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- Email customerservice@SpeechPathology.com

Do-Re-Mi for the SLP: Considering Elements of Music in Treatment

Becky Mitchum, MS, CCC-SLP, CBIS
Violinist and Speech-Language Pathologist

1

- **Presenter Disclosure:** Financial: Becky Mitchum has received an honorarium for presenting this course. Non-financial: Becky Mitchum has no relevant non-financial relationships to disclose.
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2

CONTINUED

Becky Mitchum comes to a career in speech-language pathology from over 25 years as a professional violinist in orchestras both in the USA and in Germany. She plays on a French violin made in 1833. Becky was a violinist with the Arkansas Symphony Orchestra in Little Rock for several decades before becoming a certified speech-language pathologist.

Becky currently serves on the rehabilitation team of the White River Medical Center Hospital outpatient clinic in Batesville, Arkansas. She is a member of the American Speech-Language Hearing Association (ASHA) and the American Hippotherapy Association (AHA). She holds the credential of Certified Brain Injury Specialist (CBIS) through the Brain Injury Association of America.

3

CONTINUED

Learning Outcomes

After this course, participants will be able to:

- List at least 3 ways music can be useful when delivering speech-language pathology services.
- Describe ways to use elements of music in therapy to manage or overcome barriers in speaking, thinking and swallowing.
- Describe how to apply at least one musical element to a current client's treatment plan of care.

4

Download these docs in color

1. Original art (not for resale) to use for therapy activities (client/caregiver education)
2. Attention Thermometer to train metacognition in children
3. BRAIN TRAIN: 8-page 12-week attention training activity
4. 10-page word document describing 11 activities that incorporate elements of music for SLPs to use in treatment and discharge

5

ELEMENTS of MUSIC

The phrase 'Elements of Music' in this presentation refers to:

- ❑ Rhythm
- ❑ Use of pitch and pitch variation
- ❑ Tempo
- ❑ Volume
- ❑ Duration
- ❑ Ensemble
- ❑ Lyrics
- ❑ The written symbol system of music

Q1

6

WHEN IS IT *NOT* APPROPRIATE FOR SLP TO CONSIDER ELEMENTS OF MUSIC IN TX

- If the client is sensory defensive to it
- If the client's impairments preclude him/her from being able to sense it, process it, or participate in it
- If the therapist is unclear on the WHY and HOW behind the strategy

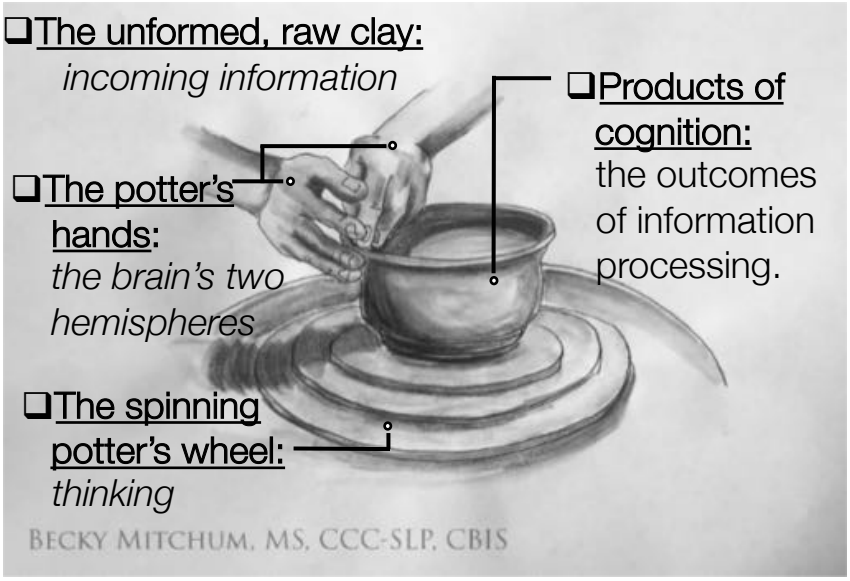
7

COGNITION

information
processing
through
thinking

8

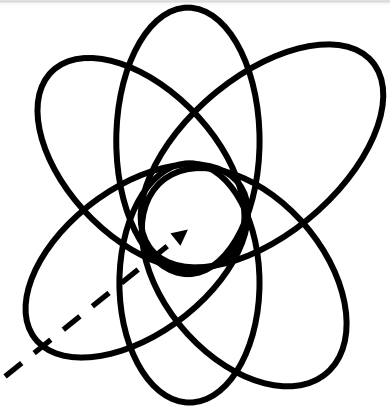
CONTINUED



Q:3, Q9

9

CONTINUED



All Disciplines Intersect at Cognition

Q9

10

Speech-Language Pathology vs Music Therapy

Q2

11

SLP vs Music Therapy

- MUSIC THERAPY is an accredited health care profession using the systematic application of music in the treatment of cognitive, social, communicative, behavioral, psychological, sensor-motor, and physical needs of clients. It is accredited by the Certification Board for Music Therapists (CBMT), and the credential is “board-certified music therapist”, or MT-BC.
- For more information, you can email the CBMT: infor@cbmt.org

12

SLP vs Music Therapy

- Entry level degree to be a practicing music therapist is a bachelor's degree from an accredited college/university. Credentials are obtained by graduating, completing an approved internship, and passing a board certification exam. There are masters level and doctoral level degrees in music therapy for those wishing to pursue higher education in music therapy.

This information comes from the website of the CBMT: www.cbmt.org

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Music & Language Overlap: Similarities & Dual Hemisphere Processes

15

Music & Language: Similarities

- Spontaneous speech and spontaneous singing typically develop in children at approximately the same time
- @18-24 months children have a language spurt, start exploring 3-5 word sentences, singing and repeating rhymes
- Both expressions of music and language are acquired hierarchically.

16

CONTINUED

Music & Language: Similarities

- Music and language are universal, unique to each culture.
- Both have pitch, timbre, rhythm, durational features, require perception, are expressed with varying rates of speed, can change meaning depending on volume/tone/emphasis, both have rule-governed written symbol systems, and both music and language can be expressed alone as well as with a partner or partners.

17

CONTINUED

Music & Language: Dual Hemisphere Processes

18

CONTINUED

Left Hemisphere

Music	Language
→Time signatures	→Logic, step-by-step
→Beats per minute	→Mathematics
→Segments pitches and rhythms, discerns patterns ("categories")	→Segments blends & syllables, organizes info into categories
→Rule-governed: key & time signatures within same measures	→Rule-governed: syntax, grammar, phonotactic constraints

19

CONTINUED

Right Hemisphere

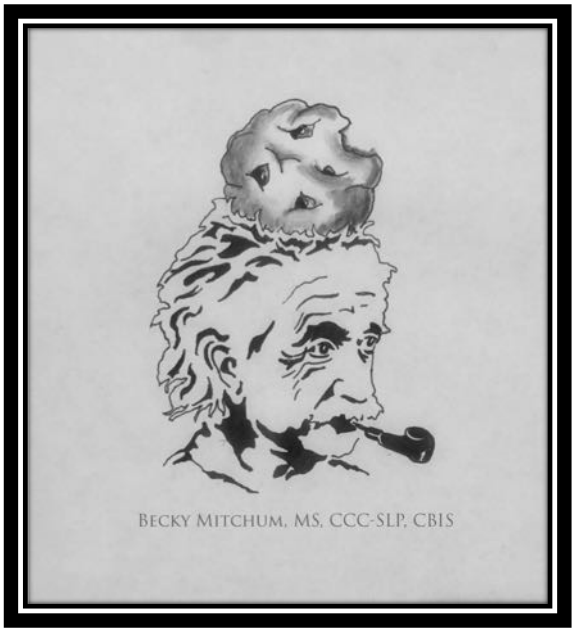
Music	Language
→Integrating, simultaneous	→Sees the larger picture, puts segments together
→Symbol systems, spatial, aesthetics/ emotive, visual	→Symbol systems, symbolic representations (poetry), spatial, visual
→Intuitive, creative, dominant for prosody in speech	→Intuitive, creative, dominant for facial expressions

Q4 20

Neuroplasticity, Albert Einstein, and Chocolate Chip Cookies: Terminology Refresher

- NEURONS
- GLIAL CELLS
- NEUROPLASTICITY

21



Q5

22

Neuroscientists:

Four Seminal Authors Studying Music and Language in the Brain

23

Four Neuroscientists

- Dr. Aniruddh Patel
- Dr. Daniel Levitin
- Dr. Gottfried Schlaug
- Dr. Michael Thaut

24

Four Neuroscientists

- Dr. Aniruddh Patel
  - Currently at Tufts University in Boston. His instrument was the piano. His research focus is music cognition: the mental processes involved in making, perceiving, and responding to music.
  - *"Music always has been, and always will be, part of the human condition."*

25

Four Neuroscientists

- Dr. Daniel Levitin
  - Currently at McGill University in Montreal. His instrument was the electric guitar. His research focus is pattern processing in the brain.
  - *"Actively participating in music exercises parts of the brain that are shared in language processing."*

26

CONTINUED

Four Neuroscientists

- Dr. Gottfried Schlaug
  - Currently at the Neuroimaging Laboratory at Beth Israel Deaconess & Harvard Medical School. His research includes determining the predictors and facilitators of post-stroke language and motor recovery. His instrument was the organ.
  - *"Music is a strong stimulus. It is a multi-sensory, multi-modal experience. Because it is multi-modal, music helps us develop or engage more associations in the brain."*

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CONTINUED

Four Neuroscientists

- Dr. Michael Thaut
  - Currently at the Rehabilitation Sciences Institute of the University of Toronto. He is the "father" of Neurologic Music Therapy (NMT). Dr. Thaut was a professional violinist in Germany before becoming a neuroscientist. He still plays the violin.
  - *"…My research looks at how the brain processes musical elements which require attention, memory, executive function, language, motor control -- and asks the question: are there mechanisms in music which can be transferred to non-musical functions? And the answer is yes, there are."*

28

CONTINUED

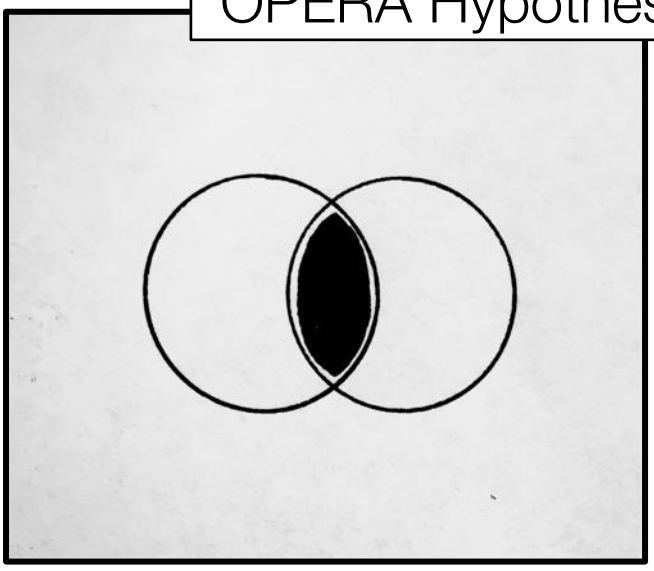
The
O.P.E.R.A. Hypothesis
by
Dr. Aniruddh Patel

A theory of how music [training] helps encode speech in the brain.

Q6 29

CONTINUED

OPERA Hypothesis



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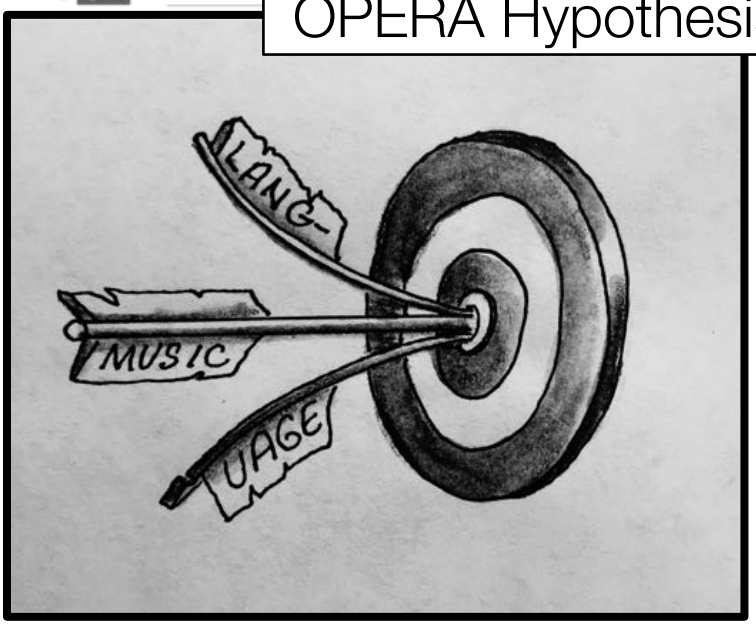
OPERA Hypothesis



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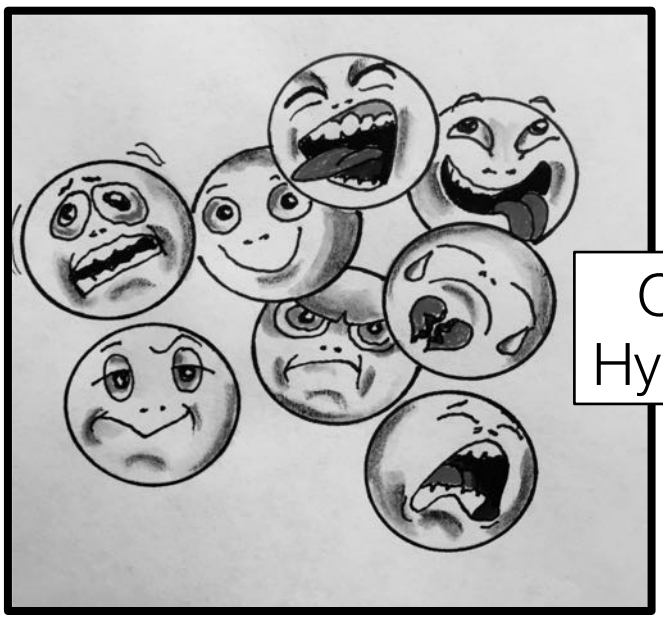
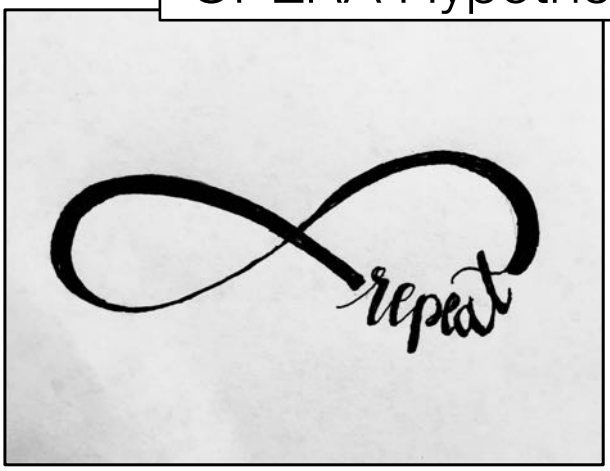


OPERA Hypothesis

32

OPERA Hypothesis



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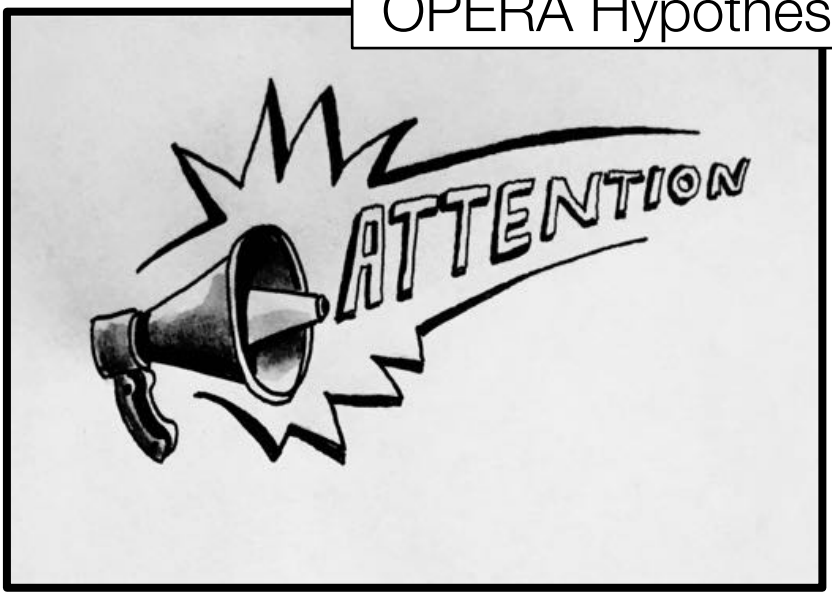
OPERA Hypothesis



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Attention & Memory: The Bookends To All Learning

Q9

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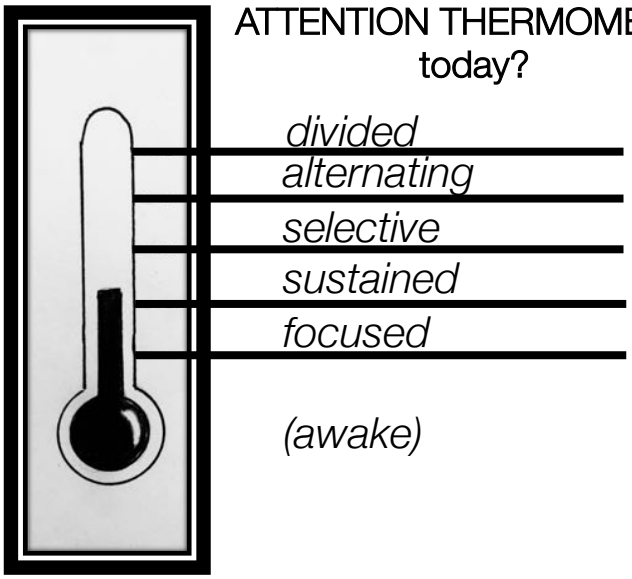
Where am I on the ATTENTION THERMOMETER today?



36

Training Metacognition in Teens and Adults: Part of training attention

DATE	SKILL	CLIENT'S 1-10 ASSESSMENT of PERFORMANCE	THERAPIST'S 1-10 ASSESSMENT of PERFORMANCE
		1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10
		1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10
		1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10
		1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10
		1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10

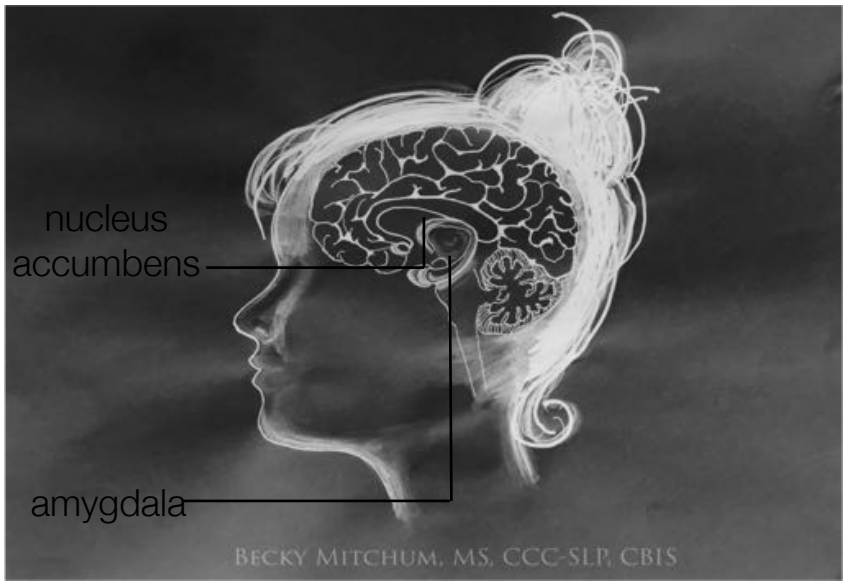
37

Music As Mood Elevator For Better Learning

Eliciting pleasing emotional responses "unlocks" the limbic system's gateway to the hippocampus*:*

emotions modulate the strength of memory consolidation.

38



Q7

39

Do-Re-Mi for the SLP: Considering Elements of Music in Treatment

***

Four Activities

40

SLPs *can* use elements of music in therapy.

ACTIVITY #1
-for infants-
Rhythmic Entrainment:
Using a metronome to facilitate a more organized non-nutritive suckle

41

ACTIVITY #1 – *for infants*

RHYTHMIC ENTRAINMENT to facilitate a more organized, rhythmic non-nutritive suckle

A non-nutritive suckle (NNS) that is more rhythmic (i.e., more regular suck waves and sucking bursts) was shown to be highly predictive of a shorter transition to full oral feeding and becoming a more competent oral feeder

Harding, C. (2014). Non-nutritive sucking for infants: what are the issues?. *Infant;* 10(2).

42

CONTINUED

#1 RHYTHMIC ENTRAINMENT

A 2016 article by Wren and associates mentions that a delay in developing motor skills is a risk factor for persistent speech sound disorder (SSD) still prevalent by age 8. Delayed development of motor skills included feeding skills and management of secretions (dribbling).

Wren Y, Miller L, Peters T, Emond A, Roulstone S. (2016). Prevalence and predictors of persistent speech sound disorder at eight years old: Findings from a population cohort study. *Journal of Speech, Language, and Hearing Research;* 59, 647-673.

43

CONTINUED

#1 RHYTHMIC ENTRAINMENT

Rhythmic NNS → predictive of more competent feeder → one less risk factor for persistent SSD

---

1. Place a pacifier in the baby's mouth
2. Set a metronome to tick at 1 x per second
3. Gently press the pacifier in with each tick and slightly releasing pressure between ticks.

44

CONTINUED

#1 RHYTHM ENTRAINMENT

Use a steady, predictable beat. Rhythmic sequences engage auditory and motor areas more strongly than arrhythmic sequences, even during passive listening and in the absence of movement.

Rajendran V, Teki S, Schnupp J. (2018). Temporal processing in audition: Insights from Music. *Neuroscience;* (389), 4-18. https://doi.org/10.1016/j.neuroscience.2017.10.041

45

CONTINUED

SLPs *can* use elements of music in therapy

ACTIVITY #2
-for children & adults-
Brain Train:
Using elements of music to train attention

46

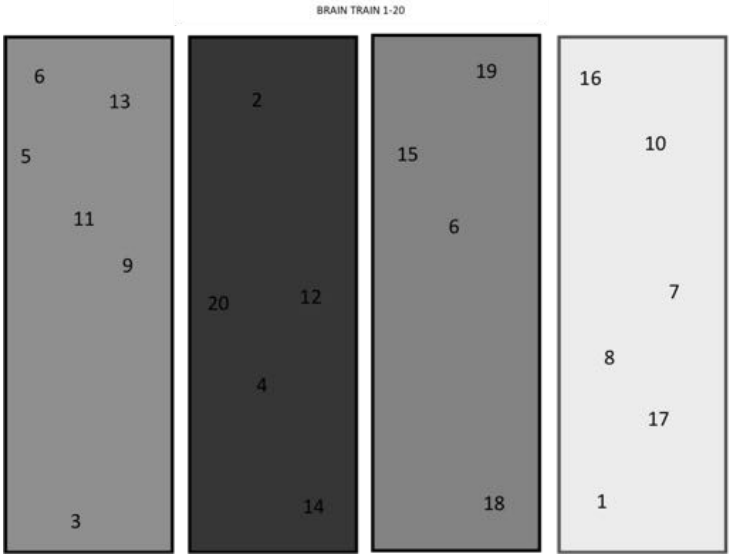
ACTIVITY #2 – *for children and adults*

BRAIN TRAIN: Client progresses through a hierarchy of timed attention tasks, starting with no distractions on a simple task and progressing to more complex tasks with accompanying music distractions.

Entire activity takes 8 weeks @ 1x weekly

47

Activity #2: Brain Train



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CONTINUED

ACTIVITY #2 - BRAIN TRAIN:

If in doubt about client's cognitive level, use the TRIAL page to probe whether to continue or stop

- WEEK 1 → 1-20 without music: record time and # of errors
- WEEK 2 → 1-20 with music: record time and # of errors
- WEEK 3 → 1-30 without music: record time and # of errors
- WEEK 4 → 1-30 with music: record time and # of errors

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CONTINUED

ACTIVITY #2 - BRAIN TRAIN

- WEEK 5 → 1-40 without music: record time and # of errors
- WEEK 6 → 1-40 with music: record time and # of errors
- WEEK 7 → 1-50 without music: record time and # of errors
- WEEK 8 → 1-50 with music: record time and # of errors

50

BRAIN TRAIN'S TASK DATA REFLECTS PROGRESS:

- *Length of time to complete task*
- *At each level (1-20, 1-30, 1-40, 1-50) you want to see the gap closing between the time to complete the task without distractions and the time to complete the task with distractions*
- *Number of errors*
- *Can they discover 2 time-saving strategies*

51

Ways to Vary Musical Elements as Attention-Training Tools During Brain Train

- *LYRICS:* Incorporate music with lyrics instead of only instrumental music (hearing language paired with pitches is more distracting than pitches only)

Q8

52

Ways to Vary Musical Elements as Attention-Training Tools During Brain Train

- *VOLUME:* Increasing or varying volume
- *TEMPO:* Increase tempo (faster music up-regulates us, slower music down-regulates us)

Q8 53

Ways to Vary Musical Elements as Attention-Training Tools During Brain Train

- *RHYTHM:* Use music with a steady, predictable beat. Rhythmic sequences engage auditory and motor areas more strongly than arrhythmic sequences, even during passive listening and in the absence of movement.

Rajendran V, Teki S, Schnupp J. (2018). Temporal processing in audition: Insights from Music. *Neuroscience;* (389), 4-18. https://doi.org/10.1016/j.neuroscience.2017.10.041

Q8 54

Ways to Vary Musical Elements as Attention-Training Tools During Brain Train

- *DURATION OF ONE PITCH:* Alter the length of a single pitch. Vary a short, staccato repetitive pitch with a pitch sustained 5-10 seconds or more.
- Varying the duration creates a higher demand on attention (like increasing the weight on bar bells).

Q8

55

SLPs *can* use elements of music in therapy.

ACTIVITY #3
Crayon Violin:
-for children & adults-

A free musical app for 2 people
to practice social pragmatic skills

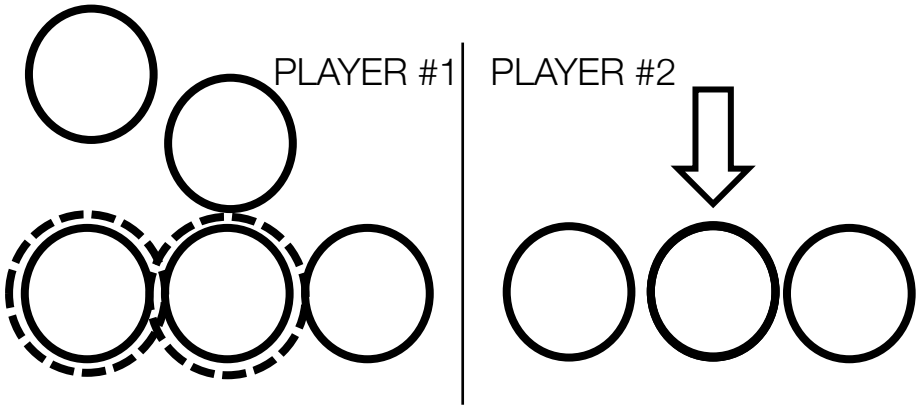
56

ACTIVITY #3: *- for children and adults*

- a free app called CRAYON VIOLIN

57

Activity #3 - CRAYON VIOLIN



CRAYON VIOLIN for practicing turn-taking, attention, collaboration, frustration, good sportsmanship, and auditory perception (as well as and timing).

58

#3 - CRAYON VIOLIN

Best for 2+ clients to practice the ENSEMBLE skills of turn-taking, collaboration, attention, good sportsmanship, frustration management (song choices available for children and adults)

59

SLPs *can* use elements of music in therapy.

ACTIVITY #4
Respiration Muscle Training (RMT) & Upper Body Stretches:
-for adolescents & adults-

Respiration and simple stretches help support the "melody" of SPEECH in speech-language pathology

60

#4 Respiration Muscle Training & Upper Body Stretches

RESPIRATION at the bottom supports every speech function above it.

If the client has trouble with respiration, (s)he will likely have trouble with speech characteristics above it.

61

#4 Respiration Muscle Training & Upper Body Stretching

Calibrated resistance on both inhalation and exhalation helps condition respiratory muscles→

the melody of speech

https://www.pnmedical.com/product/the-breather/

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#4 Respiration Muscle Training & Upper Body Stretching

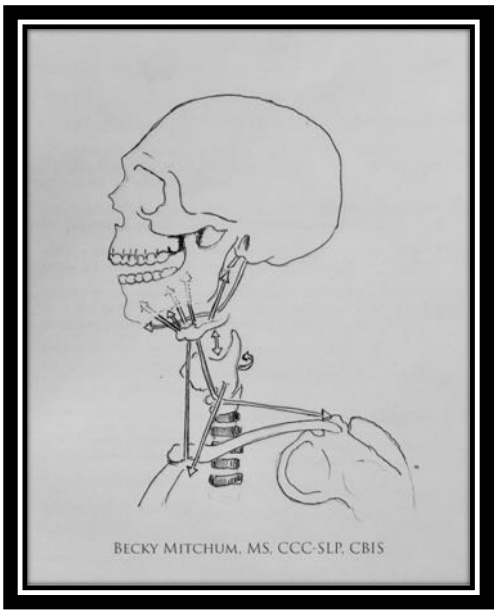
- This is one SIMPLE thing the client can do at home and can continue doing when (s)he discharges to maintain speech therapy and voice therapy gains independently.
- PERFECT FOR HOME EXERCISES and DISCHARGE! Patients don't have to be supervised by a SLP to use the Breather, nor be under the care of a physician to do so (but get doctor clearance to begin).

Q10

63

#4 Respiration Muscle Training & Upper Body Stretches

Visual aid for patient education on exercises→



64

#4 Respiration Muscle Training & Upper Body Stretches

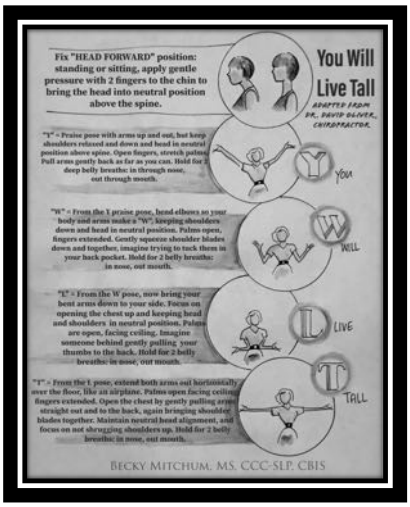
Visual aid for patient education for exercises →

65

#4 Respiration Muscle Training & Upper Body Stretches

"Y – W – L – T"

Exercises to open the chest and adjust posture. WHY is an SLP doing this? =As part of respiratory muscle training. WHY? =To facilitate respiration. WHY? = Because respiration is the driving force for all speech, including the "melody" of speech!



ALWAYS KNOW THE WHY

66

- End -

Becky Mitchum, MS, CCC-SLP, CBIS
mitchumbecky@gmail.com

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A-B-C-D TREASURES FOR FUTURE REFERENCE

- (A): vintage photos of Einstein and his violin, quotes by and about Einstein
- (B): links to more of the neuroscientists introduced here
- (C): websites, journals, specialized trainings related to music and therapy for SLPs
- (D): references provide a place to start if you want deeper study

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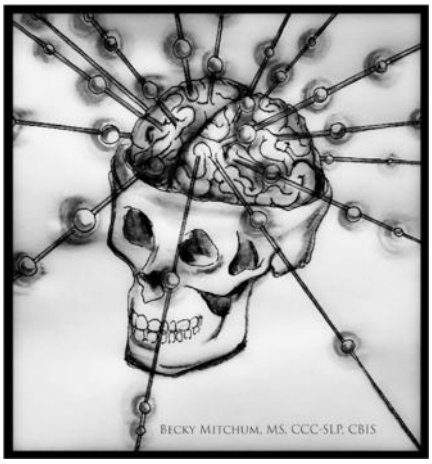
TREASURES FOR FUTURE REFERENCE (A): Einstein

Links to fascinating trivia about Einstein, his music, and archived photos of him playing the violin.



69

TREASURES – (A)

(Einstein links, continued)

- https://familypedia.wikia.org/wiki/Pauline_Koch_(1858-1920)
- https://www.nationalgeographic.com/news/2017/02/einstein-genius-violin-music-physics-science/

70

TREASURES – (A)

(Einstein, continued)

Quotes attributed to Albert Einstein, or about him:

"I know the most joy in my life has come to me from my violin." (Albert Einstein)

https://www.classicfm.com/discovermusic/ latest/quotes-about-classical-music/albert-einstein/

71

TREASURES – (A)

(Einstein, continued)

"What stands out is Einstein's multi-dimensional approach to thinking. He saw complementarity between disciplines, and wouldn't dream of siloing Science and the Humanities in separate bins."– Liam Viney

https://theconversation.com/good-vibrations-the-role-of-music-in-einsteins-thinking-54725

72

TREASURES – (A):

(Einstein, continued)

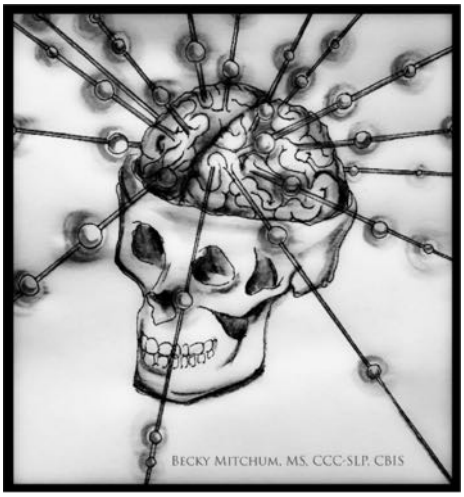
"Music inspired and guided him; it stimulated parts of his brain that could not be accessed through sitting at his desk. It gave him a sense of patterns, feelings, hunches, intuitions – all manner of sensual information that could be described as ways of thinking that don't involve words." -Liam Viney

https://theconversation.com/good-vibrations-the-role-of-music-in-einsteins-thinking-54725

73

TREASURES FOR FUTURE REFERENCE

(B): Neuro-scientists Links to a more about the four neuroscientists mentioned in this webinar.



74

TREASURES – (B): *Four important neuroscientists on videos discussing music, language, and the brain*

Dr. Ani Patel:
(a) Music Training and the Brain
https://youtu.be/z5cHrUMzNww

(b) The Music of Language and the Language of Music
https://youtu.be/2oMvtw4aeEY

75

TREASURES – (B):
(neuroscientist links, continued)

Dr. Daniel Levitin: Music and the Brain – the World in Six Songs https://youtu.be/2oMvtw4aeEY

Dr. Michael Thaut: Rhythm and Music for Motor Control in Neurorehabilitation
https://youtu.be/Aw9cb7KKyPQ

Dr. Gottfried Schlaug: From Singing to Speaking, Examples from Aphasia and Autism
https://youtu.be/8yMO0FmNyS8

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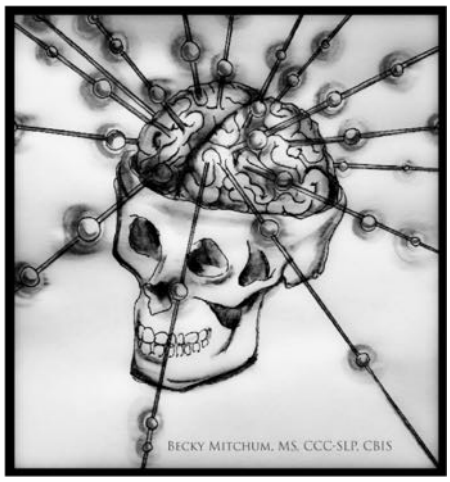
TREASURES FOR FUTURE REFERENCE (C): Resources

Links to journals, associations, websites, and specialized training for SLPs interested in music and the brain.



77

TREASURES – (C):

Journals, associations, and websites for specific types of training incorporating elements of music we can use as SLPs

1. International Association for Music & Medicine (IAMM) - A non-profit organization encouraging the use of music in medical contexts including research into the benefits of music and its specialized applications in healthcare. www.iammonline.com

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TREASURES – (C):

(journals, associations, websites, continued)

2. MUSIC and MEDICINE - The official journal of the IAMM, Music and Medicine is a quarterly peer-reviewed academic journal covering research on the intersection of music and medicine. It is an interdisciplinary and integrative forum for clinical practice and research.

www.mmd.iammonline.com

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TREASURES – (C):

(journals, associations, websites, continued)

3. The Academy of Neurologic Music Therapy: Neurologic Music Therapy (NMT) - The therapeutic application of music to cognitive, sensory, and motor function due to neurologic disease of the human nervous system.

www.nmtacademy.co

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TREASURES – (C):

(journals, associations, websites, continued)

4. Interactive Metronome (IM)- Evidence-based training and assessment tool which challenges thinking and movement simultaneously, helping to synchronize the body's internal clock. The body and brain's ability to keep time is fundamental to everything we do: timing is critical for the brain's billions of neural networks to interact effectively and efficiently.

www.interactivemetronome.com

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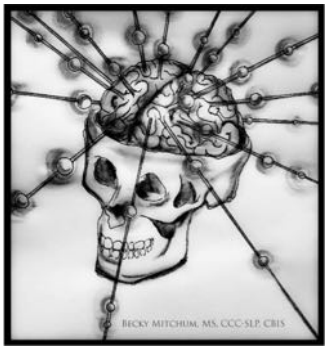
TREASURES FOR YOU (D): References

A list of references as a place to start if you want to go deeper into music, language and the brain.



82

TREASURES – (D): References

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