effectiveness of Three Systems of Sight Singing in Development of Melodic Sight-Singing Ability at the Sixth-Grade Level*, Diss., George Peabody College for Teachers, 1974.
[66] Doris Hutton, "A Comparative Study of Two Methods of Teaching Sight Singing in the Fourth Grade," *Journal of Research in Music Education* 1, no. 2 (1953).
[67] Lane Justus, *Evaluation of an Innovative Instructional Design for Sight Singing*, Diss., University of Arizona, 1970.
[68] Betty Kanable, *An Experimental Study Comparing Programmed Instruction with Classroom Teaching of Sight Singing*, Diss., Northwestern University, 1964.
[69] Edward Meyer, *The Relative Effectiveness of Vocal Instruction and Instrumental-Vocal Instruction on Sight Singing Achievement of Elementary Education Majors*, Diss., The University of Iowa, 1981.
[70] Parker, *The Relative Effectiveness of the Tap System in Instruction in Sight Singing: An Experimental Study*, Diss., University of Miami, 1979.
[71] Gerald Tucker, *The Influence of Isolated Rhythmic Drill on Growth in Sight Singing*, Diss., The University of Oklahoma, 1969.

reported across the research. It should be noted that most of the research focused on a single instructional technique, and only a few studies compared multiple methods.

Instruction of Individual Wind Sight-Reading

The focus of this subcategory is instructional methods tested for their correlation to the advancement of sight-reading abilities for wind instrumentalists. The researchers working in this field are Anderson[72], Barlar[73], Bernhard[74], Campbell[75], DiFronzo[76], Dunlap[77], Ferrin[78], Gaynor[79], Grutzmacher[80], Jarrell[81], Leafblad[82], Mann[83], McBride[84], Price[85], and Thornley[86].

This subcategory tested the validity of the following instructional techniques: "Recorded Models", "Tonal Pattern Training", "Rhythmic Training", "Tachistoscopic

[72] James Anderson, "Effects of Tape-Recorded Aural Models on Sight-Reading and Performance Skills," *Journal of Research in Music Education* 29, no. 1 (1981).
[73] Nancy Barlar, *The Effect of Sight-Reading Instruction on the Language Reading Fluency and Music Sight-Reading Ability of Middle School Band Students*, Diss., Boston University, 2010.
[74] Christian Bernhard, *The Effects of Tonal Training on the Melodic Ear Playing and Sight Reading Achievement of Beginning Wind Instrumentalist*, Diss., The University of North Carolina at Greensboro, 2003.
[75] Campbell, *A Comparison of Methods for Sight-Reading Development Utilizing Collegiate Saxophonist*, Diss., University of North Texas, 2016.
[76] Robert DiFronzo, *A Comparison of Tachistoscopic and Conventional Methods in Teaching Grade Three Music Sight-Playing on a Melody Wind Instrument*, Diss., The University of Connecticut, 1966.
[77] Michael Dunlap, *The Effects of Singing and Solmization Training on the Musical Achievement of Beginning Fifth-Grade Instrumental Students*, Diss., The University of Michigan, 1989.
[78] Craig Ferrin, *Music Reading Calisthenics: The Effect of a Consistent Regimen of Sightreading and The Effect of Educational Kinesiology Upon the Music Sightreading Skills of High School Music Students*, Diss., The University of Utah, 2003.
[79] Janice Gaynor, *Music Reading Comprehension: The Effect of Aid to Chunking and Melodic Predicting on Sight Reading Performance Achievement of Secondary School Instrumental Music Students*, Diss., The University of San Francisco, 1996.
[80] Patricia Grutzmacher, "The Effect of Tonal Pattern Training on the Aural Perception, Reading Recognition, and Melodic Sight-Reading Achievement of First-Year Instrumental Music Students," *Journal of Research in Music Education* 35, no. 3 (1987).
[81] Gail Jarrell, *An Examination of the Effects of Daily Rhythmic Dictation on the Accuracy of Sight-Reading Rhythms by Sixth Grade Beginning Band Students*, Diss., Troy State University, 1999.
[82] William Leafblad, "The Effect of the Use of Music Speed Reading on the Sight Reading Ability of Senior and Junior High School Instrumentalists," *Missouri Journal of Research in Music Education* 5, no. 2 (1984).
[83] Rochelle Mann, *The Use of Kodaly Instruction to Develop the Sight-Reading Skills of Undergraduate Flute Students*, Diss., Arizona State University, 1991.
[84] Jennifer McBride, *The Effect of Sequentially Organized Sight-Reading Pieces on the Sight-Reading Achievement of Intermediated School Instrumental Music Students*, Diss., California State University, 1993.
[85] Harry Price, Frank Blanton, and Regena Parrish. "Effects of Two Instructional Methods on High School Band Students' Sight-Reading Proficiency, Music Performance, and Attitude," *Update: Applications of Research in Music Education* 17, no. 1 (1998).
[86] Thomas Thornley, *A Design of an Instructional Program in the Sight Reading of Music*, Diss., University of Virginia, 1980.

Training", "Sight-Singing", "Solmization", "Cognitive Chunking", "Melodic Predicting Training", "Dictation", and "Literature Sequencing".

Of these methods, the instructional techniques highly correlating with sight-reading ability were "Tonal Pattern Training", "Tachistoscopic Training", "Melodic Predicting Training", and "Dictation". The following two methods were shown to have conflicting correlation between multiple research reports: "Sight-Singing" and "Solmization".

Instruction of Ensemble Vocal Sight-Reading

The focus of this subcategory is the instructional methods used by choral directors for the advancement of sight-reading in vocal ensembles. All three studies, conducted by Autry[87], Johnson[88], and Henry[89], specifically focused on sight-reading pitch accurately and the various methods to do so. This is in contrast with the later subcategories on assessments of sight-reading, which tend to focus on sight-reading rhythm accuracy. The results from this area suggest that the following instructional techniques are beneficial to choral ensembles sight-reading ability: the use of hand sign (although at slower tempi), and the use of solfege without hand signs. Interestingly, an increase in instructional time did not correlate to increased sight-reading accuracy. This would suggest that the choice of methodology is more important than the time spent using said methodology.

[87] Mollie Autry, *A Study of the Effect of Hand Signs in the Development of Sight Singing Skills*, Diss., The University of Texas at Austin, 1975.
[88] Michele Henry, "The Use of Targeted Pitch Skills for Sight-Singing Instruction in the Choral Rehearsal," *Journal of Research in Music Education* 52, no. 3 (2004).
[89] Greta Johnson, *A Descriptive Study of the Pitch-Reading Methods and the Amount of Time Utilized to Teach Sight Singing High School Choral Teachers in the North Central Region of the American Choral Directors Association*, Diss., University of Nebraska- Lincoln, 1987.

Instruction of Ensemble Wind Sight-Reading

The focus of this subcategory was the type of instruction directors used in order to increase the sight-reading ability of their bands. Two of the studies, by Boyle[90] and Warren[91], used observations from periodical sight-reading testing in order to draw meaningful conclusions. The final study, conducted by Sorrells[92], used prescribed teaching methods and then implemented sight-reading testing to find its effectiveness. The results suggest that the following instructional techniques are beneficial to ensemble sight-reading ability: prescribed rhythmical movements, modeling techniques, and the use of audiation.

Assessment of Individual Keyboard Sight-Reading

The two studies conducted in this subcategory, by Lowder[93] and Stelzer[94], have very different approaches to sight-reading assessment. Lowder, much like Elliott in "Assessment of Individual Wind Sight-Reading", focused on categorizing the error types made by pianists in order to make a more accurate sight-reading assessment. Stelzer uses analysis techniques developed by psychologists in order to find the reported difficulty of organ music using sight-reading tests. Beyond its primary focus, this research represents a practical use for sight-reading assessment.

[90] David Boyle, "The Effect of Prescribed Rhythmical Movements on the Ability to Read Music at Sight," *Journal of Research in Music Education* 18, no. 4 (1970).
[91] Melva Sorrells, *The Relationship of Festival Sightreading Room Educational Techniques to Superior Festival Ratings Among Sight School Concert Bands*, Diss., University of North Florida, 1992.
[92] Casey Warren, *An Analysis of Band Conductor Sight-Reading Behavior and Ensemble Preparation for Sight Reading*, Diss., The University of Oklahoma, 1988.
[93] Jerry Lowder, "Evaluation of a Sight-Reading Test Administered to Freshman Piano Classes," *Journal of Research in Music Education* 21, no. 1 (1973).
[94] Theo Stelzer, "Construction, Interpretation, and Use of a Sight Reading Scale in Organ Music with an Analysis of Organ Playing in Fundamental Abilities," *The Journal of Experimental Education* 7, no. 1 (1938).

Assessment of Individual Vocal Sight-Reading

In this subcategory, researchers worked to both design new sight-reading assessments and compare the relative effectiveness of existing tests. The three main scholars in this subcategory are Cooper[95], Nelson[96], and Henry[97]. All reported tests were confirmed to accurately measure sight-reading, and further reported rhythm consisting of the majority of errors made during sight-reading. There is an internal calling for replication studies, but none have thus far been published.

Assessment of Individual Wind Sight-Reading

This subcategory contains one study by Elliott[98] and focuses on the type of errors made during sight-reading, which were Pitch, Rhythm, Expression, Articulation, and Other. This system was employed to attempt to classify the types of errors being made and developing a rubric to sight-reading skill. The results of implementing this system are that nearly two-thirds of the errors made fit into the rhythm category. Although there isn't an internal calling for replication studies, the lack of research in this area warrants future investigations.

Developing Technologies in Sight-Reading

The category presented here contains all the available research on the emergence of technology in sight-reading, particularly as an educational device. It represents both

[95] John Cooper, *The Development of a Sight-Singing Achievement Test for Use with College Students*, Diss., the University of Colorado, 1965.
[96] Michele Henry, "The Development of a Vocal Sight-Reading Inventory." *Bulletin of the Council for Research in Music Education* 150 (2001).
[97] John Nelson, *A Comparison of Two Methods of Measuring Achievement in Sight Singing*, Diss., The University of Iowa, 1970.
[98] Charles Elliott, "Identification and Classification of Instrumental Performance Sight-Reading Errors," *Journal of Band Research* 18, no. 1 (1982).

the historical development of these later technologies and possible innovations that the field has yet to recognize. In examining the research, this category has many similar elements to others.

Much like the previous two categories, all of the research is being done by music professionals, although the topics of the research are relatively interdisciplinary. Regarding the studies within this category, the primary goal of the research is the development of these technologies with a secondary focus on their effectiveness as an instructional or assessment device. For all these reasons, this area, called "Developing Technologies in Sight-Reading", is separated into its own category with one major subcategory.

Research of Sight-Reading Technology

This category focuses on the development of sight-reading technologies through research. In the second half of the literature review, digital sources of sight-reading material are discussed. Readers interested in using digital materials should examine this category for both the development of the types of material available and the successful methodologies discovered through this research. The eight prominent scholars in this area are Kolb[99], Lemons[100], Platte[101], Rea[102], Streckfuss[103], Thompson[104], Tsangari[105],

[99] Randall Kolb, *A Real-Time Microcomputer-assisted System for Translating Aural, Monophonic Tones into Music Notation as an Aid in Sightsinging*, Diss., The Louisiana State University, 1984.
[100] Robert Lemons, *The Development and Trial of Microcomputer-Assisted Techniques to Supplement Traditional Training in Music Sightreading*, Diss., the University of Colorado at Boulder, 1984.
[101] Jay Platte, *The Effects of a Microcomputer-Assisted Instructional Program on the Ability to Sing Melodic Configurations at Sight*, Diss., Ball State University, 1981.
[102] Ralph Rea, *An Experimental Program for Improving the Sight-Reading Ability of Cornet and Clarinet Players*, Diss., The State University of Iowa, 1954.
[103] Robert Streckfuss, *The Effect of a Sight Reading Pacer Machine Upon the Sight Reading Ability of College Wind Instrumentalist*, Diss., The Catholic University of America, 1984.
[104] Edgar Thompson, *Sightsinging Constant Rhythm Pitch Phrases: A Computer Assisted Instruction*, Diss., University of Utah, 1973.
[105] Victoria Tsangari, *An Interactive Software Program to Develop Pianists' Sight-Reading Ability*, Diss., The University of Iowa, 2010.

Wakeland[106]. The main purpose of the research conducted in this category was to develop materials in order to advance sight-reading education.

An early technology, the pacer machine, was a common area of interest in its time. This machine functioned much like a film projector, where a role of music is transferred between to reels, and could control the pace at which the musician reads the music. The guiding philosophy behind this machine was the idea that training the eye was central to training sight-reading. Of the research that studied its effects, only one found the use of a pacer machine to be more effective than traditional training. This would suggest that physical training methods for sight-reading improvement might not be beneficial. In later subcategories, research of eye movements during sight-reading do report a change in behavior amongst skilled and unskilled sight-readers, but this subcategory suggests that it is not beneficial to base a sight-reading pedagogy on these results.

Other researchers sought to improve the technologies themselves in order to facilitate more accurate testing. Although most of the innovations have been tested and found promising results, one study, conducted in 2010 by Tsangari, focused on developing the software, but did not include experimentation as part of that document. Future research into the effectiveness of this proposed software is warranted.

[106] William Wakeland, *A Study of the Teaching of Sightsing of Melodic Configurations to a Group of Secondary-School Students by Means of a Teaching Machine*, Diss., Southern Illinois University, 1964.

Perceptual, Psychological, and Neurological Research on Sight-Reading

All documents in this category are written by either non-music professionals or with a focus that is primarily interdisciplinary in nature. The level of musical experience by each author is not attributed to this labeling. Rather, it is their professional title and the sources of which these documents are published that determine the materials qualification for this category. There are rare occasions that a non-music professional publishes a document in a professional music journal, or a dissertation is written about music by a non-music professional. In these cases, the work is again considered interdisciplinary. The separation of this section from others is to allow the reader context for the document and to show the scope of collaborative research that has been produced.

Eye-Hand Span in Sight-Reading

In this subcategory, the psychological phenomenon of "Eye-Hand Span" is examined in the context of sight-reading. Basically stated, this is the distance, in time, between where the musician is looking during sight-reading and where they are playing. Because of its physical nature, this subject primarily focuses on pianists. The three main scholars who have researched this topic are Furneaux[107], Sloboda[108], and Truitt[109].

The current research is in a general agreeance that the greater the sight-reading ability, the further ahead that reader can perceive, as well as how little time is required by the performer in order to accurately perform the sight-reading selection. It is shown that

[107] S. Furneaux and M. F. Land, "The Effects of Skill of the Eye-Hand Span During Musical Sight-Reading," *Proceedings: Biological Sciences* 266, no. 1436 (1999).
[108] John Sloboda, "The Eye-Hand Span—An Approach to the Study of Sight Reading," *Psychology of Music* 2 (1974).
[109] Frances E. Truitt, Charles Clifton, Alexander Pollatsek, and Keith Rayner, "The Perceptual Span and the Eye-Hand Span in Sight Reading Music," *Visual Cognition* 4, no. 2 (1997).

beginner sight-readers tend to make narrower visual span while sight-reading and there is an increase in error rates as the visualization time is decreased.

Eye Movement in Sight-Reading

In this subcategory, researchers observe where the eye is fixated and how often these fixations occur during the sight-reading process. This category is similar to the "Eye-Hand Span" but has a much more diverse set of auxiliary observations, such as notation complexity, duration of fixation, the frequency of fixation, experience in music reading, temporal settings, and high vs low achievement during sight-reading. The seven main scholars who have researched this subcategory are Chang[110], Goolsby[111], Halverson[112], Penttinen[113], Schmidt[114], Smith[115], and Young[116].

In its broad scope, the findings are equally as varied and there exist few replication studies. The general findings of the research are that more experienced sight-readers tend to have more frequent and shorter eye fixations, and eye fixations are longer in less experienced readers, subsequently scoring lower on the sight-reading test. The research found that temporal settings did not correlate with the frequency of eye fixations, while the complexity of the notation increased the number and frequency of those eye fixations.

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[110] Sun H. Chang, *A Study of Eye Movement During Sight-Reading of Selected Piano Compositions*, Diss., Columbia University Teachers College, 1993.
[111] Thomas Goolsby, "Eye Movement in Music Reading: Effects of Reading Ability, Notational Complexity, and Encounters," *Music Perception* 12, no. 1 (1994).
[112] David Halverson, *A Biometric Analysis of Eye Movement Pattern of Sight-Singers*, Diss., The Ohio State University, 1974.
[113] Marjaana Penttinen and Erkki Huovinen, "The Early Development of Sight-Reading Skills in Adulthood," *Journal of Research in Music Education* 59, no. 2 (2011).
[114] F. Schmidt, *The Eye Movement Patterns of Woodwind Instrument Performers While Sight-Reading*, Diss., The Ohio State University, 1981.
[115] Donald Smith, *An Investigation of the Effects of Varying Temporal Settings on Eye Movements While Sight-Reading Trumpet Music and While Reading Language Aloud*, Diss., The Pennsylvania State University, 1988.
[116] Leonora Young, *A Study of the Eye-Movement and Eye-Hand Temporal Relationship of Successful and Unsuccessful Piano Sight-Readers While Piano Sight-Reading*, Diss., Indiana University, 1971.

Psychology and Sight-Reading

Broader than the previous two subcategories, this subcategory focuses on any auxiliary sight-reading research conducted in psychology journals or by trained psychologists. The four main scholars who have researched this subcategory are Salisbury[117], Thompson[118], Waters[119], and Wolf[120]. The focus of these articles ranges from correlating factors, such as Thompson's research, to the cognitive modeling of sight-reading by Waters and Wolf, and the effectiveness of sight-reading education by the general teacher, by Salisbury. There are not correlating findings amongst the research, but these sources do illuminate the rarity of truly interdisciplinary research that is happening in the broader field of psychology and sight-reading. For further explanation of each research article, see Appendix A "Annotated Bibliography of Research Articles".

Science and Music

The main focus of this subcategory was sight-reading researcher conducted by scientists or science professionals, often times the mapping of brain activity during sight-reading, via an fMRI or MRI, . Currently one study, written by Krone[121], exists in this subcategory. This study was written in 1930 and focus on the development of sight-reading assessment tools. The other two scholars who have researched this subcategory are Schon[122] and Sergent[123]. The findings of both of these studies are that the same

[117] Frank Salisbury, "Prognosis of Sight Singing Ability of Normal School Students," *The Journal of Applied Psychology* 13, no. 5 (1929).
[118] William Thompson, "Music Sight-Reading Skills in Flute Playing." *Journal of General Psychology* 114, no. 4 (1987).
[119] Andrew Waters, Ellen Townsend, and Geoffrey Underwood, "Expertise in Musical Sight Reading: A Study of Pianists," *British Journal of Psychology* 89 (1998).
[120] Wolf, Thomas. "A Cognitive Model of Musical Sight-Reading." *Journal of Psycholinguistic Research*5, no. 2 (1976).
[121] Max Krone, *A Group Study of Sight Singing Ability*, Diss., Northwestern University, 1930.
[122] Daniele Schon, Jean Luc Anton, Muriel Roth, and Mireille Besson, "An fMRI Study of Music Sight-Reading," *NeuroReport* 13, no. 17 (2002).
[123] Justine Sergent, Eric Zuch, Sean Terriah, and Brennan MacDonald, "Distributed Neural Network Underlying Musical Sight-Reading and Keyboard Performance," *Science, New Series* 257, no. 5066 (1992).

regions of the brain are activated while the musician is engaged in music reading, text reading, numerical reading, and sight-reading. This may suggest another type of sight-reading instruction based on advancing text reading and comprehension[124].

The State of Literature in Sight-Reading

This category focuses on materials that examine the greater body of research in sight-reading for general trends and greater understanding. The two subcategories, "Literature Reviews on Sight-Reading" and "Meta-Analysis on Sight-Reading", both accomplish this goal, but the latter of the two objectively analyzes the data and finds subsequent results that may not be immediately apparent. What both of these subcategories allow the reader to do is to understand the depth and scope of research in any facet of sight-reading.

Literature Reviews on Sight-Reading

This subcategory focuses on published literature reviews from scholarly journals. In this sense, this subcategory could also be seen as a meta-literature review, allowing the reader to better understand sight-reading through other scholarly works. Listed here are three literature reviews by Galyen[125], Stebleton[126], and Wristen[127].

The literature reviews cover a wide range of topics, such as predictor of sight-reading ability; the cognitive process of sight-reading; the relationship of memory and

[124] Donald Smith, *An Investigation of the Effects of Varying Temporal Settings on Eye Movements While Sight-Reading Trumpet Music and While Reading Language Aloud*, Diss., The Pennsylvania State University, 1988.
[125] Daniel S. Galyen, "Sight-Reading Ability in Wind and Percussion Students: A Review of Recent Literature," *Update: Applications of Research in Music Education* 24, no. 1 (2005).
[126] Eloise Stebleton, "Predictors of Sight-Reading Achievement: A Review of the Literature," *Update: Applications of Research in Music Education* 6, no. 1 (1987).
[127] Brenda Wristen, "Cognition and Motor Execution in Piano Sight-Reading: A Review of Literature," *Update: Applications of Research in Music Education* 24, no. 1 (2005).

sight-reading; melodic or rhythmic pattern recognition and sight-reading; notational factors of sight-reading; and sight-reading methodology. In addition, the intended audience for each varies, and subsequently, the scope and depth of literature varies.

In their findings, each researcher summarizes the common trends and suggests possible education techniques to best advance sight-reading ability. The one area that is commonly agreed upon is that sight-reading ability is a learned behavior and can be improved, although each source has its own suggestions for the best methods for improvement.

Meta-Analysis on Sight-Reading

This subcategory includes documents that compile and analyze the body of research in order to find trends and greater understanding. Currently, there is only one meta-analysis about sight-reading, Jennifer Mishra's "Factors Related to Sight-Reading Accuracy: A Meta-Analysis"[128].

The purpose of this meta-analysis was to examine previously researched variables from multiple studies, combine the results, and determine their relationship to sight-reading. The meta-analysis examined 92 research studies (n=597 participants) that reported a correlation between sight-reading and other variables. The variables they found to most often correlate with sight-reading ability were improvisation skills, ear-training ability, technical ability, and music knowledge.

Early exposure, memorization, and perception were found to have weak correlations with sight-reading and no correlation was found between sight-reading and

[128] Jennifer Mishra, "Factors Related to Sight-Reading Accuracy," *Journal of Research in Music Education* 61, no. 4 (2013).

music aptitude or personality. The findings suggests that sight-reading is a skill to be trained and not a genetic predisposition. This meta-analysis is a powerful tool, as it can overcome personal bias and small sample sizes, but is still reliant on the validity and consistent methodology of previous research.

Performance Literature for Sight-Reading

Literature in Print for Sight-Reading Performance

This section of the literature review focuses on currently available materials for brass sight-reading performance and practice. In addition to traditional print sources and anthologies, this section covers digital sources, such as online sight-reading web pages and sight-reading material generators. Additionally, all sources included in this section are currently accessible and of professional publishable quality. Sight-reading material that is not covered in this literature review includes larger ensemble sight-reading (such as band or orchestra sight-reading anthologies), out-of-print materials or unpublished materials.

Grade by Grade

Edited by Janet Way and published by Boosey and Hawkes, this is an anthology for beginning instrumentalist, including piano, saxophone, clarinet, flute, oboe, and trumpet. Each anthology is broken into five books, ranging from first or second-year beginner to an intermediate, roughly high-school, level. The contents of the book draw largely from arranged works from notable composers, such as Serge Prokofieff, Dmitri Shostakovich, and others. Additionally, these exercises come with both a CD accompaniment and a piano accompaniment. As described by the author,

> *"These delightful collections of carefully-selected pieces provide the perfect repertoire resource for aspiring instrumentalists. Each piece included in these wide-ranging collections is complemented by useful practice and performance tips. A CD of demonstration and backing tracks is also included to enhance both private practice and public performance.* [129]"

The benefit of this resource is the use of supplemental material, such as scales and other technique exercises, to assist the musician's growth. Furthermore, these books are graded, allowing the musicians to increase the challenge and expand their knowledge base. The downside to this resource is the lack of instrumentation coverage, specifically in brass. This might be a byproduct of an educational system that starts students in a limited number of instruments and reassigns to expand the group instrumentation as they develop. Additionally, these sources stop at an intermediate level, but this might be a byproduct of their educational scope.

[129] J. Way, *Grade by Grade*, Boosey & Hawkes.

Improve Your Sight-Reading!

Edited by John Davis and Paul Harris, and published by Faber Music, these anthologies cover piano or organ (32 publications), strings (11 publications), woodwinds (10 publications), and brass (4 publications). In the brass family, there are two anthologies (8 levels) for trumpet, and one anthology each for horn and trombone, both of which cover five difficulty levels. As described by the publisher,

> *"Now more than ever, the ability to sight-read fluently is an essential part of the training of musicians of any instrument. This workbook is designed to help young musicians overcome the nerves that often cause sight-reading problems, by giving them thorough technical grounding as well as confidence boosting strategies. Step by step it helps the player to create a complete picture of each piece, first through rhythmic and melodic exercises related to specific problems, then by the study of a prepared piece with associated questions for the student to answer, and so finally to the real, unprepared sight-reading test itself.*[130]"

The benefit of this source is its step by step approach with early sight-readers, and its educational sequencing. This source uses supplemental exercises to help build sight-reading ability, particularly the use of melodic and rhythmic training. The drawback of this resource is the lack of complete coverage for brass, although it is more developed than other similar anthologies. It also lacks supplemental materials, such as a CD or website, and again stops at an intermediate level. This resource is primarily associated with the Associated Board of the Royal School of Music (ABRSM) sight-reading

[130] J. Davis, & P. Harris, *Improve Your Sight-reading,* Faber Music.

syllabus, which might explain the lack of incentive to publish resources beyond the high school level.

Sight-Reading (A Fresh Approach)

Written by John Kember and published by Schott Music, this set of anthologies cover piano (12 publications), string (14 publications), woodwind (18 publications), brass (6 publications), recorder (4 publications), guitar (4 publications), and voice (4 publications). In the brass family, there are two publications for trumpet, two for horn, and two for trombone. As described by the publisher,

> *"This collection presents many carefully graded sight-reading pieces and exercises in a range of musical styles. Taking an approach based on self-learning, the sections of the book focus on developing different key technical skills as well as introducing the student to a plethora of musical terms. Each section of the book contains solos, as well as duets, and pieces with piano accompaniment for practicing ensemble sight-reading. Suitable for preliminary, to advanced level students.*[131] *"*

The benefit of this publication its widespread instrumentation, although it again does not cover all the brass family. In each book, there are a large number of examples in a variety of styles and difficulties, as well as duets and solo piano format to allow for ensemble sight-reading. The drawback is that this material only extends to an intermediate level. Their scope is primary to secondary school and does not include the

[131] J. Kember, *Sight-Reading (A Fresh Approach)*, Schott Music Gmbh.

collegiate level. As mentioned above, this resource also does not include material for the entire brass family.

Sight-Reading Pieces for Low Brass Instruments and Piano

This book is published by A-R Editions, part of the Paris Conservatory collection, and edited by James R. Briscoe. This particular book is for trombone or euphonium but could be read by tubists transposing down the octave. The Paris Conservatory collection contains an additional nineteen publications of contest pieces and sight-reading material, but this is the only book specifically for brass. As described by the editor,

> *"The Paris Conservatoire solos, both the sight-reading works and the longer contest pieces, are the first extended series of compositions for woodwinds, brass, and harp in music history. While composers such as Mozart, Weber, and Robert Schumann contributed a few significant works for these instruments, the Conservatoire solos were composed annually for each instrument beginning in the 1830s. The wealth of musical treasures resulting from this systematic accumulation of works represents the core instrumental repertories today.*[132]*"*

The publication attempts to build sight-reading ability by engaging musicians in the act of sight-reading. The benefit is the abundance of quality material, and the opportunity for ensemble sight-reading, but does not provide supplemental exercises to improve correlating areas to sight-reading ability. In addition, it is unclear what skill

[132] J. R. Brisc, *Sight-Reading Pieces for Low Brass Instruments and Piano*, A-R Editions.

level this material is designed for and it does not seem to have a gradient thought-out the resource.

Sound at Sight

Published by and implemented at Trinity College London, these anthologies cover piano (4 publications), strings (1 publication), woodwinds (4 publications), Brass (7 publications), recorder (1 publication), guitar (1 publication), and voice (2 publications). In the brass family, there are three books for trumpet, one book for horn, one book for tenor trombone, one book for bass trombone, and one book for tuba/Eb bass. As described by the publisher,

> *"These books offer a wealth of approachable & attractive sight-reading pieces which are carefully graded to match Trinity College London's requirements. Invaluable practice material and vital preparation for Trinity College London examinations.*[133] *"*

The scope of these materials is wide-ranging, both in instrumentation and in difficulty. Further, this is one of the only complete sets of sight-reading materials for brass. Because this sight-reading material was specifically designed an assessment tool, its use as an educational material is quite limited. Modification would be necessary for its use outside of the Trinity College London.

[133] Various, *Sound at Sight*, London: Trinity College.

Specimen Sight-Reading Tests

Another sight-reading assessment, published by the Associated Board of the Royal School of Music (ABRSM), covers the instrumentation of piano (8 publications), strings (8 publications), woodwinds (2 publications), and brass (8 publications). For brass, there are two books for trumpet, two for horn, two for trombone, and two for tuba and euphonium. As described by the publisher,

> *"Being able to sight-read is a valuable skill. It enables students to explore new pieces with increased confidence and speeds up the learning process. Good sight-reading skills offer the satisfaction of independent musical discovery, as notation on the page is more readily transformed into sound.*[134]*"*

This collection has much of the same benefits and drawbacks as the Trinity College collection. The material is wide-ranging, both in instrumentation and in difficulty, but it is specifically an assessment, and therefore a limited educational tool.

Digital Literature for Sight-Reading Performance

In the Information Age, digital materials are constantly being created, evolving, and becoming obsolete. The definition of what is a credible or non-credible source becomes blurred, as these materials are not static. Discretion is used in presenting these sources and relevant pros and cons are to be discussed for its inclusion in this paper. The reader should use this section as a starting point for these types of sight-reading material

[134] Various, *Specimen Sight-Reading Tests*, Associated Board of the Royal School of Music.

but be vigilant for changes in the field. This section was last updated on March 12th, 2019.

Practice Sightreading

This website was designed by Jesse Clark and Copyrighted by Jesse Clark LLC. This is an online sight-reading generator, where the user can modify each element of the sight-reading material to fit and challenge the user. To gain access to the entire site, there is a subscription fee, but it is comparable to other such resources in the field. As described by the creator,

> *"PracticeSightReading.com creates random pieces of rhythm and melodies so you can practice sight reading and learn pieces quicker. We practice scales to make music easier to learn, why not sight reading as well? Sign up today and start practicing!*[135]*"*

This site allows the user to customize sight-reading examples with a seemingly unlimited number of musical possibilities. The rhythm-only sight-reading generator is free to use, but is limited in its ability to be customized. Each example has a playback function, allowing the user to hear the written music in real time. This function also works for non-concert pitch instruments.

The drawback with this, and other sites like it, is that the examples are randomly generated, and the music does not always follow the typical idioms of composed music. Additionally, these are not instrument-specific exactly, so it could contain uncharacteristic range or stylistic demands.

[135] J. Clark, Practice Sightreading, Retrieved from https://practicesightreading.com.

Sight Reading Factory

This website is a larger sight-reading generator designed by multiple organizations, such as GraceNotes and Help Desk Software. This is an online sight-reading generator, where the user can modify each element of the sight-reading material to fit and challenge the user, even making it instrument specific. To gain access to the entire site, there is a subscription fee, but it is comparable to other such resources in the field. As described by the creator,

> *"Sight Reading Factory makes practicing the important skill of sight reading quick, easy, effective and fun! This app composes music instantly and on-demand, providing musicians with a virtually unlimited supply of sight-reading material. There are multiple levels of difficulty and the exercises can even be customized exactly to the needs of the musician. Sight Reading Factory is very versatile and can be used by musicians of all ages and abilities including music educators, music students, casual musicians, and even professional musicians. Sight-reading exercises can be generated for piano, guitar, voice, woodwinds, brass, strings, percussion, and even full ensembles."* [136]

One of the major benefits is that the rhythmic and melodic generator is not entirely random and resembles real composed music. The material is customizable in almost every manner allowing for practically unlimited variation, even beyond "Practice Sightreading". The site also has timed or untimed reading options to allow for a more realistic reading environment.

[136] Various, *Sight Reading Factory*, Retrieved from https://www.sightreadingfactory.com.

Occasionally, notes and rhythms are irregularly grouped in a way that is not typical of the notational style in real music. This is most apparent in the combinations of rests and notes, and in the irregular beaming that ensues.

Sight Reading Mastery

This site, authored by Evan Murphy, takes a different approach to sight-reading material than the previous two. All the music contained within is composed by a human rather than digitally generated. As the site describes,

> *"Unlimited Sight Reading with Professionally Composed Music: Give up the time-consuming hunt for sheet music and exercises with our vast library of professionally-composed music at your fingertips. Get Live Help from a Real Music Teacher: The ultimate resource. Practice Personalized to Your Instrument and Skill Level: Music is tailor-made for each instrument at various difficulty levels. Correct Performance Audio with Every Piece: Catch your mistakes before they become habits. Track Your Progress Over Time: A detailed sight-reading log is recorded for you automatically, so you can easily revisit past pieces and see how you're progressing."* [137]

As previous research has shown, music that is composed by humans lends itself to greater sight-reading performance than systematically generated music[138]. This resource includes tempo and style markings, as well as many other features of real music. This

[137] E. Murphy, *Sight Reading Mastery,* Retrieved from https://sightreadingmastery.com/trumpet.
[138] L. Danfelt, *An Experimental Study of Sight Singing of Selected Groups of College Music Students*, Diss., The Florida State University, 1970.

resource has also recently expanded to all instruments, including the whole brass family. Unlike the ad, this site does not contain unlimited examples, and is rather limited in this sense compared to the online generators.

CHAPTER III – A COGNITIVE MODEL OF SIGHT-READING

Schema Theory

As it plays a foundational role in the creation of teaching methods, a brief explanation of schema theory is warranted. In a chapter on schemata titled "The Building Blocks of Cognition", David Rumelhart describes schema theory as a theory about knowledge and its representation:

> *"It is a theory about how knowledge is represented and about how that representation facilitates the use of the knowledge in particular ways. According to schema theories, all knowledge is packaged into units. These units are the schemata. Embedded in these packets of knowledge is, in addition to the knowledge itself, information about how this knowledge is to be used."*[139]

These units of knowledge have particular characteristics when it comes to the process of learning. According to Rumelhart, these characteristics can be grouped into three modes of learning: accretion, tuning, and resurrecting.

Accretion

Accretion, is the process of using previous knowledge to create a schema to fit current observation. When encountering an original stimulus, the basis for comprehension has already been laid out in some portion of our knowledge but it is fragmented. Accretion allows for the restructuring of this knowledge to fit original experiences. Rumelhart equates this roughly to "fact learning" through observations of

[139] David E. Rumelhart, "Schemata: The Building Blocks of Cognition." In *Comprehension and Teaching: Research Reviews*, (1981): 34.

events or text.[140] This mode is perhaps the most commonly used in sight-reading. When performing a novel melody, the musician's mind looks for familiar characteristics, such as key, intervals, or rhythmic patterns. The previous knowledge and practice of these patterns would facilitate the understanding of this new melody and allow for its realization in performance. Reflecting on the work of Jennifer Mishra, this could explain why the factors of improvisation, ear-training ability, technical ability, and music knowledge were related to the success of sight-reading as compared to stable characteristics.

Tuning

The second mode of learning is the system of modifying an existing schema, which Rumelhart called tuning. This process takes place when an observation by an individual does not match the characteristics of an existing schema. When this happens, variables are added, subtracted, or modified to fit the current observation. This is a constant process as the individual gains more experience with particular stimuli. In most music education programs, literature of a varying style and genre is used in order to teach music fluency. This process could also be used to advance music sight-reading abilities of these musicians.

For an example of how this mode affects sight-reading ability, consider the learning of key signatures by a brass musician and how they apply to the physical and aural schema of music performance. In the key of B-flat, a young instrumentalist might play A-flat, rather than the correct note of A-natural. This is common due to its physical correlation to E-flat, as they both are played using the index finger. If this happens, the

[140] David E. Rumelhart, "Schemata: The Building Blocks of Cognition." In *Comprehension and Teaching: Research Reviews*, (1981): 52.

musician would have to modify their understanding of key to include A-natural, thus using the mode of tuning.

Restructuring

The final mode described by Rumelhart is the process of creating entirely new schemata, called restructuring. This mode happens in one of two ways, pattern generation or schema induction. Pattern generation is the process of appropriating schema frameworks from other distinct mental areas and modifying the schema to fit this original stimulus, thus creating an entirely new schema. This would be like using non-musical ideas or examples to teach a musical concept, such as using the concept of literary story structure and relating it to music formal structure and how they organize larger ideas for the audience.

The latter process, schema induction, happens through the repeated experience of a new stimulus. As the experience is repeated, "the particular configuration forms a meaningful concept" and an entirely new idea is formed from this experience[141]. This process is integral to learning and performing in a variety of musical styles, which in turn creates a foundation of music knowledge, aural skills, and technical ability. For additional sources that explain schema theory and its application in the arts, the reader could reference works by Byros[142], Gjerdingen[143], Gombrich[144], and Nellhaus[145].

[141] David E. Rumelhart, "Schemata: The Building Blocks of Cognition." In *Comprehension and Teaching: Research Reviews*, (1981).
[142] Vasili Byros, "Meyers Anvil: Revisiting the Schema Concept," *Music Analysis* 31, no. 3 (2012).
[143] Robert Gjerdingen, "Defining a Prototypical Utterance," *Psychomusicology: A Journal of Research in Music Cognition* 10, no. 2 (1991).
[144] Ernst Gombrich, *Art and Illusion: A Study in the Psychology of Pictorial Representation*, London: Phaidon Press, 2009.
[145] Tobin Nellhaus, "Performance Strategies, Image Schemas, and Communication Frameworks." In *Performance and Cognition: Theatre Studies and the Cognitive Turn*, 76-94. 1st ed. New York, NY: Taylor & Francis Group, 2006.

CHAPTER IV – ELEMENTS OF A SIGHT-READING PEDAGOGY

In this chapter, research-supported methods and skills are outlined for the creation of an effective sight-reading pedagogy. Referring back to Mishra's work, this chapter is only concerned with music constructs that improve with practice rather than stable characteristics.

As discussed in Chapter 2, the existing research on sight-reading supports the training of fundamental skills to improve sight-reading ability and not practicing the act of sight-reading. This chapter is divided into two sections: the first examines elements that highly correlate to sight-reading ability and the second includes recommendations for possible literature for study.

Examination of Correlating Factors

In the following section, Improvisation, Aural Skills, Technical Ability, and Musical Knowledge, which are teachable factors and influence sight-reading ability, are further examined through Mishra's article and the author's perspective. In addition, justification is given to each for its inclusion in the sight-reading pedagogy.

Improvisation

The skill of improvisation and its relation to sight-reading is both unexpected and understudied ($n=4$)[146]. Nevertheless, it has been found to have the highest correlation to sight-reading performance ($r=0.65$)[147]. Upon further conversations with expert

[146] Mishra, p. 458.
[147] Mishra, p. 458.

improviser and jazz musician, Conner Eisenmenger, it seems that this may be taught in the same ways as sight-reading:

> *"…The number one thing that I did to get ready for [Jazz] lab band auditions [at UNT], by recommendation of previous one o'clock dudes, was to play scales/scalar patterns/sequences over the Louis Bellson books…"* [148]

The same ways that you might improve sight reading, via technical training, ear-training, and music knowledge, might also be underlining mechanisms to improve improvisation ability. This illuminates a critical assumption touched on earlier in this paper; does high correlation mean causation? Teaching methods specifically directed at the advancement of improvisation could have two polar outcomes.

One, the ability to improvise is improved, but sight-reading performance stays relatively stable; this would mean improvisation does not use the same cognitive mechanisms, rather there are separate unknown factors that make great improvisers better at sight-reading.

Two, the ability to improvise is improved in addition to sight-reading. This would show that both actions share a causal relationship and the underlying mechanism. For the purpose of this chapter, the latter is assumed, and suggested training methods are limited to ear-training, technical ability, and musical knowledge.

[148] Connor Eisenmenger, discussion with the author, March 2017.

Aural Skills

This construct is less surprising and much more commonly researched (n = 33) and has been ranked second in correlating factors to sight-reading performance (r = .54)[149]. Regardless of music production (instrumental or vocal), the process of reading music is as much about recognizing and producing aural patterns from sheet music as it is the physical act of production, verified through Mishra's meta-analysis. This is a construct which the author believes is at the core of sight-reading; Can a musician audiate music during initial introduction and then subsequently realize it in performance?

Technical Ability

This construct, ranked third (r = .48) and is another teachable factor, is less embraced by Mishra than the previous two[150]. Like music aptitude, the meta-study found that age had an effect on the construct's significance. Mishra states, "The findings could indicate that with musicians, technical ability may continue to increase while sight-reading ability does not—or improves at a slower pace."[151] She later states that there are fewer articles regarding technical ability (n = 11) than music aptitude (n = 40), pointing to the need for further research[152]. In addition, how technical ability was measured varied widely, from direct performance measurement to indirect ratings from teachers. Anecdotally, this type of training has been observed to positively correlate with sight-

[149] Mishra, p. 458.
[150] Mishra, p. 458.
[151] Mishra, p. 463.
[152] Mishra, p. 463.

reading ability. The base assumption here is that a musician cannot sight-read past their average prepared performance ability.

Music Knowledge

This construct, ranked fourth, is the last mentioned by Mishra to correlate most highly with sight-reading. The term music knowledge is defined my Mishra as "the direct measures of music achievement (e.g., scores on the Music Achievement Test) or theory class grades".

Similar to other constructs, this is not a stable characteristic but a teachable one. Music knowledge is highly correlated with age of participants, and more importantly, experience. Furthermore, the author states that, "Cues in the notation and aural cues from the performance may interact with music knowledge during sight-reading, resulting in sophisticated guessing"[153]. The implication here is that any training in musical knowledge advances the musicians schemata of melodic and harmonic idioms, thus allowing for a more efficient realization in performance.

Suggested Literature for Sight-Reading Training

Ear-Training

Aural skills are of the utmost importance for brass musicians, as tone production and pitch control derive mainly from the embouchure. Much like a vocalist, brass buzzing allows for an infinite number of pitches and it is the responsibility of the brass

[153] Mishra, p. 461.

musician to learn control. This physical control of the lips begins with ear-training. Training for this construct can be divided into two parts: recognition and production.

In the recognition section, the musician is training the ability to identify elements of music, such as intervals, chords, melodic patterns, and harmonic patterns. This is also a way in which musicians can train their "Music Knowledge" construct but in a practical manner. For this training, programs such as MacGAMUT[154] are beneficial. This program allows the user to train in categories of "Intervals", "Scales", "Chords", "Rhythmic Dictation", "Melodic Dictation" and "Harmonic Dictation". In addition, users can share their training information, making this a great educational tool.

In the production section, the musician is training the ability to audiate a variety of music patterns, such as intervals and scales in all keys. This can take the form of singing, humming, buzzing, half-valving, or any technique in which the user has complete control over the pitch, but doesn't require novel technical abilities. This method can be applied to any literature for brass musicians and subsequently find positive results.

Technique-Training

Fluency on a brass instrument is fundamental to sight-reading ability. A logical principle of this process is that a musician cannot sight-read beyond their technical ability and that subsequent readings of the material will only improve its performance. Training for this construct can be divided into two parts: Scalar Patterns and Sequences.

[154] Ann K. Blombach, *MacGAMUT* (Version 6.3.0). MacGAMUT Music Software, 2016.

In the first section, the musician is using scales of all kinds and a variety of scalar patterns in all keys for training both technique and music fluency. The material available for building technique, which would also expand a musician's schema of music patterns, is quite vast. A set of exercises that the participants could use is the Clarke technical studies[155] or the Arban method book[156]. The reader is encouraged to further design novel patterns in order to build technical ability and broaden their schema of music.

In the second section, the musician is training with transposition exercise and sequences of composed excerpts. These exercises again allow musicians to build technique and expand their schema of musical patterns, but in a context of real music. Anecdotally, it is when the musician focuses on the larger orders of music making (expression, interpretation, etc.) and allow their technical skill to be automatic, that they can enter into a "flow state" which allows for maximal sight-reading ability. These exercises give the musician the opportunity to experience this state while expanding their schema of music knowledge and performance. A prime example of these types of exercises is Will Baker's "Get Fluent" exercises[157]. Mr. Baker describes,

> *"GetFluent Sequences are for musicians who believe that music practice can be fun. They are for musicians who want to sound great in ALL KEYS and ALL REGISTERS and want to be exposed to a new piece of music each week. If you play my sequences, you will learn to transcend the technical limitations of your instrument and become a more complete musician. I guarantee it."*

[155] Herbert Clarke, *Technical Studies for the Cornet*, ser. 2, Elkhart IND. , 1912.
[156] Arban, *Complete Conservatory Method for Trumpet,* J. W. Pepper, 1879.
[157] Will Baker, "Get Fluent." *WillBakerMusic*, 2019, willbakermusic.com/getfluent/.

CHAPTER V – CONCLUSION

The purpose of this study is to outline an effective pedagogical approach to advancing the sight-reading skills of brass musicians. Rather than practicing sight-reading to advance the skill, this study suggests using supplemental materials in areas that correlate to sight-reading ability. Training the underlining mechanisms of aural skills, technical ability, and music knowledge, as supported by the research of Jennifer Mishra and the cognitive theory of schemata, is the basis for an effective sight-reading pedagogy. In this way, a musician might accelerate their rate of learning, and subsequently reach high levels of performing ability.

Call for Further Research

The study of sight-reading is well-documented, but there are areas that have yet to be examined. One such area is "Stylistic Sight-Reading". Particularly with the rise of A.I. Bots, digitally generated sight-reading material for brass could become indistinguishable from composer created material. This is accomplishable by combining the current digital sight-reading format with a program called EMI (pronounced "Emmy").

Created by David Cope, this songwriting computer program could break down and analyze a mass of musical examples to deduce their style characteristics and then create new works indistinguishable from the same composer. At a lecture held at Stanford University in 1997, attendees heard Winifred Kerner, University of Oregon professor, play three separate pieces of music on the piano: one by Bach, one by EMI in the style of Bach, and one by Steve Larson, Bach compositional expert, and UO professor. When asked to categorize the pieces, people mistook Larson's piece for the

computer's and EMI's for the real Bach. Larson was devastated, telling the New York Times at the time "Bach is absolutely one of my favorite composers...".[158]

If this was applied to sight-reading programs, this would create a deeper level of customization not heard of: style selection. For example, a style pull-down menu could include the likes of Wagner, Beethoven, Mozart, or Stravinsky; of which the user can select in additional fields of instrumentation, key, range, difficulty, etc. In this way, students are not learning random patterns, but working with real music. This, in turn, should theoretically advance sight-reading education beyond our current means, but no definitive research currently exists to support this theory.

Application

For the brass studio, establishing a sight-reading pedagogy could help implementing a comprehensive curriculum with limited face time. As shown through this study, the practical benefits of advanced sight-reading accelerate the learning process, broaden the learner's knowledge of musical patterns, and through cognitive efficiency, allows the musician to focus on higher orders of music making. All of these benefits aid the teaching process and provide the learner with a sense of confidence and musical control. Guided by the underlining cognitive mechanism of schema, the training of fundamental skills correlated to sight-reading ability is the most efficient method to improve sight-reading ability. In this way, the teacher is not just training one auxiliary skill, but improving the musician as a whole. Sight-reading training, for all of the reasons stated in this study, is the key for musicians to be successful in the competitive musical circuit.

[158] Frida Garza, "The Quest to Teach AI to Write Pop Songs," *Gizmodo.* April 19, 2018.

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APPENDIX- ANNOTATED BIBLIOGRAPHY OF RESEARCH ARTICLES

This section of the dissertation is an annotated bibliography of the research material covered in the literature review. The categories and subcategories appear in the same order, and research articles are organized within by the authors last name. Each entry is organized by the following table:

"Title of Research Article" [bold]	
Author(s)	Year Published [centered]
Source of Research [italics]	Participants (number)
Sight-Reading Test	Cell for Relevant Data
Methodology: (A summary of research methods by Guytano Martorano)	
Results: (Excerpts from the work cited that explain the findings or general conclusions)	

Factors Correlating to Sight-Reading Ability

Characteristic Factors of Individual Keyboard/Sting Sight-Reading

"The Development of a String Sight-Reading Pitch Skill Hierarchy"	
Michael L. Alexander; Michael L. Henry	2012
Journal of Research in Music Education	High school strings students (n =94)
Test: Vocal Sight-Reading Inventory	Factors: "Tonal Pitch Skills", "Key Signature"
Methodology: Individual testing. Single sight-reading test and questionnaire.	
Results: Participants had an average score of 27.28 out of 31 for pitch skills. Key was found to effect sight-reading performance. Pitch skills are a valid measurement of sight-reading ability.	

"Factors Associated with Success in Sight Reading Four-Part Chordal Piano Music"	
Buford E. Cox	2000
Dissertation — Auburn University	College piano students (n =84)
Test: Researcher selected sight-reading exercises	Factors: "Pre-playing analysis", "Piano Experience", "Pattern Reading Ability"
Methodology: Individual testing. Single sight-reading test and questionnaire.	
Results: Chord recognition ability and piano experience were significantly correlated with sight-reading scores.	

"A Correlation Study of Keyboard Sight-Reading Facility with Previous Training, Note-Reading, Psychomotor, and Memorization Skills"	
Jack Lyman Eaton	1978
Dissertation — Indiana University	College pianist and organist (n = 73)
Test: Researcher selected sight-reading exercises	Factors: "Previous Training", "Note-Reading", "Psychomotor", "Memorization"
Methodology: Individual testing. Single sight-reading test and questionnaire.	
Results: Keyboard psychomotor skills possessed the strongest relationship to sight-reading facility. Following in rank order were note-reading skills and years of keyboard playing experience.	

"Classification of High and Low Achievers in a Music Sight-Reading Task"	
Reinhard Kopiez; Claus Weihs; Uwe Ligges; Ji In Lee	2006
Psychology of Music	College piano students (n =52)
Test: Researcher selected sight-reading exercises	Factors: "General Cognitive Skills", "Psychomotor Skills", "Practice-Related Skills"
Methodology: Individual testing. Single sight-reading test and questionnaire.	
Results: Speed of reaction time and sight-reading expertise are important in reaching a high-performance class. Sight-reading is not the result of a single predictor, such as expertise, but a complex interaction between predictors.	

"An Exploratory Study of Individual Difference Variables in Piano Sight-Reading Achievement"	
Ladonna Eloise Kornicke	1992
Dissertation — Indiana University	College-level piano students (n =73)
Test: Researcher selected sight-reading exercises	Factors: "Sight-Reading Experience", "Aural Imagery", "Locus of Control", "Field Dependence", "Personality"
Methodology: Individual testing. Single sight-reading test and questionnaire.	
Results: Aural imagery, sight-reading experience, and FI were the best linear combination of predictor variables.	

"Component Skills Involved in Sight Reading Music"	
Andreas C. Lehmann	2007
Psychomusicology	Advanced piano students and staff (n =52)
Test: Sight reading selections	Factors: "IQ", "Working Memory", "Musical Subskills"
Methodology: Individual Testing. Sight-reading tests in five successive levels of complexity.	
Results: The outcome confirms the importance of training variables in explaining individual differences in sight reading.	

"Deliberate Practice is Necessary but Not Sufficient to Explain Individual Differences in Piano Sight-reading Skill: The Role of Working Memory Capacity"	
Elizabeth J. Meinz; David Z. Hambrick	2010
Psychological Science	Pianist with a music degree (n =57)
Test: Four Star Sight-Reading and Ear Test	Factors: "Deliberate Practice", "Working Memory"
Methodology: Individual testing. Single sight-reading test and questionnaire.	
Results: Deliberate practice accounted for nearly half of the total variance in piano sight-reading performance. There was no evidence that deliberate practice reduced the positive effect of Working Memory Capacity.	

"Effect of Improvising in Given Rhythms on Piano Students' Sight Reading Rhythmic Accuracy Achievement"	
David R. Montano	1985
Dissertation — University of Denver	College group piano students (n =32)
Test: Rhythmic sight-reading	Factors: "Improvisation"
Methodology: Individual testing. Pretest-posttest of sigh-reading ability with treatment groups.	
Results: Exercises in improving the pitches within given rhythm notations appeared to positively affect rhythmic accuracy achievement. Total music reading experience was significantly related to rhythmic accuracy achievement.	

Characteristic Factors of Individual Vocal Sight-Reading

"The Influence of Selected Factors on Growth in Sight Singing and Rhythmic Reading"	
Joyce Inez Johnson Bolden	1967
Dissertation — Michigan State University	Elementary Education Majors (n =348)
Test: Kwalwasser-Ruch Test on Musical Accomplishment	Factors: "Piano Keyboard", "Syllables/Letters", "Recorder"
Methodology: Individual Testing. Pre/posttest of sigh-reading ability with treatment groups.	
Results: Syllables/Letters resulted in growth exceeding both the other factors.	

"Individual Sight-Singing Achievement in Successful Choral Ensembles: A Preliminary Study"	
Steven M. Demorest; Michele L. Henry	1994
Update: Applications of Research in Music Education	High School Choir Students (n = 97)
None.	Factors: "Movable Do/Fixed Do", "Musical Training"
Methodology: Individual testing. Single sight-reading test and questionnaire.	
Results: The method of instruction was not related to performance of this sight-reading measure. Piano instruction was strongly related to individual achievement.	

"Sight-Singing Instruction in the Choral Ensemble: Factors Related to Individual Performance."	
Steven M. Demorest; Michele L. Henry	1995
Journal of Research in Music Education	First and second choir students of four Texas high schools (n =414)
Test: Researcher selections for sight-reading.	Factors: "Movable Do/Fixed Do", "Musical Training"
Methodology: Individual testing. Single sight-reading test and questionnaire.	
Results: Choir experience was the strongest predictor of individual success, followed by years of piano/instrumental/vocal lessons.	

"The Relationship between Sightsinging Accuracy and Error Detection in Junior High Singers"	
Janice N. Killian	1991
Journal of Research in Music Education	Junior High Choir Students (n =75)
Test: Researcher selections for sight-reading	Factors: "Error Detection"
Methodology: Individual testing. Sightsinging and self-assessment.	
Results: High and medium scoring sightsingers showed now significant difference between sightsinging and error-detection, while low scoring sightsingers were more accurate on error detection tasks.	

"Relationships between Melodic Error Detection, Melodic Dictation, and Melodic Sightsinging"	
Richard C. Larson	1997
Journal of Research in Music Education	Undergraduate music majors (n =204)
Test: Researcher developed tests	Factors: "Error Detection", "Melodic Dictation"
Methodology: Individual testing. Single sight-reading test.	
Results: Significant relationships were obtained among nearly all task and subtask scores, although the relationships were generally higher between error detection and dictation than between error detection and sightsinging scores.	

"The Effect of Keyboard Training on the Ability to Sightsing"	
Lorraine Rincoe Lueft	1974
Dissertation — Indiana University	Freshman in a sightsinging course (n =75)
Test: Gordon's Music Aptitude Profile	Factors: "Keyboard Training"
Methodology: Individual Testing. Pretest-Posttest of sigh-reading ability with treatment groups.	
Results: Incorporating selected keyboard activities into the sightsinging sessions does not facilitate the acquisition of the sightsinging skill.	

"A Statistical Investigation of the Influence of Selected Factors on the Skill of Sigh-Singing"	
Robert William Ottman	1956
Dissertation — North Texas State College	Sophomore music theory students (n =52)
Test: Nelson-Denny Reading Test	Factors: "Tonal Memory", "Melodic Dictation" "Music Literacy" "Technical Ability"
Methodology: Individual testing. Pretest-Posttest of sigh-reading ability and questionnaire.	
Results: Music literacy showed the greatest degree of relatedness to the sight-singing criterion.	

"An Investigation of the Relationship of Selected Variables to Sight-Singing Ability"	
John William Read	1968
Dissertation — North Texas State College	A Cappella Choir Student (n =125)
Test: American College Testing Program	Factors: "Aural Skills", "Keyboard Technique", "Academic Training in Music", "Level of Musical Interest"
Methodology: Individual testing. Single sight-reading test and questionnaire.	
Results: A significant difference of means was found between the high group and low group for each of the following musical variables: "Aural Skills", "Keyboard Technique", "Academic Training in Music", in addition to their score on the American College Testing Program.	

"The Study and Evaluation of Certain Problems in Eartraining related to Achievement in Sightsinging and Music Dictation"	
Marvin S. Thostenson	1967
Bulletin of the Council for Research in Music Education	First-year music students (n =142)
Test: Criterion Sightsinging Test	Factors: "Music Dictation", "Pitch", "Rhythm"
Methodology: Individual testing. Single sight-reading test and additional area testing.	
Results: Music dictation and sightsinging skills did not show significance relationship except in extreme cases.	

"Factors Related to musical Reading Ability of Senior High School Students Participating in Choral Groups"	
David Walter Tucker	1969
Dissertation — University of California, Berkeley	Senior high school students (n =120)
Test: Gordon Index of Musical Insight	Factors: 24 variables
Methodology: Individual testing. Single sight-reading test and additional area testing.	
Results: This study has shown five factors to be highly significant and collinear with sight singing. They are pitch, melodic memory, notational discrimination, musical signs, and chordal analysis.	

Characteristic Factors of Individual Wind Sight-Reading

"Sightreading Achievement in Instrumental Music Performance, Learning Gifts, and Academic Achievement: A Correlation Study"	
Gary Michael Ciepluch	1988
Dissertation — University of Wisconsin, Madison	High School Band Students (n =157)
Test: Watkins-Farnum Performance Scale	Factors: "Field-Dependence/Independence", "Sensory Mode Preference", "Musical Aptitude", "GPA", "Math Achievement", "Reading Achievement"
Methodology: Individual testing. Single sight-reading test and questionnaire.	
Results: This study found a significant relationship between music performance and the following: "Field-Dependence/Independence", "Musical Aptitude", "GPA", "Math Achievement", "Reading Achievement"	

"The Relationships among Instrumental Sigh-Reading Ability and Seven Selected Predictor Variables"	
Charles A. Elliott	1982
Journal of Research in Music Education	Wind instrumentalist (n =32)
Test: Watkins-Farnum Performance Scale	Factors: "Technical Proficiency", "Rhythm Reading Ability", "Sight-Singing Ability", " Cumulative GPA", "Theory GPA", "Jury GPA", "Music GPA"
Methodology: Individual testing. Single sight-reading test and additional area testing.	
Results: A strong positive relationship exists between sight-reading performance and sight-reading rhythm. Rhythm reading ability is the single best predictor of wind instrumentalists' sight reading scores.	

"Predictors of Music Sight-Reading Ability in High School Wind Players"	
Joyce Eastlund Gromko	2004
Journal of Research in Music Education	High school instrumentalist (n =98)
Test: Watkins-Farnum Performance Scale	Factors: "Tonal Audiation", "Rhythmic Audiation", "Visual Field Articulation", "Spatial Orientation", "Reading Comprehension", "Math Achievement"
Methodology: Individual testing. Single sight-reading test and additional area testing.	
Results: Music reading draws on a variety of cognitive skills that include reading comprehension, audiation, spatial-temporal reasoning, and visual perception of patterns rather than individual notes.	

"Relationships Among Music Sight-Reading and Technical Proficiency, Spatial Visualization, and Aural Discrimination"	
Carol M. Hayward; Joyce Eastlund Gromko	2009
Journal of Research in Music Education	University wind instrumentalist (n =70)
Test: Watkins-Farnum Performance Scale	Factors: "Aural Skills", "Spatial-Temporal Reasoning", "Technical Proficiency"
Methodology: Individual testing. Single sight-reading test and additional area testing.	
Results: Although Aural-spatial skills and technical proficiency skills were orthogonal, they both were essential to the complex task of sight-reading.	

"Sight-Reading and Ear-Playing Abilities as Related to Instrumental Music Students"	
John R. Luce	1965
Journal of Research in Music Education	High school instrumentalist (n =98)
Test: Researcher sight-reading selection	Factors: "Ear-Playing"
Methodology: Individual testing. Single sight-reading test and questionnaire.	
Results: A significant relationship between sight-reading and ear-playing was found for all students.	

"Factors and Abilities Influencing Sightreading Skill in Music"	
Gary E. McPherson	1994
Journal of Research in Music Education	High school clarinets and trumpets (n =101)
Test: Watkins-Farnum Performance Scale; Australian Music Examination Board Performance Examination;	Factors: "Repertoire", "Types of Mistakes"
Methodology: Individual testing. Single sight-reading test.	
Results: In the beginning stages of training, sightreading skill is not significantly corelated with the ability to perform a repertoire of rehearsed music for a comprehensive performance examination. Rhythmic errors far outweigh all other types of errors.	

"Contributions of Selected Music Skills to Music Sight-Reading Achievement and Rehearsed Reading Achievement"	
Ross Edwin Miller	1988
Dissertation — University of Illinois at Urbana-Champaign	6^{th}-7^{th} grade wind instrumentalist (n =123)
Test: Watkins-Farnum Performance Scale	Factors: "Cognitive Skills", "Pitch Audiation", Rhythmic Audiation", "Steady Beat", "Music Memory", "Grasp of Tonality", "Pattern Recognition"
Methodology: Individual testing. Single sight-reading test with questionnaire.	
Results: As music becomes more difficult, cognitive music skills appear to contribute increasingly to music reading achievement.	

"Analysis of Difficulties in Sight Reading Music for Violin and Clarinet"	
Albert Goodwin Thomson	1953
Dissertation — University of Cincinnati	Violin (n =20) and clarinet students (n= 20)
Test: Research selected sight-reading examples	Factors: "Error Type"
Methodology: Individual testing. Single sight-reading test.	
Results: The playing of rhythm is the major source of difficulty in the sight reading of music.	

"Sources on Individual Differences in Music Sight-Reading Skill"	
William B. Thompson	1985
Dissertation — University of Missouri – Columbia	Flute players between ages 17 and 31 (n =30)
Test: Watkins-Farnum Performance Scale	Factors: "Eye-Performance Span", "Music-Encoding", "Letter-Encoding", "Reaction Time"
Methodology: Individual testing. Single sight-reading test and additional area testing.	
Results: Sight-reading ability was highly correlated with eye-performance span, choice reaction time and music-encoding.	

"Relationships Between Sight-Reading Ability of College Freshmen Wind Instrumentalist and Music Experience, Band Experience, and Music Aptitude"	
Bradley Glenn Townsend	1991
Dissertation — Pennsylvania State University	Freshmen wind instrumentalist (n =92)
Test: Sight-reading selections	Factors: "Music Experience", "Band Experience", "Music Aptitude"
Methodology: Individual testing. Single sight-reading test and additional area testing with a questionnaire.	
Results: Pearson Product-Moment correlations revealed significant relationships between sight-reading and private instruction, and band experience.	

Characteristic Factors of Ensemble Vocal Sight-Reading

"Relationships Among Selected Factors and the Sight-Reading Ability of High School Mixed Choirs"	
Ross Dwiggins Daniels	1986.
Journal of Research in Music Education	20 high school mixed choirs (n = ~800)
Test: Five expert adjudicators and selected sight-reading selections	Factors: "School", "Music Curriculum", "Teachers"
Methodology: Group testing. Single sight-reading test with a questionnaire.	
Results: The best predicters of sight-reading ability are: the ethnic makeup of the school, a large percentage of choir students with a piano in their home, a rural school, rote teaching methods, large percentage of all-state choir participation, and music instrument experience.	

Contextual Factors of Individual Keyboard/String Sight-Reading

"The Role of Visual and Auditory Feedback During the Sight-Reading of Music"	
Louise J. Banton	1995
Psychology of Music	Pianist of Grade 6 in the ABPE (n =15)
Test: Associated Board of Music Sight-Reading Examinations (Grade 5)	Factors: "Auditory Feedback", "Visual Feedback", "Error Type"
Methodology: Individual testing. Multiple modes of sight-reading tests.	
Results: Performances where visual feedback was unavailable resulted in an increased number of adjacent note errors. When auditory feedback was unavailable proved to be indistinguishable from normal sight-reading.	

"The Problems of Sight-Reading on Mallet-Played Instruments and their Relationship to Kinesthetic Sensation"	
Joseph Carl Combs	1967
Dissertation — University of Oklahoma	Mallet players, various backgrounds (n =7)
Test: Researcher selected sight-reading excerpts	Factors: "Visual", "Non-Visual"
Methodology: Individual testing. Multiple modes of sight-reading tests.	
Results: The distance formed without vision was nearly always larger than the distance attempted when the subject was looking at the instrument.	

"Sight-Reading Ability of Expert Pianist in The Context of Piano Accompanying"	
Andreas C. Lehmann; K. Anders Ericsson	1993
Psychomusicology	Expert Pianist (n =16)
Test: Select flute solo music with accompanying piano parts	Factors: "Piano Accompanying"
Methodology: Individual testing. Multiple modes of sight-reading tests.	
Results: Pianist with performance specialization performed poorer than accompanist, but showed the most improvement.	

"A Comparison of Prompts to Aid Rhythmic Sight-Reading of String Students"	
Rita S. Salzberg; Cecilia Chu Wang	1989
Psychology of Music	String students ages 8 to 16 (n =46)
Test: Researcher designed rhythmic sight-reading test	Factors: "Counting Aloud", "Foot Tapping, "Counting and Tapping"
Methodology: Individual testing. Multiple modes of pre and post sight-reading tests.	
Results: Counting out loud was the most effective prompt for lesser sight-readers.	

Contextual Factors of Individual Vocal Sight-Reading

"An Experimental Study of Sight Singing of Selected Groups of College Music Students"	
Lewis Seymour Danfelt	1970
Dissertation — Florida State University	First year music theory students (n =41)
Test: Researcher designed test	Factors: "Composed Music", "Contrived Music"
Methodology: Individual testing. Multiple modes of pre and post sight-reading tests.	
Results: The type of material had not influence upon sight-singing performance.	

"The Effect of Patter Recognition and Tonal Predictability on Sight-Singing Ability"	
Philip Fine; Anna Berry; Burton Rosner	2006
Psychology of Music	Experienced choral singers (n =22)
Test: Research settings of Bach chorales	Factors: "Tonal Harmony", "Atonal Harmony"
Methodology: Individual testing. Multiple modes of sight-reading tests.	
Results: Pattern recognition and harmonic prediction are integral to sight-singing ability.	

"A Comparison Study of the Sigh-Reading Ability of Students Taught by the Music Specialist and of Students Taught by the General Teacher in a Self-Contained Classroom"	
Evelyn Louise Hermann	1962
Dissertation — University of Oregon	4th and 5th grade students (n =30)
Test: Research designed test	Factors: "Music Teacher", "General Teacher"
Methodology: Individual testing. Single sight-reading tests.	
Results: There is a relationship between sight-reading ability of students and the organizational plan employed by the district.	

"The Effect of Contextual Conditions on the Sightsinging Achievement of Middle School Choral Music Students"	
Keitha Victoria Lucas	1991
Dissertation — University of Miami	Middle school choral music students (n =59)
Test: Researcher designed test	Factors: "Harmonic Context"
Methodology: Individual testing. Multiple modes of pre and post sight-reading tests.	
Results: The best sightsinging performances occurred when tested with melodies isolated from harmonic context.	

"A Study of Interval Problems in Sight-Singing Performance with Consideration of the Effect of Context"	
James Henry Marquis	1963
Dissertation — University of Iowa	First year music students in college (n =52)
Test: The Sightsinging Criterion; The Isolated Interval Criterion	Factors: "Harmonic Background"
Methodology: Individual testing. Multiple modes of sight-reading tests.	
Results: The percentage of errors made in singing a musical interval with differ depending on the context in which it appears.	

"An Experimental Study of the Use of Shape Notes in Developing Sight Singing"	
James Patrick O'Brien	1969
Dissertation — University of Colorado	Elementary School Students (n = 29)
Test: Hammer's Sight-Singing Criterion	Factors: "Shape Note", "Round Note"
Methodology: Individual testing. Pre and post sight-reading tests with questionnaire.	
Results: The structure of the method, not the device, ultimately facilitates growth in musicality.	

"The Effects of Distracted Inner Hearing on Sight-Reading"	
Clemens Wollner; Emma Halfpenny; Stella Ho; Kaori Kurosawa	2003
Psychology of Music	Undergraduate music students (n =20)
Test: Researcher designed test	Factors: "Inner Hearing"
Methodology: Individual testing. Multiple modes of sightreading tests with questionnaire	
Results:	Distracted inner ear led to significantly worse rating results for overall performance.

"Relationship of Musical Environment to Choral Sight-Reading Ability"	
C. Robert Zimmerman	1962
Dissertation — University of Oregon	Singers of varying age (n =272)
Test: O-M Sight-Singing Test	Factors: "Musical Factors", "Environmental Factors", "Music Reading Ability"
Methodology: Individual testing. Multiple modes of sightreading tests with questionnaire.	
Results:	Singers who have spent several years in formal music classes and had instrumental training tended to be good sight-readers.

Contextual Factors of Individual Wind Sight-Reading

"The Effect of Rhythmic Notation Variables on Sight-Reading Errors"	
Thomas B. Gregory	1972
Journal of Research in Music Education	Grade 7-12 clarinet players (n = 63)
Test: Researcher developed sight-reading test (Modification of WFPS)	Factors: "Rhythmic Notation"
Methodology: Individual testing. Multiple modes of sight-reading tests.	
Results:	Younger players seemed to have greater difficulty with the cognitive process of translating new notation and generally did rather poorly on the test.

Characteristics of Sight-Reading Education

Instruction of Individual Keyboard Sight-Reading

"The Effects of Interval Prestudy and A Cue for Rhythmic Continuity on Piano Sight Reading Achievement of Group Piano Students"	
Christina Jacobs Beeler	1995
Dissertation — University of Texas at Austin	2nd semester group piano students (n =50)
Test: Researcher designed sight-reading test	Instruction: "Interval Prestudy", "Cue for Rhythmic Continuity"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: Participation in structured sight reading exercises was effective for improvement in sight reading pitch, but rhythm accuracy was not affected.	

"The Use of Sight Singing as a Prestudy Aid for the Improvement of the Sigh-Reading Skill of Second-Semester Class Piano Students"	
John Michael Bozone	1986
Dissertation — University of Oklahoma	2nd semester class piano students (n =17)
Test: Researcher designed sight-reading test	Instruction: "Sight Singing Prestudy"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: The class employing sight singing had a significantly higher group mean in all cases. Sight singing can be a valuable aid in the improvement of piano sight reading.	

"A Survey of the Development of Sight-Reading Skills in Instructional Piano Methods for Average-Age Beginners and Sample Primer-Level Sight-Reading Curriculum"	
Scott Dirkse	2009
Thesis — University of South Carolina	
Instruction: "Keyboard Topography", "Directional Reading", Pattern Recognition", "Sight-Reading Habits"	
Results: This sample sight-reading curriculum contains activities and exercises for primer-level students.	

"The Effects of Playing the Melody by Rote During the Prestudy Procedure upon Sight-Reading Skill Development of Beginning Class Piano Students"	
Betty J. Fincher	1983
Dissertation — University of Oklahoma	Beginner adult piano students (n =48)
Test: Researcher designed sight-reading test	Instruction: "Rote Playing Prestudy"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: Visual analysis of the raw data suggested an enormous difference between the two groups in favor of the experimental group.	

"A Comparison of Tachistoscopic and Metronomic Training for Developing Sight-Reading of Harmonic Notation within Class Piano Instruction"	
Clinton Dale Fjerstad	1969
Dissertation — Indiana University	University piano students (n =17)
Test: Researcher designed sight-reading study	Instruction: "Tachistoscopic Training", "Metronomic Training"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: The metronomic training was not found to be superior to the tachistoscopic training, which did lead to an increase in the skill of sight-reading.	

"The Effect of Computer-Assisted Instruction and Cognitive Style on Sight Playing Among University Group Piano Students"	
Sara L. Hagen	2001
Dissertation — Florida State University	Group piano class (n =40)
Test: Researcher designed sight-reading test	Instruction: "Two Computer-Assisted Training Methods", "Traditional Method"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: Significant differences were not found among the practice methods.	

"Teaching Sight-Reading at the Piano: Method and Significance"	
Dianne Blaine Hardy	1992
Dissertation — Southwestern Oklahoma State University	Level two piano students (n =8)
Test: Questionnaire and Researcher designed sight-reading test	Instruction: "DPSRP"
Methodology: Survey of Piano Teachers. Pre/post sight-reading tests with treatment groups.	
Results: It was concluded that the Diagnostic/Prescriptive Sight-Reading Program (DPRSRP) was an effective tool for increasing sight reading skills at the piano.	

"An Experimental Study of the Use of The Reading Accelerator in the Teaching of Keyboard Sight Reading"	
Oliver C. Houston Jr.	1963
Thesis — University of Colorado	University organ students (n =20)
Test: Keyboard Sight-Reading Achievement test	Instruction: "Reading Accelerator Training"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: Although each group made a significant gain in score on the keyboard sight-reading achievement test, the difference between the two groups was not greater than change difference.	

"The Effects of Error-Detection Practice on Keyboard Sight-Reading Achievement of Undergraduate Music Majors"	
Marilyn J. Kostka	2000
Journal of Research in Music Education	Undergraduate music majors in piano class (n =69)
Test: Researcher designed sight-reading test	Instruction: "Error Detection Training", "Shadowing"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: While no significant differences were found in overall sight-reading improvement among the groups, error-detection subjects achieved modest overall gains and rhythm was the most improved category.	

"Employing Cognitive Chunking Techniques to Enhance Sight-Reading Performance of Undergraduate Group-Piano Students"	
Pamela D. Pike; Rebecca Carter	2010
International Journal of Music Education	Frist-semester group-piano music major (n =43)
Test: Sight-reading selections	Instruction: "Cognitive Chunking Techniques"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: The pitch experimental group improved significantly in pitch, rhythm and continuity accuracy. The rhythm experimental group improved in rhythm and continuity, while the control group improved only in pitch accuracy.	

"The Effect of the Use of a Recorded Soloist as an Aid to the Teaching of Sight Reading Accompaniments at the Piano"	
Alice Jan Watkins	1984
Dissertation — University of Oklahoma	Collegiate music non-keyboard students; Level III piano class (n =24)
Test: Research designed sight-reading test	Instruction: "Recorded Soloist"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: Treatment group was found to have significantly higher rhythm accuracy scores than did the group that employed no taped soloist.	

"The Effect of an Accompanying Situation on the Improvement of Students' Sight Reading Skills"	
Alice Jan Watkins; Marie Adele Hughes	1986
Psychology of Music	non-keyboard music major (n =22)
Test: Researcher designed sight-reading test	Instruction: "Recorded Soloist"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: Treatment group had a significantly higher mean posttest rhythm accuracy score than did the group that employed no taped soloist.	

Instruction of Individual Vocal Sight-Reading

"An Experimental Study of Interval Drills as it Affects Sight Reading Skill"	
James Woodrow Barnes	1960
Dissertation — Indiana University	2nd term freshman music theory class (n =60)
Test: Researcher designed Sight-reading test	Instruction: "Interval Study", "Tachistoscopic Training"
Methodology: Individual testing. Pretest-Posttest of sigh-reading ability.	
Results: A high correlation was found between the ability to sight sing intervals and the ability to sight sing melody.	

"Comparison of Fixed and Movable Solfege in Teaching Sight Singing from Staff"	
Walter Buchanan	1946
Dissertation — University of Michigan	Students of various age levels (n =82)
Test: Researcher designed sight-singing test	Instruction: "Fixed Do", "Movable Do"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: Tonic solfege subjects made more improvement than fixed solfege subjects at every age level except the youngest.	

"Effects of Various Sightsinging Strategies on Nonmusic Majors' Pitch Accuracy"	
Jane W. Cassidy	1993
Journal of Research in Music Education	Elementary education majors (n =91)
Test: Researcher designed sight-reading test	Instruction: "Hand Signs", "Solfège", "Note Names"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: Using solfege coupled with Curwen hand signs or using just solfege showed the most improvement in sigh-reading skills.	

"Improving Sight-Singing Performance in the Choral Ensemble: The Effect of Individual Testing"	
Steven M. Demorest	1998
Journal of Research in Music Education	High school choir student (n =306)
Test: Ottman's Music for Sight Singing	Instruction: "Individual Testing"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: A significantly greater gain in individual sight-singing performance on the major melody for members of the experimental group.	

"An Experimental Study of the use of the Tachistoscope in the Teaching of Melodic Sight-Singing"	
Harry Hammer	1961
Dissertation — University of Colorado	Two fourth grade class (n =24)
Test: Researcher designed sight-reading test	Instruction: "Tachistoscopic Training"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: The tachistoscopic material and procedures developed were significantly more effective than the conventional techniques employed.	

"An Experimental Study of the Relative Effectiveness of 'Whole' and 'Part' Methods of Teaching Sight Singing"	
Devon Willis Helbling	1965
Dissertation — University of Colorado	Elementary education majors (n =26)
Test: Researcher designed sight-reading test	Instruction: "'Whole' and 'Part' Method"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: Neither the Whole Method Group nor the Part Method Group excelled in significant progress in sight-singing performance.	

"The Relative Effectiveness of Three Systems of Sight Singing in Developing Melodic Sight-Singing Ability at the Sixth-Grade Level"	
Johnathan David Horton	1974
Dissertation — George Peabody College for Teachers	Sixth grade students (n =291)
Test: Researcher designed sight-reading test	Instruction: "Shape Note", "Song flute", "Solfege"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: All three teaching systems were all effective in developing sight-singing ability.	

"A Comparative Study of Two Methods of Teaching Sight Singing in the Fourth Grade"	
Doris Hutton	1953
Journal of Research in Music Education	Fourth Grade Pupils (n =20)
Test: Researcher developed sight-reading test	Instruction: "Visual Materials", "Audio-Visual Materials"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: The experimental group made a significantly higher average on the final sight reading test.	

"Evaluation of an Innovative Instructional Design for Sight Singing"	
Lane Dale Justus	1970
Dissertation — University of Arizona	Beginning level female vocal students (n =88)
Test: Researcher designed sight-reading test	Instruction: "Sequentially Structured Form"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: All three experimental groups achieved a higher gain in the improvement of sight singing skills during the period of study than students taught by the conventional method compared.	

"An Experimental Study Comparing Programed Instruction with Class-Room Teaching of Sight Singing "	
Betty Mae Kanable	1964
Dissertation — Northwestern University	High school music students (n =15)
Test: Researcher designed sight-reading test	Instruction: "Programed Instruction"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: There was no significant difference in achievement between the experimental groups and the control groups.	

"The Relative Effeteness of Vocal Instruction and Instrumental-Vocal Instruction on Sight Singing Achievement of Elementary Education Majors"	
Edward Harry Meyer	1981
Dissertation — University of Iowa	Elementary education majors (n =121)
Test: Pre-Registration Examination of Sight Singing	Instruction: "Vocal Instruction", "Instrumental-Vocal Instruction",
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: Significant differences in sight singing achievement scores between the control group and the treatment groups.	

"The Relative Effectiveness of the Tap System in Instruction in Sight Singing: An Experimental Study"	
Robert Clinton Parker	1979
Dissertation — University of Miami	1st and 2nd year music majors (n =38)
Test: Belwin-Mills Singing Achievement Test	Instruction: "Tap System"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: Individual drill in rhythmic execution using the TAP System in an effective tool for teaching sight singing.	

"The Influence of Isolated Rhythmic Drill on Growth in Sight Singing "	
Gerald L. Tucker	1969
Dissertation — University of Oklahoma	Freshman music students (n =30)
Test: The Alfieri's Music Achievement Test	Instruction: "Rhythmic Drill"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: Neither the isolated rhythm groups not the traditional group excelled in significant progress in sight-singing performance.	

Instruction of Individual Wind Sight-Reading

"Effects of Tape-Recorded Aural Models on Sight-Reading and Performance Skills"	
James N. Anderson	1981
Journal of Research in Music Education	6th grade clarinet players (n =20)
Test: Watkins-Farnum Performance Scale	Instruction: "Tape-Recorded Aural Models"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: No significant difference between the experimental and control groups with regard to wither the skills measured or the number of music exercises completed during the study.	

"The Effect of Sight-Reading Instruction on the Language Reading Fluency and Music Sight-Reading Ability of Middle School Band Students"	
Nancy Elizabeth Barlar	2010
Dissertation — Boston University	Middle school band students (n =55)
Test: Watkins-Farnum Performance Scale	Instruction: "Sight-Reading Program"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: No significant difference was found between the oral reading fluency scores of the control and experimental groups. No significant difference was found between the music sight-reading scores of the experimental and control groups. A significant, positive correlation was found between the oral reading fluency and music sight-reading of all participants.	

"The Effects of Tonal Training on the Melodic Ear Playing and Sight Reading Achievement of Beginning Wind Instrumentalists"	
H. Christian Bernhard II	2003
Dissertation — University of North Carolina at Greensboro	Beginning wind instrumentalist (n =42)
Test: Grutzmacher's Melodic Sight Reading Achievement test	Instruction: "Tonal Training"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: Analysis of subjects' performances revealed that tonal training, as applied using standard method book melodies, significantly affected beginning wind instrumentalists' melodic ear playing achievement, but did not significantly affect their melodic sight reading achievement.	

"A Comparison of Methods for Sight-Reading Development Utilizing Collegiate Saxophonists"	
Scott Campbell	2016
Dissertation — University of North Texas	Collegiate Saxophonist (n =74)
Test: Researcher designed sight-reading test	Instruction: "Rhythm Study"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: There was no significant difference between the two groups' sight-reading improvement.	

"A Comparison of Tachistoscopic and Conventional Methods in Teaching Grade Three Music Sight- Playing on a Melody Wind Instrument"	
Robert Francis DiFronzo	1966
Dissertation — University of Connecticut	Elementary students on flutophones (n =25)
Test: Elementary Rhythm and Pitch test	Instruction: "Tachistoscopic Training"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: Tachistoscopic training used in this study was significantly more effective at teaching melodic-rhythmic sight-playing than conventional training techniques.	

"The Effects of Singing and Solmization Training on the Musical Achievement of Beginning Fifth-Grade Instrumental Students"	
Michael Paul Dunlap	1989
Dissertation — University of Michigan	5th grade beginning instrumentalist (n =92)
Test: Instrumental Sight-Reading test	Instruction: "Singing", "Solmization"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: A considerable, significant relationship was observed between vocal accuracy scores and measures of melodic ear-to-hand coordination, melodic aural-visual discrimination, and musical aptitude.	

"Music Reading Calisthenics: The Effect of a Consistent Regimen of Sightreading and The Effect of Educational Kinesiology Upon the Music Sightreading Skills of High School Music Students"	
Craig E. Ferrin	2003
Dissertation — University of Utah	Advanced band class students (n =51)
Test: Watkin-Farnum Performance Scale	Instruction: "Sightreading Regimen", "Educational Kinesiology"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: The data revealed that there was a significant difference between the pretest and posttest mean scores for combined groups, that is, both groups combined, improved in sightreading ability.	

"Music Reading Comprehension: The Effect of Aid to Chunking and Melodic Predicting on Sight Reading performance Achievement of Secondary School Instrumental Music Students"	
Janice Gaynor	1996
Dissertation — University of San Francisco	Secondary school students (n =59)
Test: Watkin-Farnum Performance Scale	Instruction: "Melodic Predicting", "Chunking"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: Instruction in reading strategies with address the predictability of music compositional structure merit further consideration.	

"The Effect of Tonal Pattern Training on the Aural Perception, Reading Recognition, and Melodic Sight-Reading Achievement of First-Year Instrumental Music Students"	
Patricia Ann Grutzmacher	1987
Journal of Research in Music Education	Beginning instrumentalist (n =48)
Test: Researcher designed sight-reading test	Instruction: "Tonal Pattern Training"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: The experimental group scored significantly higher on aural identification of major and minor tonalities and significantly higher in melodic sightreading achievement. No significant difference occurred between groups in reading recognition.	

"An Examination of The Effects of Daily Rhythmic Dictation of the Accuracy of Sight-Reading Rhythms by Sixth Grade Beginning Band Students"	
Gail Jarrell	1999
Dissertation — Troy State University	6th grade beginning band students (n =69)
Test: Researcher designed sight-reading test	Instruction: "Rhythmic Dictation"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: The experimental group saw a greater increase pre-test to posttest than did the students in the control group.	

"The Effect of The Use of Music Speed Reading on the Sight Reading Ability of Senior and Junior High School Instrumentalist"	
William J. Leafblad	1984
Missouri Journal of Research in Music Education	Instrumental high school students (n =74)
Test: Watkins-Farnum Performance Scale	Instruction: "Tachistoscopic Training"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: Improvement for the experimental group subjects was 12.5 points greater than that of control group subjects.	

"The Use of Kodaly Instruction to Develop the Sight-Reading Skills of Undergraduate Flute Students"	
Rochelle Gayl Mann	1991
Dissertation — Arizona State University	Undergraduate flute students (n =6)
Test: Watkins-Farnum Performance Scale	Instruction: "Kodaly Training"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups, but seemingly without a control group.	
Results: No statistically significant differences were discovered as a result of the Kodaly treatment. The subjects who achieved the greatest gains in all areas tested were initially the poorest sight-readers, indicating that the Kodaly method may prove most beneficial to less-experienced flutists who are at the early stages of sight-reading skill development.	

"The Effect of Sequentially Organized Sight-Reading Pieces on the Sight-Reading Achievement of Intermediate School Instrumental Music Students"	
Jennifer M. McBride	1993
Thesis — California State University, Fullerton	Instrumental music students in intermediate bands (n =102)
Test: Watkins-Farnum Performance Scale	Instruction: "Literature Sequencing"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups.	
Results: Due in part to differences between groups in implementing the study, no formal conclusions could be drawn.	

"Effects of Two Instructional Methods on High School Band Students' Sight-Reading Proficiency, Music Performance, and Attitude"	
Harry E. Price; Frank Blanton; Regena Turner Parrish	1998
Update: Applications of Research in Music Education	High School Instrumentalist (n =58)
Test: Watkins-Farnum Performance Scale	Instruction: "Excerpt Approach", "Method Book Approach"
Methodology: Individual testing. Pre/post sight-reading tests with treatment groups, but seemingly without a control group.	
Results: No significant difference between both experimental groups pretest and a significant difference in posttest scores in favor of the excerpt group.	

"A Design of an Instructional Program in the Sight Reading of Music"	
Thomas Robert Thornley Jr.	1980
Dissertation — University of Virginia	None.
None.	Focus: "Design of an Instructional Program in the Sight Reading of Music"
Methodology: Included materials for the rudiments of notation, notation fractionalization, note and rest relation, time signature characteristics, note and rest rhythm diagraming procedures in five different meters, and music exercise of four measures duration.	
Audience: Instrumental students with a minimum of one school year of music training.	

Instruction of Ensemble Vocal Sight-Reading

"A Study of the Effect of Hand Signs in the Development of Sight Singing Skills"	
Mollie Rose Autry	1975
Dissertation — University of Texas at Austin	5th grade students and College non-music students (n =120)
Test: Researcher developed sight-reading test	Instruction: "Hand Signs"
Methodology: Group testing. Two types of pre/post sight-reading tests with treatment groups.	
Results: No clear statistical proof that improved aural discrimination developed as a result of the use of hand signs. The use of hand signs did not prove a more effective method of learning to sight sing than the use of solfege alone.	

"The Use of Targeted Pitch Skills for Sight-Singing Instruction in the Choral Rehearsal"	
Michele L. Henry	2004
Journal of Research in Music Education	Novice high school singers (n =67)
Test: Vocal Sight Reading Inventory	Instruction: "Scale Degree Training", "Harmonic Function Training"
Methodology: Group testing. Pre/post sight-reading tests with treatment groups.	
Results: Each treatment group also obtained significantly higher mean scores on the posttest than on the pretest; however, there was no significant difference between the two treatments. Targeting specific pitch skills in both familiar and unfamiliar melodies shows promise as an effective tool for sight-singing instruction.	

"A Descriptive Study of the Pitch-Reading Methods and the Amount of Time Utilized to Teach Sight-Reading by High School Choral Teachers in the North Central Region of the American Choral Directors Association"	
Greta J. Bredemeier Johnson	1987
Thesis — University of Nebraska	High school choral ensembles (n =156)
Test: Researcher developed sight-reading test	Instruction: "Instruction Time", "Sight-Reading Instructions",
Methodology: Group testing. Questionnaire with sight-reading assessment.	
Results: The interval approach was most frequently used in sight-reading instruction. In beginning mixed chorus, there was a moderately positive relationship between the number of contests with sight-singing and the amount of instruction time spent to sight-singing.	

Instruction of Ensemble Wind Sight-Reading

"The Effect of Prescribed Rhythmical Movements on the Ability to Read Music at Sight"	
J. David Boyle	1970
Journal of Research in Music Education	Junior high Band students (n =191)
Test: Watkins-Farnum Performance Scale	Instruction: "Rhythmic Movements"
Methodology: Group testing. Treatment groups with pre/post testing in sight-reading.	
Results: Both the control and experimental groups made statistically significant gains in their scores on the rhythm sight-reading test and The Watkins-Farnum Performance Scale. However, the experimental group's scores on both criterion measures were significantly higher than those made by the control group.	

"The Relationship of Festival Sightreading Room Educational Techniques to Superior Festival Rating Among High School Concert Bands"	
Melva Virginia Sorrells	1992
Thesis — University of North Florida	26 high school band with students on various instruments (n =1,311)
Test: Florida Bandmasters Association Judges	Instruction: "Guided Model Technique", "Verbal Instruction", "Aural Instruction"
Methodology: Group testing. Observation of teaching combined with Ratings.	
Results: Band directors who had the attention of their students, who gave precise instruction in an organized manner using the guided model technique, whose students understood the instruction, who used their sightreading music study time efficiently and who controlled student questions, received superior ratings in the sightreading portion of the music festival.	

"An Analysis of Band Conductor Sight-Reading Behavior and Ensemble Preparation for Sight Reading"	
Casey J. Warren	1988
Dissertation — University of Oklahoma	High school band conductors (n =20)
Test: Contest Sight-Reading Judges	Instruction: "Conductor Activity"
Methodology: Group testing. Observation of sight-reading and interviews.	
Results: When in the contest sight-reading setting, most conductors implemented a fundamental-oriented, topical approach mirroring regular rehearsal practices. Conductors who chose not to use this approach did so because it did not reflect their regular rehearsal style, and because their students did not require a review of fundamental techniques. In these cases, fundamental techniques were regarded.	

Assessment of Individual Keyboard Sight-Reading

"Evaluation of a Sight-Reading Test Administered to Freshman Piano Classes"	
Jerry E. Lowder	1973
Journal of Research in Music Education	Freshman piano student (n =23)
Test: Researcher designed sight-reading test	
Methodology: Individual testing. Literature review on characteristics of sight-reading errors.	
Results: The types of errors committed during performance: that a pitch error was accompanied by a rhythmic error; that a high proportion of subjects' errors consisted of the omission of accidentals required by the key signature; and that more errors occurred in the bass clef than in the treble clef.	

" Construction, Interpretation, and Use of a Sight Reading Scale in Organ Music with an Analysis of Organ Playing into Fundamental Abilities"	
Theo G. Stelzer	1938
Journal of Experimental Education	Organist of varying ability (n =5)
Test: Researcher designed sight-reading test	
Methodology: Individual testing. Literature review on characteristics of sight-reading errors.	
Results: The sight reading scale developed in this study is a reliable and valid measure of ability in the reading of organ music.	

Assessment of Individual Vocal Sight-Reading

"The Development of a Sight-Singing Achievement Test for use with College Students"	
John J. Cooper	1965
Thesis — University of Colorado	Music majors (n =102)
Test:	Researcher designed sight-reading test
Methodology:	Individual testing. Literature review on characteristics of sight-reading errors.
Results:	The primary conclusion was that the test developed in this study has face or content validity. It meets most of the criteria of a good test, with the exception of usability.

"The Development of a Vocal Sight-Reading Inventory"	
Michele Henry	2001
Bulletin of the Council for Research in Music Education	High school students (n =183)
Test:	Researcher designed vocal sight-reading test
Methodology:	Individual testing. Literature review on characteristics of sight-reading errors.
Results:	Subjects obtained a mean score of 10.7 out of 28 skills, or roughly 38% accuracy. Difficulty levels were established for 28 pitch skills identified in the study. No significant differences between forms were found for 22 of the 28 pitch skills.

"A Comparison of Two Methods of Measuring Achievement in Sight Singing"	
John Charles Nelson	1970
Dissertation — University of Iowa	College music students (n =83)
Test:	Short-item objective test (comprising of 76 items); Long-Item Sight Singing Test (constructed by the author)
Methodology:	Individual testing. Literature review and previous researcher on testing devices.
Results:	No empirical evidence was found to support the superiority of one form of test over the other.

Assessment of Individual Wind Sight-Reading

"The Identification and Classification of Instrumental Performance Sight-Reading Errors"	
Charles A. Elliott	1982
Journal of Band Research	Undergraduate wind instrumentalist (n =32)
Test: Watkin-Farnum Performance Scale	Focus: Categorization of errors; Characteristics of musician errors
Methodology: Individual testing.	
Results: 61 percent of error types were rhythm errors. In addition, the four categories of pitch, rhythm, expression, and articulation accounted for over 99 percent of the total number of errors noted.	

Developing Technologies in Sight-Reading

Research of Sight-Reading Technology

"A Real-Time Microcomputer-Assisted System for Translating Aural, Monophonic Tones into Music Notation as an Aid in Sightsinging"	
Randall Martin Kolb	1984
Dissertation — Louisiana State University	Beginning music theory students (n =72)
Test: Aural skills grade	Mode: Voice Technology: Aural Translator
Methodology: Individual testing. Treatment and control group combine with their theory grade. Questionnaire.	
Results: No formal proof or measurement of value was found with any statistical valid significance. Questionnaire showed students thought that the system was beneficial.	

"The Development and Trials of Microcomputer-Assisted Techniques to Supplement Traditional Training in Music Sightreading"	
Robert McCord Lemons	1984
Dissertation — University of Colorado at Boulder	College students (n =19)
Test: Researcher designed sight-reading test	Mode: Treble clef instruments Technology: Microcomputer-Assisted Tachistoscopic Training
Methodology: Individual testing. Pre/post testing with treatment groups.	
Results: No significant initial difference between the experimental and control groups. Posttest data showed that the experimental group had scored significantly higher than the control group.	

"The Effect of a Microcomputer-Assisted Instructional Program on the Ability of College Choral Ensemble Members to Sing Melodic Configurations at Sight"	
Jay Daniel Platte	1981
Dissertation — Ball State University	College students (n =41)
Test: Singing Achievement Test	Mode: Voice Technology: Microcomputer-Assisted Tachistoscopic Training
Methodology: Individual testing. Pre/post testing with treatment groups.	
Results: There was no significant effect on the ability to sing melodic configurations at sight through the use of the MELODIOUS DICTATOR as measured by mean scores of two criterion posttests.	

"An Experimental Program for Improving The Sight-Reading Ability of Cornet and Clarinet Players"	
Ralph Curtis Rea	1954
Dissertation — University of Iowa	Cornet and Clarinet players (n =54)
Test: Objective Measures of Instrumental Performance	Mode: Wind Technology: Music Reading Films
Methodology: Individual testing. Pre/post testing with treatment groups.	
Results: Satisfactory evidence was obtained as to the effectiveness of the material selected for use in filming. On the average, students taking part in the experiment improved as much in a period of six weeks as they had during the previous twelve months.	

"The Effect of a Sight Reading Pacer Machine Upon the Sight Reading Ability of College Wind Instrumentalist"	
Robert J. Streckfuss	1984
Dissertation — Catholic University of America	College wind instrumentalist (n =28)
Test: Watkins-Farnum Performance Scale	Mode: Wind Technology: Pacer Machine
Methodology: Individual testing. Pre/post testing with treatment groups.	
Results: The sight reading pacer machine was effective in improving sight reading ability as measured by the WFPS. The difference between the gains scores of the two groups was significant at the .05 level.	

"Sightreading Constant Rhythm Pitch Phrases: A Computer Assisted Instructional System"	
Edgar Joseph Thompson	1973
Dissertation — University of Utah	University first year theory students (n =20)
Test: Researcher developed sightsinging test	Mode: Voice Technology: Computer Assisted Instructional Program
Methodology: Individual testing. Pre/post testing with treatment groups.	
Results: Students showed progress in sightsinging ability after having received instruction on a computer assisted instructional program using learning materials generated by the computer itself.	

"Interactive Software Program to Develop Pianist Sight-Reading Ability"	
Victoria Tsangari	2010
Dissertation — University of Iowa	
Test: None	Mode: Keyboard
	Technology: Interactive Software
Results: The program proposed in this essay aspires to fill this gap in sight-reading instruction. Some of the features of the program are instant and specific feedback capabilities, recording of users' performances for comparison with pre-recorded audio versions of the musical material, and animation techniques. These features are applied in a framework of sound pedagogy in order to develop effectively each of the component sight-reading skills.	

"A Study of the Teaching of Sightsinging of Melodic Configurations to a Group of Secondary-School Students by Means of a Teaching Machine"	
William Floyd Wakeland	1964
Dissertation — Southern Illinois University	Secondary-School Students (n =53)
Test: Researcher designed sight-reading test	Mode: Voice
	Technology: "Teaching Machine"
Methodology: Individual testing. Pre/post testing with treatment groups, but without a control group.	
Results: The group gain in configurations sung correctly would lend strong support for the use of this type of programmed instruction in secondary schools as a method of improving sightsinging skills.	

Perceptual, Psychological, and Neurological Research on Sight-Reading

Eye-Hand Span in Sight-Reading

"The Effects of Skill on the Eye-Hand Span during Musical Sight-Reading"	
S. Furneaux; M. F. Land	1999
Proceedings: Biological Sciences	Pianist of varying ability (n =8)
Test: Researcher selected materials	Mode: Keyboard
Methodology: Individual testing. Recording of eye movements.	
Results: The professionals showed significantly larger note indexes than the amateur. Surprisingly, the different groups of showed almost identical mean time indexes with no significant differences between any of levels.	

"The Eye-Hand Span – An Approach to the Study of Sight Reading"	
John Sloboda	1974
Psychology of Music	Subjects of varying ability (n= 10)
Test: Researcher designed sight-reading test	Mode: Keyboard
Methodology: Individual testing. Recording of eye movements.	
Results: The data form the experiment argues against the "pure guessing" hypothesis and instead suggests a "sophisticated guessing" model.	

"The Perceptual Span and the Eye-Hand Span in Sight Reading Music"	
Frances E. Truitt; Charles Clifton; Alexander Pollatsek; Keith Rayner	1997
Visual Cognition	Voluntary participants (n =8)
Test: Mikrokosmos, Vol. 1 – Bartok	Mode: Keyboard
Methodology: Individual testing. Recording of eye movements.	
Results: It was found that pianists need to see no more than the whole measure that they are fixating in order to perform normally: playing time was longest in the two-beat window condition, and there were longer fixation durations ,more fixations, more regressions, and shorter saccade lengths in the two-beat window condition than in the other three conditions, which generally did not differ from one another.	

Eye Movement in Sight-Reading

"A Study of Eye Movement During Sight-Reading of Selected Piano Compositions	
Sun-Hee Chang	1993
Dissertation — Columbia University Teacher College	Piano performance majors (n =6)
Test: Researcher selected piano composition	Mode: Keyboard
Methodology: Individual testing. Recording of eye movements.	
Results: The accurate sight-reader had for more frequent fixations and a longer total fixation duration, but shorter average fixation duration.	

"Eye Movement in Music Reading: Effects of Reading Ability, Notational Complexity, and Encounters"	
Thomas W. Goolsby	1994
Music Perception: An Interdisciplinary Journal	Graduate music students (n =24)
Test: Belwin-Mills Singing Achievement Test	Mode: Voice
Methodology: Individual testing. Recording of eye movements.	
Results: Eye movement was reduced when performing dies with more-concentrated visual information than when performing melodies with less-concentrated visual information. The main effect encounters indicated that music readers used fewer but longer after practicing the melodies.	

"Profiles of Processing: Eye Movements during Sightreading"	
Thomas W. Goolsby	1994
Music Perception: An Interdisciplinary Journal	Selected music students (n =2)
Test: Researcher selected material	Mode: Voice
Methodology: Individual testing. Recording of eye movements.	
Results: Music readers do not fixate on note stems bar lines that connect eighth notes when sightreading. The less-skilled music reader progressed through the melody virtually note-by-note using long fixations, whereas the skilled sight-reader directed fixations to all areas of the notation to perform the music accurately.	

"A Biometric Analysis of Eye Movement Patterns of Sight-Singer	
David Lee Halverson	1974
Dissertation — Ohio State University	Vocalist of varying ability (n =8)
Test: Researcher developed sightsinging test	Mode: Voice
Methodology: Individual testing. Recording of eye movements.	
Results: The number of fixations per second were greater for the sight-singing test composed of difficult rhythm than they were for the easier test. The eye-voice span of expert subjects was greater than that of the novice subjects.	

"The Early Development of Sight-Reading Skills in Adulthood: A Study of Eye Movement"	
Marjaana Penttinen; Erkki Huovinen	2011
Journal of Research in Music Education	Beginning adult sight readers (n =49)
Test: Researcher selected sight-reading	Mode: Voice
Methodology: Individual testing. Recording of eye movements.	
Results: Concerning larger melodic skips in otherwise stepwise melodic contexts, an analysis of fixation times suggested that the novices' visual processing of skips did not proceed in terms of note comparison across the skip but rather through a direct identification of the notational symbols involved.	

"The Eye Movement Patterns of Woodwind Instrument Performers While Sight-Reading"	
Frederick Owen Schmidt	1981
Dissertation — Ohio State University	Woodwind players of varying ability (n =4)
Test: Criterion Sight-Reading Test	Mode: Wind
Methodology: Individual testing. Recording of eye movements.	
Results: Sight-reading expertise of the subjects significantly affected the mean number of eye regressions per second. However, sight-reading expertise did not significantly affect the mean number of eye fixations per second, or the mean duration of the eye fixations, or the mean duration of the eye regressions.	

"An Investigation of the Effects of Varying Temporal Settings of Eye Movements While Sight-Reading Trumpet Music and While Reading Language Aloud"	
Donald Jay Smith	1988
Dissertation — Pennsylvania State University	College trumpet players (n =40)
Test: Researcher selected sight-reading	Mode: Wind
Methodology: Individual testing. Recording of eye movements with various tempos.	
Results: Fixation rates and duration of fixations were not different among the temporal conditions. Accurate music readers used significantly more fixations and a faster fixation rate than Inaccurate readers in ail temporal conditions of music reading. Music sight-reading and language reading were found to be most similar in eye movement characteristics when read at similar rates of notes-per-minute and words-per-minute.	

"A Study of the Eye-Movements and Eye-Hand Temporal Relationships of Successful and Unsuccessful Piano Sight-Readers While Piano Sight-Reading"	
Leonora Jeanne Young	1971
Dissertation — Indiana University	Highly skilled pianist (n =17)
Test: Researcher designed sight-reading test	Mode: Keyboard
Methodology: Individual testing. Recording of eye movements with pre/post testing.	
Results: As reflected in the previous authoritative dictums of how to piano sight-read, the musician's concept of piano sight-reading appears to have been an oversimplification of a very complex process.	

Psychology and Sight-Reading

"Prognosis of Sight Singing Ability of Normal School Students	
Frank S. Salisbury; Harold B. Smith	1929
The Journal of Applied Psychology	Students at a Normal school (n =132)
Test: Seashore tests of musical ability	Mode: Voice
Methodology: Individual testing. Multiple tests for correlative ability.	
Results: The most effective combination for predicting sight singing is gotten by weighting the standard scores of dictations, pitch .22 and tonal memory .22, resulting in a multiple correlation of .84, and a probable error of .27 of a sigma in predicting true scores.	

"Music Sight-Reading in Flute Players"	
W. Burt Thompson	1987
Journal of General Psychology	Flute Players (n =30)
Test: Watkins-Farnum Performance Scale	Factors: "Music Recall", "Letter Recall", "Eye-Performance Span", "Perpetration Time"
Methodology: Individual testing. Multiple tests for correlative ability.	
Results: Sight reading ability was significantly correlated with eye-performance span and music recall, but not with letter recall.	

"Expertise in Musical Sight Reading: A Study of Pianist"	
Andrew J. Waters; Ellen Townsend; Geoffrey Underwood	1998
British Journal of Psychology	University pianist (n =13)
Test: Associate Board sight-reading pieces	Factors: "Verbal Protocols", "Note Recognition", "Chord Recall", "Pattern Recognition", "Musical Problem Solving"
Methodology: Individual testing. Multiple tests for correlative ability.	
Results: Correlational analysis showed that performance in the pattern-recognition task requiring immediate recall of rapidly presented chords correlated most strongly with sight-reading skill.	

"A Cognitive Model of Musical Sight-Reading"	
Thomas Wolf	1975
Journal of Psycholinguistics Research	Pianist (n =4)
Methodology: Researcher interview.	
Results: Sight-reading is analyzed as a problem in pattern recognition. The close relationship between sight-reading and text reading is also suggested.	

Science and Music

"A Group Study of Sight Singing Ability"	
Max T. Krone	1930
Thesis — Northwestern University	6th grade vocalist (n =105)
Test: Krone Test; Hillbrand Individual Sight Singing Test	
Methodology: Individual testing. Multiple tests for correlative ability.	
Results: There is a moderate degree of relationship in the sight grade between sight reading and ability to tell from following the notation when music was played correctly.	

"An fMRI Study of Music Sight-Reading"	
Daniele Schon; Jean Luc Anton; Muriel Roth; Mireille Besson	2002
NeuroReport	Pianist with 12 year experience (n =9)
Test: Researcher selected material	Mode: Keyboard
Methodology: Individual testing. Observation of brain activity during sight-reading.	
Results: Overall, the three tasks revealed a similar pattern of activated brain areas. However, direct contrasts between the music notation and the verbal or the numerical notation tasks also revealed specific major foci of activation in the right occipito-temporal junction, superior parietal lobule and the intraparietal sulcus.	

"Distributed Neural Network Underlying Musical Sight-Reading and Keyboard Performance"	
Justine Sergent; Eric Zuck; Sean Terriah; Brennan MacDonald	1992
Science, New Series	Professional Pianist (n =10)
Test: Researcher selected material	Mode: Keyboard
Methodology: Individual testing. Observation of brain activity during sight-reading.	
Results: Reading musical notations and translating these notations into movement patterns on a keyboard resulted in activation of cortical areas distinct from, but adjacent to, those underlying similar verbal operations. These findings help explain why brain damage in musicians may or may not affect both verbal and musical functions depending on the size and location of the damaged area.	

The State of Literature in Sight-Reading

Literature Reviews on Sight-Reading

"Sight-Reading Ability in Wind and Percussion Students: A Review of Recent Literature"	
S. Daniel Galyen	2005
Update: Applications of Research in Music Education	
Topics:	"Variables that Influence Sight-Reading", "Notation Variables", "Computer-Assisted Instruction", "Characteristics of Successful Sight-Reading", "Sight-Reading Methods", "Sight-Reading Methods Involving Vocalization", "Sight-Reading and Conductors"

Predictors of Sight-Reading Achievement: A Review of the Literature	
Eloise Stebleton	1987
Update: Applications of Research in Music Education	
Topics:	"Predictors of Sight-Reading Achievement", "Individual Differences in Visual Memory Trace", "Melodic Pattern Recognition", "Rhythmic Pattern Recognition", "Individual Difference Variables Cognitive Styles"

"Cognition and Motor Execution in Piano Sight-Reading: A Review of Literature"	
Brenda Wristen	2005
Update: Applications of Research in Music Education	
Topics:	"Specialized Demands of Sight-Reading", "Sight-Reading Related to Musical Specialization", "Suggestions for Further Research"

Meta-Analysis on Sight-Reading

"Factors Related to Sight-Reading Accuracy: A Meta-Analysis"	
Jennifer Mishra	2013
Journal of Research in Music Education	Research studies on sight reading (n =92)
Constructs:	"Improvisation", "Ear Training", "Technical Ability", "Music Knowledge", "Age", "Music Aptitude", "Sight-Reading ability", Psychomotor", "Music Study", "Academic Achievement", "Practice", "IQ", "Perception", "Memorization", "Personality", "Early Exposure", "Attitude"
Methodology:	Variables grouped by construct and analyzed by meta-analyses.
Results:	In general, music constructs that improve with practice correlated more strongly with sight-reading than did stable characteristics. These results support sight-reading being considered a music skill that improves with the musicality of the performer rather than a simple visuo-motor decoding process.