

Ancillary Unit Annual Report
Reporting Period: July 1, 2020 – June 30, 2021

Deadline for submission to Reporting Administrator: November 15, 2021

This report is required by [FAM 105.4 \(FSD 87-17.R6\) -- POLICY GUIDELINES FOR THE FORMATION AND REVIEW OF INSTITUTES AND CENTERS](#). The report is due by November 15, 2021 this year. **Please make sure to sign and forward scanned signed copies of the report. Thank you.

Basic Information	
Ancillary Unit's name	Learning Research Institute (LRI)
Director(s)	Jason Reimer and Hideya Koshino, Professors of Psychology
Administrator to whom the unit reports ("Reporting Administrator")	Rafik Mohamed, Dean – College of Social & Behavioral Sciences
Purpose and goals of the Ancillary Unit	<p>The CSUSB Learning Research Institute (LRI) promotes an interdisciplinary scholarly focus on the student learning experience and how it may be improved. The Institute supports this focus by sponsoring and conducting research activities that examine the cognitive, neurobiological, and environmental variables that contribute to the academic success of our diverse student body.</p> <p>In addition, the Institute contributes to a campus culture supportive of student learning by hosting invited speakers, collaborating with other campus institutes, providing students the opportunity to be directly involved in the research process, and disseminating our research findings to the local and global communities.</p>

Advisory Board (if applicable)	
Member	Affiliation
Jean Peacock	CSUSB
Barbara Quarton	CSUSB
Young Suk Hwang	CSUSB
Rowena Santiago	CSUSB

Activities during reporting period (2020 – 2021)		
Activity (please describe)	Funds spent	Goal advanced (and extent)
Hideya Koshino Dr. Ricco, and CSUSB students presented three posters at the 61st Annual Meeting of the Psychonomic	\$0.0	Dissemination of research, support of student and faculty professional growth, and enhancing partnerships between CSUSB and psychology community.

Society (Virtual), Fall, 2020. See Attachment 2		
In the reasoning project, Dr. Ricco, Koshino, and CSUSB students designed a new study on the relationship between autistic trait and analytical thinking in conditional reasoning, Fall 2020.	\$0.0	Designed experiment.
In the mindfulness meditation project, Dr. Clapper, Koshino, and three CSUSB students submitted a manuscript for publication, Fall, 2020. See Attachment 2	\$0.0	Dissemination of research, support of student and faculty professional growth, and enhancing partnerships between CSUSB and psychology community.
In the reasoning project, Dr. Ricco, Koshino, and CSUSB students collected data in the study on analytical thinking and conditional reasoning, Fall 2020 – Spring 2021.	\$3,000	Data collection and analyses.
Hideya Koshino Dr. Ricco, and CSUSB students presented a poster at the 101st Annual Meeting of the Western Psychological Association (Virtual), Spring, 2021. See Attachment 2	\$0.0	Dissemination of research, support of student and faculty professional growth, and enhancing partnerships between CSUSB and psychology community.
In the reasoning project, Dr. Ricco, & Koshino submitted a grant proposal to NSF, Summer 2021. See Attachment 3	\$0.0	Obtaining an external grant.
In the reasoning project, Dr. Ricco, Koshino, and CSUSB students are preparing a manuscript for publication, Summer 2021. See Attachment 2	\$0.0	Dissemination of research, support of student and faculty professional growth, and enhancing partnerships between CSUSB and psychology community.
In the mindfulness meditation project, the manuscript by Dr. Clapper, Koshino, and three CSUSB students was accepted for publication, Summer, 2021. See Attachment 2	\$0.0	Dissemination of research, support of student and faculty professional growth, and enhancing partnerships between CSUSB and psychology community.
In the emotional attention project, Hideya Koshino and two CSUSB students revising a manuscript for publication, Summer 2021. See Attachment 2	\$0.0	Dissemination of research, support of student and faculty professional growth, and enhancing partnerships between CSUSB and psychology community.
Jason Reimer, Anja Pahor (UCR), Aaron Seitz (UCR), and CSUSB students presented a poster at the 61st Annual Meeting of the Psychonomic Society (Virtual), Fall, 2020. See Attachment 2	\$0.0	Dissemination of research, support of student and faculty professional growth, and enhancing partnerships between CSUSB and psychology community.

Working Memory Task Validation Study, Data collection and Data Analysis Phase, Fall 2020	\$0.0	Collected and analyzed behavioral and eye-tracking data from cognitive control experiment. Ran a set of correlational and regression analyses.
Measures of Inhibitory Control Study, Planning/Study Design/Organization Phase, Fall 2020	\$0.0	Designed experiments, constructed experimental stimuli, programmed experiments, wrote computer code.
Measures of Inhibitory Control Study, Data Collection Phase, Spring 2021 – Summer 2021	\$7,120	Collected behavioral (response times and accuracy rates) from 82 CSUSB research participants online.
Measures of Inhibitory Control Study, Data Analysis Phase, Summer-Fall 2021	\$0.0	Collected and analyzed behavioral and data from inhibitory control experiment. Ran a set of correlation analyses and factor analyses.
Working Memory Capacity and Modes of Cognitive Control Study, Planning/Study Design/Organization Phase, Summer 2021	\$0.0	Designed experiments, constructed experimental stimuli, programmed experiments, wrote computer code for Tobii eye tracker.
Working Memory Capacity and Modes of Cognitive Control Study, Data Collection Phase, Summer - Fall 2021	\$0.0	Collected behavioral (response times and accuracy rates) and eye-tracker data from 35 CSUSB research participants.
For the Inhibitory Control Task project, submitted manuscript by Jason Reimer, Anja Pahor (UCR), Aaron Seitz (UCR), and students for publication, Spring 2021. See Attachment 2	\$0.0	Dissemination of research, support of student and faculty professional growth, and enhancing partnerships between CSUSB and psychology community.
For the Effects of Spatial Organization on Working Memory and Cognitive Control project, revised manuscript by Jason Reimer, Gabriel Radvansky (University of Notre Dame), Thomas Lorsbach (University of Nebraska at Omaha), and students, Summer 2021.	\$0.0	Dissemination of research, support of student and faculty professional growth, and enhancing partnerships between CSUSB and psychology community.
For the Effects of Spatial Organization on Working Memory and Cognitive Control project, submitted manuscript by Jason Reimer, Gabriel Radvansky (University of Notre Dame), Thomas Lorsbach (University of Nebraska at Omaha), and students for publication, Summer - Fall 2021. See Attachment 2	\$0.0	Dissemination of research, support of student and faculty professional growth, and enhancing partnerships between CSUSB and psychology community.

<p>For the Effects of Spatial Organization on Working Memory and Cognitive Control project, preparing a second manuscript for publication with collaborators and CSUSB students, Spring 2021-Fall 2021. See Attachment 2</p>	<p>\$0.0</p>	<p>Dissemination of research, support of student and faculty professional growth, and enhancing partnerships between CSUSB and psychology community.</p>
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Please also describe planned activities for the current academic year:

The mission of the LRI is to work toward a better understanding of student learning and classroom performance. Given the diverse educational backgrounds of CSUSB students, the planned activities of the LRI for the current academic year are designed to contribute to the improvement of learning in our students by studying the role that cognitive factors play in the learning process. During this year, CSUSB students will continue to play a significant role in the Institute’s research activities. The LRI provides support for students through scientific research education, training, and participation. A large amount of Institute resources is invested in students to provide them with the necessary research experience required for their advancement to academic and educational careers. At the LRI, we take great pride in the amount of support we provide to students and are committed to work hard to include as many CSUSB students as possible in our research in the future.

This academic year, we have identified a set of activities that we believe are critical to the central mission of the LRI. As Co-Directors of the LRI, we have made significant progress on a number of research projects. For example, through LRI research activities we have assessed the working memory capacity of more than 700 CSUSB students, and the inhibitory control abilities of another 100 students. This is important because it allows us to better understand the cognitive abilities of the CSUSB student population. It is our hope that such an understanding will contribute to the development of strategies that will improve classroom performance and overall academic success in our students.

This year’s projects largely coalesce around four specific goals: 1) To better understand the role of cognitive processes such as working memory and executive functions in learning, especially reasoning and attention, 2) To better understand the neurobiological underpinnings of these basic processes, 3) To develop effective interventions for improving these processes, resulting in greater academic success, and 4) To build a foundation for a future University Center for Brain Sciences. In order to achieve these goals, we have identified a number of specific research projects. These research projects are intended to be conducted in collaboration with multiple campus entities including, students, faculty, departments, and faculty of other universities, institutes, and centers, as well as the local community. In addition, these research activities are intended to serve the entire campus community by bringing leading experts to CSUSB so that they can interact with CSUSB students and faculty.

So far this year, multiple undergraduate and graduate CSUSB students have been involved in LRI activities as research assistants. Each is working closely with us and is receiving in-depth training on all aspects of scientific research. Some of these students will present their research virtually at an international research conference, The Annual Meeting of the Psychonomic Society. At this conference, students will give presentations on research findings generated by the LRI. Experiences like these have proven to be incredibly valuable to our students, as many of them have gone on to attend MA- and PhD-level graduate programs after graduating from CSUSB.

Continuing Research Projects

1. **Emotional Attention:** In this project, we investigate interactions between emotion and attention. Effects of emotion on cognition have long been ignored in the traditional cognitive psychology, because traditional cognitive psychology is based on the information processing paradigm, which is a computer metaphor of the human mind. However, recent years have seen a huge increase in the number of studies investigating relationships between emotion and cognition. We plan to continue focusing on the effects of anxiety on attention, because the proportion of people suffering some form of anxiety has been increasing in recent years, especially among college students. We all know that anxiety impairs our learning and cognition; however, how anxiety interferes with cognitive functions is not very well understood yet. Therefore, our short-term goal is to enhance our understanding of the interactions between anxiety and attention, but our long-term goal is to develop some intervention methods to help students who suffer from anxiety, including test anxiety and math anxiety. We revised a manuscript, and it is under review.
2. **Educational Neuroscience:** In this project, we investigate the underlying mechanisms of mindfulness meditation. Research has reported that mindfulness meditation improves our attention control, emotion regulation, self-control, and reduces anxiety and depression. However, the underlying mechanism of mindfulness meditation is not well known yet. We investigate cognitive, physiological, and social factors affecting mindfulness meditation. This project is conducted in collaboration with Drs. John Clapper and Michael Lewin. Based on the experiments we conducted in the past years, we published one paper recently (See **Attachment 2**), and are currently working on an NIH grant proposal.
3. **Reasoning and working memory:** In collaboration with Dr. Bob Ricco, we investigate relationships between reasoning and working memory based on the dual process framework (e.g., Kahneman, 2012). The dual process framework claims that there are two types of processing: Type 1 processing and Type 2 processing. Type 1 processing is heuristic, intuitive, reflective, and doesn't require working memory resources, whereas Type 2 processing is algorithmic, logical, reflexive, and requires working memory resources. We investigate roles of working memory and other thinking abilities and dispositions in various reasoning tasks, including conditional reasoning, denominator neglect, base rate neglect, and mathematical reasoning. Based on the experiments we conducted in the past years, we published a manuscript in the journal "Thinking and Reasoning". Based on our research, we published one paper in 2020, and submitted an NSF grant proposal in 2021 (See **Attachment 3**).
4. **Inhibitory Control Tasks Validation Project:** The purpose of this project is to assess the reliability and validity of a newly redesigned task of inhibitory control. This will be accomplished by having participants complete a redesigned, tablet-based measure of selective attention and inhibitory control. The central questions being addressed in the study are 1) does this new task have adequate test-retest reliability, and 2) does this new task have adequate criterion validity. This is being accomplished by testing participants twice on the task and comparing performance on the new task with another (more standard) task of executive functioning and inhibitory control. For this project, we are collaborating with Dr. Aaron Seitz, Director of the Brain Game Center and Professor of Psychology at

UCR. Since August 2019 we have collected data from more than 200 CSUSB research participants.

5. **Working Memory Tasks Validation Project:** The purpose of this project is to assess the reliability and validity of newly redesigned tasks of working memory. This will be accomplished by having participants complete multiple redesigned, tablet-based measures of working memory. The central questions being addressed in the study are 1) does this new task have adequate test-retest reliability, and 2) does this new task have adequate criterion validity. This is being accomplished by comparing performance on the new task with another (more standard) tasks of working memory. For this project, we are collaborating with Dr. Aaron Seitz, Director of the Brain Game Center and Professor of Psychology at UCR. So far, we have collected data from more than 80 CSUSB research participants both in the lab and remotely, using Zoom and web-based data collection software.
6. **Components of Inhibitory Control Project:** This project is designed to assess the reliability and validity of a redesigned, tablet-based measure of inhibitory control, and to better understand how common measures of inhibitory control relate to each other and work together to measure the inhibitory control construct. As part of the study, participants complete eight different inhibitory and working memory tasks and a set of questionnaires remotely using Zoom and web-based data collection software. Participants complete three, 1-hour testing sessions across three sites (CSUSB, UCR, and UCI). To date, we have collected data from 320 students across the three sites. For this project, we are collaborating with Dr. Aaron Seitz, Director of the Brain Game Center and Professor of Psychology at UCR, and Dr. Susanne Jaeggi, Director of the Center for the Neurobiology of Learning and Memory and Professor at UCI.
7. **Effects of Spatial Organization on Working Memory and Cognitive Control:** This project is designed to 1) extend recent research that demonstrates how the physical organization of the learner's environment affects his or her ability to internally represent aspects of that environment and 2) investigate ways in which the physical organization of information presented in the classroom may help to improve working memory and cognitive control functions. This research involves assessing cognitive control through traditional behavior measures, as well as through the use of eye-tracking technology. The project is being conducted in collaboration with Dr. Gabriel Radvansky, Professor of Psychology at the University of Notre Dame.

As part of this project, we have already collected eye-tracker data from a total of 300 participants. The study is designed to examine how college students use attentional processes during cognitive control tasks. The data will be used to examine the role that strategies play in controlled processing. Two manuscripts based on the effect of spatial organization on working memory either have been submitted, or are currently being prepared, for publication.

Additional Current Year Goals

Prepare External Grant Proposals

Provide support for the colloquium series of the department

Use of funds during the reporting period
On a separate sheet, provide an itemization of A., B., and E.

****See Attachment 1 for itemization****

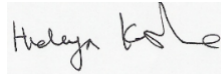
	Internal funds		External funds	
	Reporting Period	Current academic year (projected)	Reporting Period	Current academic year (projected)
A. Salaries	\$26,380.31	\$43,000	\$	\$
B. Assigned time	\$0	\$0	\$	\$
C. Telephone/fax	\$0	\$0	\$	\$
D. Office supplies	\$0	\$0	\$	\$
E. Other	\$1,755	\$11,000	\$	\$
Total	\$28,135.31	\$54,000	\$	\$

Hideya Koshino

Co-Director Name

Jason Reimer

Co-Director Name



Co-Director Signature



Co-Director Signature

Attachment 1

A. Salaries

Payments made to student research assistants: \$8,620. Student research assistants are involved in various aspects of experiments, including recruiting and posting for research participants, testing human research participants on computer-controlled perceptual and cognitive assessments (i.e. administering paperwork, setting-up the computer program, explaining instructions, supervising participants during the experiment itself, and administering feedback), administering vision assessments, using iPads for assessments and experiments, doing some preliminary analyses and data entry, attending regular weekly lab meetings, and helping out with a variety of miscellaneous tasks as they arise.

One-month summer salary (summer 2020) for the Institute Co-Directors Dr. Hideya Koshino and Dr. Jason Reimer: \$17,760.31. The LRI continues to operate during the summer months. These funds are used to compensate Hideya and Jason for the work they do during that time. Work during summer includes activities such as conducting research studies, designing and developing research projects, computer programming in preparation of future data collection, and setting up computer equipment in preparation for data collection.

B. Assigned Time: No funds were spent by the LRI on assigned time.

E. Other

Membership Dues (Psychonomic Society): \$75

Materials for research: \$1,680. These materials are necessary to conduct psychological research on student learning. For example, we use computers to present stimuli in our experiments and to collect participant responses. In addition, we use commercial experimental software and devices for experiment design and execution. This year we have purchased an iPad and a one-year license for web-based commercial experimental software (INQUISIT Web).

Attachment 2


List of publications, presentations, and manuscripts from November 1, 2020 to October 30, 2021 (Student author in bold font)

- Bonsel, J., Ware, S., Monteza, J. V.,** Koshino, H. & Ricco, R. (2021). Complexity of Inference in Conditional Reasoning. Paper presented at the 101th annual meeting of the Western Psychological Association, (Virtual).
- Clapper, C., **Ware, S., Martinez, F. J., Benitez, K.,** & Koshino, H. (in press). Breath Counting as a Measure of Sustained Attention in Mindfulness Meditation and its Effect on Mood. *Psychology of Consciousness: Theory, Research, and Practice*.
- Koshino, H. & **Bonsel, J.** (2020). The effect of anxiety on spatial negative priming task with emotional stimuli. Paper presented at the 61st annual meeting of the Psychonomic Society (Virtual).
- Koshino, H., **Tsukahara, J., & Buitron, D.** (under revision). Effects of perceptual load on performance in a Simon task.
- Olid, P.,** & Koshino, H. (2020). The Role of Numerical Processing and Working Memory Capacity on The Relationship Between Math Anxiety and Math Performance. Paper presented at the 61st annual meeting of the Psychonomic Society (Virtual).
- Pahor, A., Mester, R. E., Carrillo, A. A., & Ghil, E., Reimer, J. F., Jaeggi, S. M., Seitz, A. R. (2021). *UCancellation: A new mobile measure of selective attention*. Manuscript under review.
- Perez-Martinez, A., Rivera, A., Sierra, A., Marino, R.,** Pahor, A., Seitz, A., Reimer, J. F. (November, 2020). *Comparing performance on working memory tasks administered in the lab versus remotely*. Poster presented at the 61st Annual Meeting of the Psychonomic Society (Virtual).
- Reimer, J. F., Radvansky, G. A., Lorsbach, T. C., & **Armendarez, J. J.** (2021). *The influence of event structure on modes of cognitive control within a virtual environment*. Manuscript in under review.
- Reimer, J. F., **Sierra, A., Mobly, K., Perez-Martinez, A., & Rivera, A.** (2021). *Ocular measures of cognitive control: Can eye movements predict the use of reactive and proactive modes of control during the AX-CPT?* Manuscript in Preparation.
- Ricco, R., **Bonsel, J., Monteza, J. V., Owens, D., Sierra, A.,** & Koshino, H. (2020). Analytical Thinking and Complexity of Inference in Conditional Reasoning. Paper presented at the 61st annual meeting of the Psychonomic Society (Virtual).
- Ricco, R., **Bonsel, J., Monteza, J. V., Ware, S.,** & Koshino, H. (in preparation). Implicit and Explicit Processing on Base Rate Neglect Problems.

Attachment 3

Submitted grant proposals from November 1, 2020 to October 30, 2021

Koshino, H. & Ricco, R (Submitted in July, 2021). Intuitive and Analytical Processing in Reasoning (NSF Proposal Number: 2146732)

Unit Reporting Person recommendation	
Name and title: Rafik Mohamed, Dean, College of Social and Behavioral Sciences	
XX	Keep on active status.
	Move to probationary status.
	Move to inactive status.
Recommendations and comments including the criteria and data reviewed. Please attach additional page(s) as necessary.	
	
Unit Reporting Person Signature	Date
	11-23-2021

FORWARD A SCANNED COPY OF THIS REPORT TO sylvia.myers@csusb.edu AND SEND THE ORIGINAL COPY TO THE FACULTY SENATE AD-155. THE SENATE OFFICE WILL TAKE CARE OF THE REMAINING PORTIONS OF THE REPORT. THANK YOU.

Educational Policy and Resources Committee recommendation (if applicable)	
	Keep on active status.
	Move to probationary status.
	Move to inactive status.
Recommendations and comments including the criteria and data reviewed. Please attach additional page(s) as necessary:	
EPRC Chair Signature	Date

Provost recommendation (if applicable)	
	Keep on active status.
	Move to probationary status.
	Move to inactive status.
Recommendations and comments including the criteria and data reviewed. Please attach additional page(s) as necessary:	
Provost Signature	Date

