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## Learning Style Preferences in Undergraduate Speech-Language Pathology and Audiology Students

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*University of Southern Mississippi*

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The University of Southern Mississippi

Learning Style Preferences in Undergraduate Speech-Language Pathology and Audiology  
Students

by

Callahan C. Shirk

A Thesis  
Submitted to the Honors College of  
The University of Southern Mississippi  
in Partial Fulfillment  
of Honors Requirements

May 2019



Approved by:

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## **Abstract**

Learning styles can be described as an individual's unique way of assimilating new information based on his/her preferences and methods of acquiring knowledge. The awareness of a student's learning style preference can be beneficial to both students and instructors. The goal of this project was aimed at identifying the learning style preferences of undergraduates in the Speech-Language Pathology and Audiology programs within the state of Mississippi. The researchers surveyed 137 participants involved in this study by utilizing the Kolb Learning Style Inventory and the VARK Questionnaire. Results from this study revealed that students enrolled as undergraduates in Speech-Language Pathology and Audiology had a significant preference for the Kinesthetic and Diverging learning styles. These learners need problem-centered learning activities, hands-on, real-world scenarios to promote critical thinking and understanding to supplement their learning process. This information could be useful to instructors as they continue to revise and update courses.

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## **Literature Review**

In any given classroom, there are a variety of students who possess a multitude of varied strengths and weaknesses. Each student has his/her own unique views, opinions, preferences and ways of learning. These various preferences can be described as learning styles. Learning styles can be described as an individual's unique way of assimilating new information based on his/her preferences and methods of acquiring knowledge (AlQahtani, AlMoammar, Taher, AlBarakati, & AlKofide, 2018). Furthermore, learning styles can also describe what mode of instruction a student feels is most effective for him/her such as utilizing concrete information versus abstract information (Pashler, McDaniel, Rohrer, & Bjork, 2009; Gokalp, 2013). It is not surprising that a variety of learning styles can be found in higher education classrooms. Since there are numerous learning style preferences among students in the higher education classroom it can be advantageous at this level for instructors to survey and determine each individual student's learning style preferences. It is imperative for instructors to recognize different learning style preferences because it has been proven that learning styles affect students' performance at the university level (Goldfinch & Hughes, 2007; Marriott & Marriott, 2003; Sangster, 1996).

The first recognized learning style inventory was the Bett's Inventory in 1909. Learning style preferences gained popularity in 1976 with adaptation of the Dunn and Dunn Learning Style Model which was the first teaching model to introduce diagnostic testing for evaluation purposes (Farrid & Abassi, 2014). Nearly a decade later, David Kolb published his largely recognized learning style model which focused primarily on an individual's internal cognitive processes when learning. The Kolb Learning Style

Inventory (Kolb LSI) is a questionnaire designed to examine a person's information processing style or his/her way of assimilating new information (Kolb, 2005). Kolb's learning model was based on the fact that learning is "the process whereby knowledge is created through the transformation of experience," otherwise known as the experiential learning theory (ELT) (Kolb, 1984). He also believed that learning was the process of transferring new experiences into pre-existing knowledge and the way a person acts on this knowledge. Kolb believed that individual learning preferences are based on personal experiences, upbringing, and demands of the environment (Kolb, 2005). Experiential learning theory defines these experiences as transactions between a person and their environment and are determined by 5 levels of behavior: personality, education, vocation, current job role, and adaptive competencies (the way a person matches skills to a type of information/task) (Kolb & Kolb, 2013). There are four parts of the Kolb Learning Style Inventory (Kolb LSI) consisting of two models of grasping experiences— concrete experience (CE, 'experiencing') and abstract conceptualization (AC, 'thinking')— and two models of transferring experience— reflective observation (RO, 'reflecting') and active experimentation (AE, 'doing') (Hauer, 2005; Kolb, 2005; Kolb, 1984). As an individual develops, he/she progresses in his/her individual abilities to utilize all four aspects of this process of learning with the ideal situation being an integration of all four stages. The Kolb LSI uses a multi-linear model to evaluate what combination of these an individual possesses with the following as the learning style outcomes: Diverging, Assimilating, Converging, and Accommodating (Kolb, 1984, 2005).

The 4 learning style outcomes of the Kolb LSI have their own defining characteristics, and each are a combination of one model of grasping experiences and one



model of transferring experiences. The Diverging style is a combination of concrete experience and reflective observation making individuals with this style skilled at viewing concrete situations from a variety of angles, enjoy idea generation, collecting information, and are interested in people (Kolb & Kolb, 2013). Individuals with the Assimilating style have a combination of abstract conceptualization and reflective observation making them skilled at consolidating a wide range of information into a clear, concise format and are more interested in abstract concepts than in people. The Converging style is a combination of abstract conceptualization and active experimentation and individuals with this style tend to be skilled at problem solving, practical intervention and prefer technical tasks to interpersonal issues. The Accommodating style is a combination of concrete experience and active experimentation, and individuals with this style are “hands-on” learners who act on “gut” feelings and are skilled at action-based tasks and careers (Kolb & Kolb, 2013). The learning styles are determined by a Kolb LSI questionnaire.

Another widely used tool for examining learning style preference is the VARK Questionnaire, developed by Fleming and Mills in 1992. The VARK Questionnaire asserted four preferred learning modalities representing its acronym: Visual, Aural, Read/Write, and Kinesthetic. Visual is a preference for graphics and symbols in repressing information which may include diagram, charts, maps, or flow charts (Marcy, 2001). Visual does not include movies, pictures or PowerPoint but rather ways of symbolically conveying meaningful information that could have been presented in words (Fleming & Mills, 1992; Marcy, 2001). Aural indicates a preference for heard information (Fleming & Mills, 1992). This includes lectures, conversation, or talking

things through (Fleming & Mills, 1992; Marcy, 2001). Read is categorized by a preference for text-based input including manuals, books, PowerPoint, essays and other written assignments (Fleming & Mills, 1992). Kinesthetic was defined by Fleming and Mills as the “perceptual preference related to the use of experience and practice (simulated or real)”. Furthermore, Fleming and Mills explain that since this learning style prefers a simulation of reality, new information can be processed through a variety of multiple modalities but will still be considered Kinesthetic since the information is shared in an integrative and realistic way (Fleming & Mills, 1992).

This 13-16 question learning style inventory was created based on previously existing inventories and modifications based on the author’s observations to provide a tool for understanding to participants about the way they learn. “VARK is a catalyst for metacognition, not a diagnostic or a measure” and was designed for the primary purpose of starting conversations among teachers and students about learning (Fleming, 2006). Fleming explains that when a learner is aware of his/her learning style and initiates actions based on that information, there is potential for a productive difference in his/her learning experience (Fleming, 2006). When attention is paid to preferred learning style, this knowledge can be used to match learning style preferences to learning strategies (Fleming, 2006).

Through exploring the extensive body of research that exists on learning style preferences, there are differing opinions regarding the physiological existence of learning styles. However, the authors would argue that the notion of learning styles is valid, and the intent is not to label students into any particular category, but rather to provide insight into how students feel they learn best, hence the use of the term “preferences”.

Concurrent with previous indications that learning styles should be used for a point of conversation, this study's purpose is to gain further insight into the learning style preferences among undergraduate students in Speech-Language Pathology and Audiology (Fleming, 2006). While being aware of one's learning style, does not inherently improve learning, a person's knowledge of his/her learning style is helpful when followed by action. For example, knowing one's weight does not cause one to lose weight, the action does; likewise, knowing one's learning style can be useful when it initiates a process of reflection that can make a difference in behavior (Fleming, 2006).

There is a great need for this research as no current research exists into this undergraduate population, unlike other professional preparation programs such as medical-based programs, marketing programs, and graduate programs in Speech-Language-Pathology (Loo, 2004; Young, Klemz, & Murphy, 2003; Hernandez-Torrano, Ali, & Chan, 2017; Rapillard, Plexico, & Plumb, 2019). The findings from previous research indicate medical students learn differently from the general population and are multimodal learners demonstrating a flexible nature and ability to use a variety of modalities to acquire new information (Busan, 2014; Ojeh, Sobers-Grannum, Gaur, Udupa, & Majumder, 2017; Urval et al., 2014). One recent study found that graduate students in Speech-Language Pathology had a preference for hands-on involvement through their clinical work and a Visual preference through observation of their supervisors (Rapillard, Plexico, & Plumb, 2019). These students emphasized their preference for practical examples for application of concepts learned in the classroom to their clinical work. These students also indicated a desire for concrete, practical knowledge and a specific set of guidelines and expectations to follow (Rapillard, Plexico,

& Plumb, 2019). It is hypothesized that undergraduate students in Speech-Language Pathology and Audiology may have similar learning style preferences and outcomes as those students in the medical field or graduate students in Speech-Language-Pathology programs. If specific learning style preferences exist in this population, the information may be useful for both instructors and students to utilize in the classroom.

It has been well-documented that effective teaching relies heavily on the “simple awareness of differences in student learning styles which is vital for educators to aid the learning process” (Gokalp, 2013). Research has revealed that instruction in the medical based undergraduate programs require problem-based, interactive, and hands-on activities (Samarakoon, Fernando, Rodrigo, & Rajapakse, 2013). In order to modify current lectures, the information obtained from this study should be shared with instructors who teach undergraduate students in Speech-Language Pathology and Audiology. Previous research has suggested that students whose learning styles have been accommodated perform up to 75 percent of a standard deviation higher than those who have not (Dunn & Griggs, 2000). Therefore, it is vital that instructors have this information in order to use creative andragogy while teaching the undergraduates in Speech-Language Pathology and Audiology programs. In addition, students’ understanding of their own learning preferences and basic learning skills is crucial to higher academic success (Fleming, 2006). The intent of this project is to fill this gap of knowledge in the field of Speech-Language Pathology and Audiology.

The goal of this project is aimed at identifying the learning style preferences of undergraduates in the Speech-Language Pathology and Audiology programs within the state of Mississippi. It is the authors’ intent to distribute the results to instructors at each

university, at the state's professional conference, as well as a national publication in the Journal of Teaching in Communicative Sciences and Disorders. Findings from this research could potentially impact the quality of instruction delivered to undergraduate students in the fields of Speech-Language Pathology and Audiology. At the very least, the information gathered will be the first of its kind for both fields.

## **Methods**

### **Subjects**

The population sampled was 137 adults over the age of 18 years who were enrolled in Speech-Language Pathology and Audiology undergraduate programs within the state of Mississippi. The subjects attend three universities within the state including: The University of Southern Mississippi, Jackson State University, and the University of Mississippi. The criteria for selection was that that the participants had a declared major in Speech-Language Pathology and/or Audiology and were willing to participate in this study.

### **Procedure**

The researchers surveyed participants involved in this study by utilizing the Kolb Learning Style Inventory and the VARK Questionnaire. Permission from each university's respective department heads to disseminate the questionnaires in their classrooms was obtained. Research approval was granted by The University of Southern Mississippi's Institutional Review Board (IRB) and visits to each university were scheduled to The University of Mississippi, Jackson State University and The University of Southern Mississippi. Each participant signed the Informed Consent Form and was given the opportunity to complete both the VARK Questionnaire and the Kolb LSI on an anonymous and voluntary basis. The questionnaires were completed by students who were enrolled in Speech-Language Pathology and Audiology undergraduate programs. Questionnaires were scored by the author in accordance with the respective questionnaire manuals. A total of 137 participants completed the questionnaires for the purpose of this study.

## Results

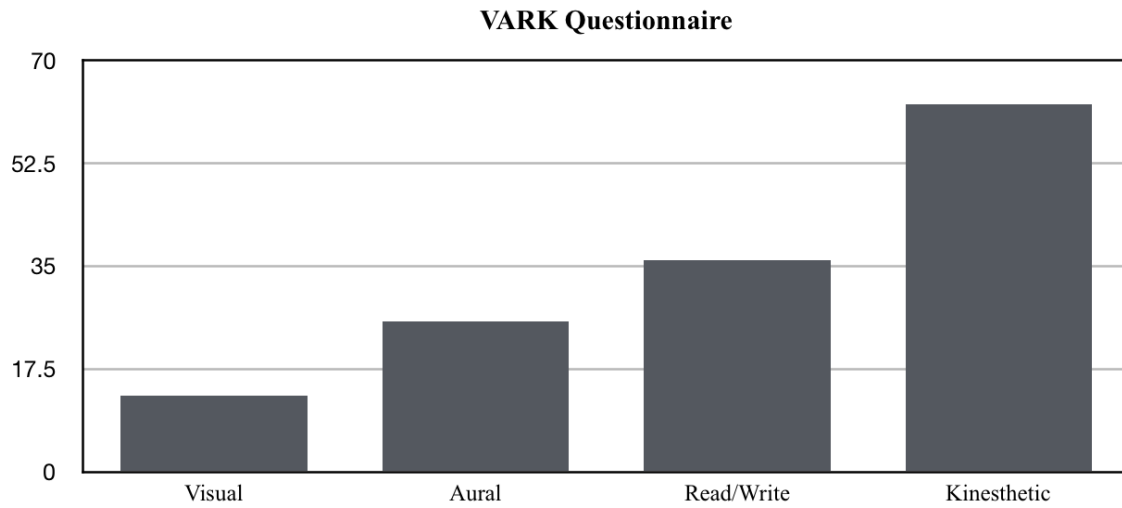
Data was analyzed with Excel software using the Chi Square analysis approach. Statistically significant findings were observed for both the Kolb LSI and the VARK Questionnaire results. Analysis for the VARK Questionnaire (Table 1) yielded  $X^2 (3, N=137) = 38.79 = p > .05$ . Analysis for the Kolb LSI (Table 1) yielded  $X^2 (3, N=138) = 152.58 = p > .05$ .

Table 1. Chi-square analysis for the VARK Questionnaire and Kolb LSI.

Learning Styles	O	E	(O-E)	(O-E) <sup>2</sup>	$\frac{(O-E)^2}{E}$
Visual	12.99	34.25	-21.25	451.56	13.18
Auditory	25.49	34.25	-8.76	76.73	2.24
Read/Write	35.99	34.25	+1.74	3.02	0.088
Kinesthetic	62.49	34.25	+28.24	797.49	23.28
Accommodator	10.33	34.25	-23.92	572.16	16.71
Diverger	96.83	34.25	+62.58	3,916.25	112.60
Assimilator	17.66	34.25	-16.59	275.23	8.03
Converger	12.16	34.25	-22.09	487.96	14.25

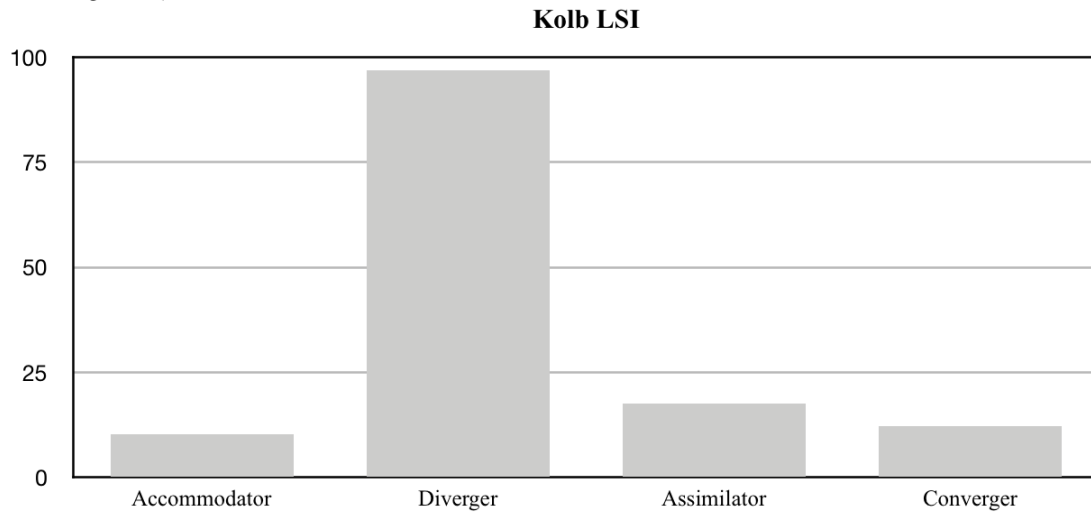
The quantitative results for the VARK Questionnaire (Figure 1), 13 subjects scored highest for a preference of Visual learning, 26 scored highest for a preference of Aural learning, 36 scored highest for a preference of Written learning and 63 scored highest for a preference of Kinesthetic learning.

Figure 1. Quantitative results for the VARK Questionnaire.



The quantitative results for the Kolb Learning Style Questionnaire (Figure 2), 10 subjects scored for a preference of the Accommodator style, 97 subjects scored for a preference of the Diverger style, 18 subjects scored for a preference of the Assimilator and 12 subjects scored for a preference of the Converger style.

Figure 2. Quantitative results for the Kolb LSI.





## **Discussion**

The results for the VARK Questionnaire reveal that undergraduate students in Speech-Language Pathology and Audiology have a statistically significant preference for the Kinesthetic learning style preference. As previously mentioned, students with a preference for a Kinesthetic learning style prefer a stimulation of reality (Fleming & Mills, 1992; Fleming, 2006). These realistic situations often result in information also being synthesized through Visual, Aural and Written processes but in an integrative, hands-on way. In addition, the Kolb LSI revealed that undergraduate students in Speech-Language Pathology and Audiology have a secondary preference for the Diverging learning style. According to Kolb and Kolb (2013), those with a preference for a Diverging learning style prefer working in group settings that require open-minded thinking, “brainstorming” sessions, and personalized feedback. These individuals are imaginative and enjoy thinking of creative solutions to problems (Kolb & Kolb, 2013). These two learning styles work together, emphasizing problem-solving in a group setting where the issues are tangible and realistic in nature. For these learners, it is useful for them to integrate this new information to promote understanding of clinical practices for the field of Speech-Language Pathology and Audiology.

The findings support the American Speech-Language-Hearing Association’s statement that programs in the field of Speech-Language Pathology and Audiology should promote problem-centered learning to foster critical thinking skills with a strong focus on interactive learning and case-based teaching (2015). Traditionally, lectures are the basis for instruction in undergraduate programs in Speech-Language Pathology and Audiology. Instructors should be aware of the learning style preferences of the

undergraduate population in order to adapt and revise their curricula into more meaningful approaches for the students. Some of the strategies aimed at teaching individuals with Kinesthetic and Diverging learning styles may be the following: games, simulations, inter-professional collaboration, case studies, and student modifications to study/classroom habits.

Games have been proposed as a means of reinforcement following initial presentation of new information (Goon, 2013). Games can be used to promote critical thinking and active learning in a group setting and facilitate group discussion. Games, such as Kahoot quizzes or Jeopardy, allow immediate feedback and rationale for correct answers (Goon, 2013; Lee, Cheung & Chen, 2005). Games are an addition that can be made to class presentations which can provide the real-life simulation that Kinesthetic learners need while maintaining the attention of traditionally aged undergraduates.

Furthermore, simulations may also be useful for these Kinesthetic and Diverging learners. The use of simulations is already a best practice at the graduate level and this study's findings suggest the use of simulations could be highly beneficial to undergraduates in Speech-Language Pathology and Audiology, as well (Dudding et al., 2018). Simulations help to improve certain skills and can be repeated until a skill is satisfactorily mastered, all while practicing in a safe environment that can be later transferred to real world application (Brown, 2017). Simulations may include use of manikins or task trainers, as well as computer-based and virtual reality (Dudding et al., 2018). Computer-based simulations, such as SimuCase, allow practice of case-based interventions and assessments on virtual patients which often include a scenario where the learner makes treatment decisions to complete the simulation. Manikins are also

commonly used simulations in Speech-Language Pathology and Audiology and provide a life-size simulation for practicing various “high-risk low-incidence procedures” in a safe and interactive environment (Dudding et al., 2018). An undergraduate program should consider implementing a simulation-based course or add simulations as a component that works in conjunction with the required observation hours.

Additionally, the American Speech-Language-Hearing Association recommends that undergraduate education promote inter-professional attitudes and collaboration (2015). Inter-professional collaboration among multiple professions could lead to further opportunities for hands-on and real-life experiences for undergraduate students with a Kinesthetic learning style preference. A potential inter-professional collaboration opportunity could be use of standardized patients. Presently, best practices for Speech-Language Pathology and Audiology curriculum includes the use of standardized patients or actors who have been trained to mimic the needs of real patients with a particular disorder for training purposes (Dudding et al., 2018). These situations allow practice on clients portraying a variety of socioeconomic, ethnic and cultural backgrounds and build confidence among the students in their patient interactions. While undergraduate programs may have limited financial resources, interdepartmental collaboration with theatre or drama majors in portraying these roles is a unique opportunity for further inter-professional collaboration that is beneficial to both parties. Role play between students, such as practicing case history intake or patient counseling, is also a possible alternative to supplement some real-life application of concepts at the undergraduate level.

One andragogy that allows both real-life application of the Kinesthetic learning style preference as well as the problem-solving and imagination aspects of the Diverging

learner is use of case studies for practice applying critical thinking skills. Utilizing case studies as a teaching method can be a strategy that provides realistic patient information and requires a focus on real-life context that direct students to a particular conclusion (Amerson, 2011). Instructors who choose to utilize case studies as a teaching method, can provide guidance on evidence-based practices while discussing the cases with the students. Because a student is using true data from a client, the student may feel more connected to the activity and be able to critically think more effectively.

While the aforementioned strategies may be useful for instructors, students also have a role in their learning. A student's awareness of his/her learning style can be beneficial so that he/she may make modifications to his/her study and classroom habits to better facilitate learning. Fleming offers practical strategies of how students can use learning styles to their advantage and learn in the best way for them. One of these strategies for an individual with a Kinesthetic learning style preference includes rearranging notes so that the articles come first, the rules and principles last (Fleming, 1992). Further strategies proposed are recording lectures for learners with an Aural learning style preference, building personal glossaries for students with a Reading/Writing learning style preference, or color-coded notes for students who have a preference for Visual learning (Fleming, 1992).

The awareness of a student's learning style preference can be beneficial to both students and instructors. Instructors should strive to reach all students with different learning style preferences while teaching to best serve the student. Although undergraduates in Speech-Language Pathology and Audiology have different learning style preferences than undergraduates in the medical field, both desire hands-on and real-

life applications while learning. It is not surprising that this study reveals undergraduates and graduate students in Speech-Language Pathology and Audiology have similar learning style preferences. As the professions continue to grow and evolve, so should the teaching and learning. Further research into learning style preferences in additional geographic regions may be useful in the future for global incorporation of these strategies.

## Reference List

- AlQahtani, N., AlMoammar, K., Taher, S., AlBarakati, S., & AlKofide, E. (2018). Learning preferences among dental students using the VARK questionnaire: A comparison between different academic levels and gender. *Journal of Pakistan Medical Association*, 68 (1), 59-64.
- Amerson, R. (2011). Making a case for the case study method. *Journal of Nursing Education*, 50 (8), 427-428. <https://doi.org/10.3928/01484834-20110719-01> .
- Busan, A.M. (2014). Learning styles of medical students - Implications in education. *Current Health Sciences Journal*, 40(2), 104–110. <http://doi.org/10.12865/CHSJ.40.02.04> .
- Brown, D. (2017). Simulation before clinical practice: The educational advantages. *Audiology Today*, 29 (5), 17-24.
- 2020 Standards for the Certificate of Clinical Competence in Speech-Language Pathology. Council for Clinical Certification in Audiology and Speech-Language Pathology of the American Speech-Language-Hearing Association. (2018). Retrieved from <https://www.asha.org/certification/2020-SLP-Certification-Standards>.
- Dudding, C.C., Brown, D., Estis, J., Szymanski, C. & Zraick, R. (2018, April). Best practices in healthcare simulations in CSD. Paper session presented at the meeting of Council of Academic Programs in Communication Sciences and Disorders, Austin, TX.
- Dunn, R. S., & Griggs, S. A. (2000). Practical approaches to using learning styles in higher education. Westport, Conn: Greenwood Publishing Group.

- Fleming, N (2006). Learning styles again: VARKing up the right tree!. *Educational Developments*, 7 (4), 4-7.
- Fleming, N.D. & Mills, C. (1992). Not another inventory, rather a catalyst for reflection. *To Improve the Academy*, 11, 137-143.
- Goklap, M. (2013). The effect of students' learning styles to their academic success. *Creative Education*, 4, 627-632.
- Goldfinch, J & Hughes, M. (2007). Skills, learning styles and success of first-year undergraduates. *Active Learning in Higher Education* 8 3, 259-273. doi: 10.1177/1469787407081881.
- Hauer, P., Straub, C. & Wolf, S. (2005). Learning styles of allied health students. *Journal of Allied Health*, 34 (3), 177-182.
- Hernández-Torrano, D., Ali, S., Chan, C.K. (2017). First year medical students' learning style preferences and their correlation with performance in different subjects within the medical course. *BMC Medical Education*, 17 (131), 1-7.
- Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development* (Vol. 1). Englewood Cliffs, NJ: Prentice-Hall.
- Kolb, A.Y. & Kolb, D.A. (2005). Learning styles and learning spaces: Enhancing experiential learning in higher education. *Academy of Management and Learning Styles*, 4 (2), 193-212.
- Kolb, A.Y. & Kolb, D.A. (2013). The KOLB learning style inventory 4.0: A comprehensive guide to the theory, psychometrics, research on validity and educational applications. Retrieved from

- <https://learningfromexperience.com/downloads/research-library/the-kolb-learning-style-inventory-4-0.pdf>.
- Lee, M., Cheung, C. & Chen, Z. (2005). Acceptance of internet-based learning medium: the role of extrinsic and intrinsic motivation. *Information & Management*, 42 (8), 1095-1104. <https://doi.org/10.1016/j.im.2003.10.007>.
- Loo, R. (2004). Kolb's learning styles and learning preferences: Is there a linkage? *Educational Psychology*, 24, 99-108. doi: <https://doi.org/10.1080/0144341032000146476>.
- Marcy, V. (2001). Adult learning styles: How the VARK learning style inventory can be used to improve student learning. *Perspective on Physician Assistant Education*, 12 (2).
- Marriott, N. & Marriott, P. (2003). 'Student learning style preferences and undergraduate academic performance at two UK universities, *International Journal of Management Education* 3(1), 4–13.
- Ojeh, N., Sobers-Grannum, N., Gaur, U., Udupa, A., & Majumder, M.A.A. (2017). Learning style preferences: A study of pre-clinical medical students in Barbados. *J Adv Med Educ Prof*, 5 (4), 185-194.
- Pashler, H., McDaniel, M., Rohrer, D. & Bjork, R. (2009). Learning styles: concepts and evidence. *Association for Psychological Science*, 9 (3), 105-119. doi: [10.1111/j.1539-6053.2009.01038](https://doi.org/10.1111/j.1539-6053.2009.01038).
- Rapillard, S., Plexico, L., & Plumb, A. (2019). Influence of graduate speech language pathology student's learning style and coping strategies on training and



- development. *Teaching and Learning in Communication Sciences & Disorders*, 3 (1), article 2.
- Samarakoon, L., Fernando, T., Rodrigo, C. and Rajapakse, S. (2013) Learning styles and approaches to learning among medical undergraduates and postgraduates. *BMC Medical Education*, 13, 42. doi: <http://dx.doi.org/10.1186/1472-6920-13-42>
- Sangster, A. (1996). Objective tests, learning to learn and learning styles. *Accounting Education*, 5(1), 131–46.
- Young, M.R., Bruce, R., Klemz, J. & Murphy, W. (2003). Enhancing learning outcomes: The effects of instructional technology, learning styles, instructional methods, and student behavior. *Journal of Marketing Education*, 25 (2), 130 - 142. doi: <https://doi.org/10.1177/0273475303254004>.

## Appendices

### Appendix A: Institutional Review Board Approval



#### **INSTITUTIONAL REVIEW BOARD**

118 College Drive #5147 | Hattiesburg, MS 39406-0001

Phone: 601.266.5997 | Fax: 601.266.4377 | [www.usm.edu/research/institutional-review-board](http://www.usm.edu/research/institutional-review-board)

#### **NOTICE OF COMMITTEE ACTION**

The project below has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services regulations (45 CFR Part 46), and University Policy to ensure:

- The risks to subjects are minimized and reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered involving risks to subjects must be reported immediately, but not later than 10 days following the event. Problems should be reported to ORI via the Incident template on Cayuse IRB.
- The period of approval is twelve months. An application for renewal must be submitted for projects exceeding twelve months.

PROTOCOL NUMBER: IRB-18-38

PROJECT TITLE: Learning Style Preferences in Speech-Language Pathology and Audiology Undergraduate Students in Mississippi

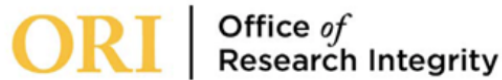
SCHOOL/PROGRAM: School of SAHS, Speech & Hearing Sciences

RESEARCHER(S): Callahan Shirk  
Kimberly Ward

IRB COMMITTEE ACTION: Approved

CATEGORY: Exempt

## Appendix B: Participant Informed Consent



### INSTITUTIONAL REVIEW BOARD STANDARD (SIGNED) INFORMED CONSENT

STANDARD (SIGNED) INFORMED CONSENT PROCEDURES		
<p>This completed document must be signed by each consenting research participant.</p> <ul style="list-style-type: none"><li>• The Project Information and Research Description sections of this form should be completed by the Principal Investigator before submitting this form for IRB approval.</li><li>• Signed copies of the consent form should be provided to all participants.</li></ul> <p style="text-align: right;">Last Edited February 9<sup>th</sup>, 2018</p>		
Today's date:		
PROJECT INFORMATION		
Project Title: Learning Style Preferences in Undergraduate Speech-Language Pathology and Audiology Students		
Principal Investigator: Callahan C Shirk	Phone: 954-261-3952 or 601-266-5257	Email: callahan.shirk@usm.edu
College: Health	Department: Speech and Hearing Sciences	
RESEARCH DESCRIPTION		
<p><b>1. Purpose:</b></p> <p>The purpose of this study is to collect and analyze data regarding the learning style preferences of undergraduate students with a declared major in Speech-Language and/or Audiology at various universities across the state of Mississippi.</p> <p><b>2. Description of Study:</b></p> <p>The study will assess the learning style preferences of approximately 200-250 undergraduate students ages 18 and older enrolled in the undergraduate Speech-Language and/or Audiology programs at various universities across the state of Mississippi. The study will involve one interaction with a maximum duration of 1 hour. Willing participants will complete two questionnaires: the Kolb Learning Style Inventory and the VARK Questionnaire. Data will later be analyzed to determine any statistical significance among learning style preferences in this population.</p> <p><b>3. Benefits:</b></p> <p>You may not receive any personal benefit for participating in this study. However, others may potentially benefit from the knowledge gained in this study.</p> <p><b>4. Risks:</b></p> <p>A risk to the subject is possible inconvenience due to the time spent participating in the data collection process. As with any research, there may additional risks that are unknown or unexpected.</p> <p><b>5. Confidentiality:</b></p> <p>All participant data will be anonymous and all physical data will be locked in a file drawer in the Honor's Thesis advisors office in accordance with .</p>		

**6. Alternative Procedures:**

At this time, there are no alternative procedures to participation in this study.

**7. Participant's Assurance:**

This project has been reviewed by the Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations.

Any questions or concerns about rights as a research participant should be directed to the Chair of the IRB at 601-266-5997. Participation in this project is completely voluntary, and participants may withdraw from this study at any time without penalty, prejudice, or loss of benefits.

Any questions about the research should be directed to the Principal Investigator using the contact information provided in Project Information Section above.

**CONSENT TO PARTICIPATE IN RESEARCH**

Participant's Name: \_\_\_\_\_

I hereby consent to participate in this research project. All research procedures and their purpose were explained to me, and I had the opportunity to ask questions about both the procedures and their purpose. I received information about all expected benefits, risks, inconveniences, or discomforts, and I had the opportunity to ask questions about them. I understand my participation in the project is completely voluntary and that I may withdraw from the project at any time without penalty, prejudice, or loss of benefits. I understand the extent to which my personal information will be kept confidential. As the research proceeds, I understand that any new information that emerges and that might be relevant to my willingness to continue my participation will be provided to me.

Questions concerning the research, at any time during or after the project, should be directed to the Principal Investigator with the contact information provided above. This project and this consent form have been reviewed by USM's Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research participant should be directed to the Chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5116, Hattiesburg, MS 39406-0001, 601-266-5997.

The University of Southern Mississippi has no mechanism to provide compensation for participants who may incur injuries as a result of participation in research projects. However, efforts will be made to make available the facilities and professional skills at the University. Participants may incur charges as a result of treatment related to research injuries. Information regarding treatment or the absence of treatment has been given above.

\_\_\_\_\_  
**Research Participant**

\_\_\_\_\_  
**Person Explaining the Study**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Date**

## Appendix C: VARK Questionnaire



### The VARK Questionnaire (Version 7.8)

#### How Do I Learn Best?

Choose the answer which best explains your preference and circle the letter(s) next to it.

**Please circle more than one** if a single answer does not match your perception.

Leave blank any question that does not apply.

1. You are helping someone who wants to go to your airport, the center of town or railway station. You would:
  - a. go with her.
  - b. tell her the directions.
  - c. write down the directions.
  - d. draw, or show her a map, or give her a map.
2. A website has a video showing how to make a special graph. There is a person speaking, some lists and words describing what to do and some diagrams. You would learn most from:
  - a. seeing the diagrams.
  - b. listening.
  - c. reading the words.
  - d. watching the actions.
3. You are planning a vacation for a group. You want some feedback from them about the plan. You would:
  - a. describe some of the highlights they will experience.
  - b. use a map to show them the places.
  - c. give them a copy of the printed itinerary.
  - d. phone, text or email them.
4. You are going to cook something as a special treat. You would:
  - a. cook something you know without the need for instructions.
  - b. ask friends for suggestions.
  - c. look on the Internet or in some cookbooks for ideas from the pictures.
  - d. use a good recipe.
5. A group of tourists want to learn about the parks or wildlife reserves in your area. You would:
  - a. talk about, or arrange a talk for them about parks or wildlife reserves.
  - b. show them maps and internet pictures.
  - c. take them to a park or wildlife reserve and walk with them.
  - d. give them a book or pamphlets about the parks or wildlife reserves.
6. You are about to purchase a digital camera or mobile phone. Other than price, what would most influence your decision?
  - a. Trying or testing it.
  - b. Reading the details or checking its features online.
  - c. It is a modern design and looks good.
  - d. The salesperson telling me about its features.
7. Remember a time when you learned how to do something new. Avoid choosing a physical skill, eg. riding a bike. You learned best by:
  - a. watching a demonstration.
  - b. listening to somebody explaining it and asking questions.
  - c. diagrams, maps, and charts - visual clues.

- d. written instructions – e.g. a manual or book.
8. You have a problem with your heart. You would prefer that the doctor:
- gave you a something to read to explain what was wrong.
  - used a plastic model to show what was wrong.
  - described what was wrong.
  - showed you a diagram of what was wrong.
9. You want to learn a new program, skill or game on a computer. You would:
- read the written instructions that came with the program.
  - talk with people who know about the program.
  - use the controls or keyboard.
  - follow the diagrams in the book that came with it.
10. I like websites that have:
- things I can click on, shift or try.
  - interesting design and visual features.
  - interesting written descriptions, lists and explanations.
  - audio channels where I can hear music, radio programs or interviews.
11. Other than price, what would most influence your decision to buy a new non-fiction book?
- The way it looks is appealing.
  - Quickly reading parts of it.
  - A friend talks about it and recommends it.
  - It has real-life stories, experiences and examples.
12. You are using a book, CD or website to learn how to take photos with your new digital camera. You would like to have:
- a chance to ask questions and talk about the camera and its features.
  - clear written instructions with lists and bullet points about what to do.
  - diagrams showing the camera and what each part does.
  - many examples of good and poor photos and how to improve them.
13. Do you prefer a teacher or a presenter who uses:
- demonstrations, models or practical sessions.
  - question and answer, talk, group discussion, or guest speakers.
  - handouts, books, or readings.
  - diagrams, charts or graphs.
14. You have finished a competition or test and would like some feedback. You would like to have feedback:
- using examples from what you have done.
  - using a written description of your results.
  - from somebody who talks it through with you.
  - using graphs showing what you had achieved.
15. You are going to choose food at a restaurant or cafe. You would:
- choose something that you have had there before.
  - listen to the waiter or ask friends to recommend choices.
  - choose from the descriptions in the menu.
  - look at what others are eating or look at pictures of each dish.
16. You have to make an important speech at a conference or special occasion. You would:
- make diagrams or get graphs to help explain things.
  - write a few key words and practice saying your speech over and over.
  - write out your speech and learn from reading it over several times.
  - gather many examples and stories to make the talk real and practical.



visual aural read/write kinesthetic

## The VARK Questionnaire Scoring Chart

Use the following scoring chart to find the VARK category that each of your answers corresponds to. Circle the letters that correspond to your answers

e.g. If you answered b and c for question 3, circle V and R in the question 3 row.

Question	a category	b category	c category	d category
3	K	V	R	A

## Scoring Chart

Question	a category	b category	c category	d category
1	K	A	R	V
2	V	A	R	K
3	K	V	R	A
4	K	A	V	R
5	A	V	K	R
6	K	R	V	A
7	K	A	V	R
8	R	K	A	V
9	R	A	K	V
10	K	V	R	A
11	V	R	A	K
12	A	R	V	K
13	K	A	R	V
14	K	R	A	V
15	K	A	R	V
16	V	A	R	K

## Calculating your scores

Count the number of each of the VARK letters you have circled to get your score for each VARK category.

Total number of **V**s circled =

Total number of **A**s circled =

Total number of **R**s circled =

Total number of **K**s circled =




## Appendix D: Kolb Learning Style Questionnaire

### Kolb's Learning Style Questionnaire



This questionnaire is designed to find out your preferred learning styles(s) as an adult. Over the years, you have probably developed learning habits that help you benefit more from some experiences than from others. You may be unaware of this, and this questionnaire will help you pinpoint your learning preferences and share them with the other Community Facilitators.

This questionnaire will probably take you about 10 minutes to complete. The accuracy of your results depends on how honest you are. There are no right or wrong answers. **If you agree more than you disagree with a statement, place a tick (✓) in the box to the left of the question.** If you disagree more than you agree, leave the box blank. If you find yourself wondering which situation to think of when answering a question, just think about how you are when you are working with people. Go with your first gut reaction instead of over-thinking your response.

#### QUESTIONS

- ☐ 1. I have strong beliefs about what is right and wrong, good and bad.
- ☐ 2. I often act without considering the possible consequences.
- ☐ 3. I tend to solve problems using a step-by-step approach.
- ☐ 4. I believe that formal procedures and policies restrict people.
- ☐ 5. I have a reputation for saying what I think, simply and directly.
- ☐ 6. I often find that actions based on feelings are as sound as those based on careful thought and analysis.
- ☐ 7. I like the sort of work where I have time for thorough preparation and implementation.
- ☐ 8. I regularly question people about their basic assumptions.
- ☐ 9. What matters most is whether something works in practice.
- ☐ 10. I actively seek out new experiences.
- ☐ 11. When I hear about a new idea or approach, I immediately start working out how to apply it in practice.
- ☐ 12. I am keen on self discipline such as watching my diet, taking regular exercise, sticking to a fixed routine, etc.
- ☐ 13. I take pride in doing a thorough job.
- ☐ 14. I get on best with logical, analytical people and less well with spontaneous, 'irrational' people.



- ☐ 15. I take care over how I interpret data and avoid jumping to conclusions.
- ☐ 16. I like to reach a decision carefully after weighing up many alternatives.
- ☐ 17. I am attracted more to novel, unusual ideas than to practical ones.
- ☐ 18. I don't like disorganised things and prefer to fit things into a coherent pattern.
- ☐ 19. I accept and stick to laid down procedures and policies so long as I regard them as an efficient way of getting the job done.
- ☐ 20. I like to relate my actions to a general principle, standard or belief.
- ☐ 21. In discussions, I like to get straight to the point.
- ☐ 22. I tend to have distant, rather formal relationships with people at work.
- ☐ 23. I thrive on the challenge of tackling something new and different.
- ☐ 24. I enjoy fun-loving spontaneous people.
- ☐ 25. I pay careful attention to detail before coming to a conclusion.
- ☐ 26. I find it difficult to produce ideas on impulse.
- ☐ 27. I believe in coming to the point immediately.
- ☐ 28. I am careful not to jump to conclusions too quickly.
- ☐ 29. I prefer to have as many sources of information as possible – the more information to think over the better.
- ☐ 30. Flippant, superficial people who don't take things seriously enough usually irritate me.
- ☐ 31. I listen to other people's points of view before putting my own view forward.
- ☐ 32. I tend to be open about how I'm feeling.
- ☐ 33. In discussions, I enjoy watching the plotting and scheming of the other participants.
- ☐ 34. I prefer to respond to events in a spontaneous, flexible way rather than plan things out in advance.
- ☐ 35. I tend to be attracted to techniques such as flow charts, contingency plans etc.
- ☐ 36. It worries me if I have to rush work to meet a tight deadline.

- ☐ 37. I tend to judge people's ideas on their practical merits.
- ☐ 38. Quiet, thoughtful people tend to make me feel uneasy.
- ☐ 39. I often get irritated by people who want to rush things.
- ☐ 40. It is more important to enjoy the present moment than to think about the past or future.
- ☐ 41. I think that decisions based on a careful analysis of all the information are better than those based on intuition.
- ☐ 42. I tend to be a perfectionist.
- ☐ 43. In discussions, I usually produce lots of spontaneous ideas.
- ☐ 44. In meetings, I put forward practical, realistic ideas.
- ☐ 45. More often than not, rules are there to be broken.
- ☐ 46. I prefer to stand back from a situation and consider all the perspectives.
- ☐ 47. I can often see inconsistencies and weaknesses in other people's arguments.
- ☐ 48. On balance I talk more than I listen.
- ☐ 49. I can often see better, more practical ways to get things done.
- ☐ 50. I think written reports should be short and to the point.
- ☐ 51. I believe that rational, logical thinking should win the day.
- ☐ 52. I tend to discuss specific things with people rather than engaging in social discussion.
- ☐ 53. I like people who approach things realistically rather than theoretically.
- ☐ 54. In discussions, I get impatient with irrelevant issues and digressions.
- ☐ 55. If I have a report to write, I tend to produce lots of drafts before settling on the final version.
- ☐ 56. I am keen to try things out to see if they work in practice.

- ☐ 57. I am keen to reach answers via a logical approach.
- ☐ 58. I enjoy being the one that talks a lot.
- ☐ 59. In discussions, I often find I am a realist, keeping people to the point and avoiding wild speculations.
- ☐ 60. I like to ponder many alternatives before making up my mind.
- ☐ 61. In discussions with people I often find I am the most dispassionate and objective.
- ☐ 62. In discussions I'm more likely to adopt a 'low profile' than to take the lead and do most of the talking.
- ☐ 63. I like to be able to relate current actions to the longer-term bigger picture.
- ☐ 64. When things go wrong, I am happy to shrug it off and 'put it down to experience'.
- ☐ 65. I tend to reject wild, spontaneous ideas as being impractical.
- ☐ 66. It's best to think carefully before taking action.
- ☐ 67. On balance, I do the listening rather than the talking.
- ☐ 68. I tend to be tough on people who find it difficult to adopt a logical approach.
- ☐ 69. Most times I believe the end justifies the means.
- ☐ 70. I don't mind hurting people's feelings so long as the job gets done.
- ☐ 71. I find the formality of having specific objectives and plans stifling.
- ☐ 72. I'm usually one of the people who puts life into a party.
- ☐ 73. I do whatever is practical to get the job done.
- ☐ 74. I quickly get bored with methodical, detailed work.
- ☐ 75. I am keen on exploring the basic assumptions, principles and theories underpinning things and events.
- ☐ 76. I'm always interested to find out what people think.

- ☐ 77. I like meetings to be run on methodical lines, sticking to laid down agenda.
- ☐ 78. I steer clear of subjective (biased) or ambiguous (unclear) topics.
- ☐ 79. I enjoy the drama and excitement of a crisis situation.
- ☐ 80. People often find me insensitive to their feelings.

### Scoring

You score one point for each item you **ticked**. There are no points for items you crossed. Go back over your responses and simply circle the question number in the table below for each question you **ticked**. Then add up the number of circled responses in the Totals row.

	QUESTION NUMBER			
	2	7	1	5
	4	13	3	9
	6	15	8	11
	10	16	12	19
	17	25	14	21
	23	28	18	27
	24	29	20	35
	32	31	22	37
	34	33	26	44
	38	36	30	49
	40	39	42	50
	43	41	47	53
	45	46	51	54
	48	52	57	56
	58	55	61	59
	64	60	63	65
	71	62	68	69
	72	66	75	70
	74	67	77	73
	79	76	78	80
<b>Totals:</b>				
	<b>Activist</b>	<b>Reflector</b>	<b>Theorist</b>	<b>Pragmatist</b>