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| Type of Review (Select One) | |  | IRB Use Only | |
| Exempt |  |  | IRB # |  |
| Expedited |  |  | Date Received |  |
| Full Board |  |  | Date Approved |  |

**MIDWESTERN STATE UNIVERSITY**

**Application for Use of Human Participants in Research**

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| Submission Date | | |  | | |  | | |  | | |  |
| November 29, 2023 | | |  | | |  | | |  | | |  |
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| **Principal Investigator** | | Undergraduate | | | Graduate | | Faculty | | | Other | | Training Certificate[[1]](#footnote-1)  Yes  No |
| Name | Nicholas Maxwell | | | Phone | | | 6019090201 | | | | Dept | Psychology |
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| Organization Affiliation, if not MSU | | |  | | | | | | | | | |
| Address | 118 O'Donohoe, 3410 Taft Blvd, Wichita Falls, TX, 76308 | | | | | | | | | | | |
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| **Co-Investigator and/or Faculty Advisor** | | Undergraduate | | | Graduate | | Faculty | | | Other | | Training Certificate1  Yes  No |
| Name |  | | | Phone | | |  | | | | Dept |  |
| Primary Email |  | | | | | Alt. Email | |  | | | | |
| Organization Affiliation, if not MSU | | |  | | | | | | | | | |
| Address |  | | | | | | | | | | | |
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| **Co-Investigator** | | Undergraduate | | | Graduate | | Faculty | | | Other | | Training Certificate1  Yes  No |
| Name |  | | | Phone | | |  | | | | Dept |  |
| Primary Email |  | | | | | Alt. Email | |  | | | | |
| Organization Affiliation, if not MSU | | |  | | | | | | | | | |
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| **Project Title** | | | | |
| Exploring the Effects of List-Wise Relatedness on Judgment of Learning Reactivity | | | | |
| **Project Type** | | | | |
| Directed Independent Study/EURECA Research | | Senior Thesis | | Master’s Thesis |
| Faculty Research | | | | |
| Other MSU-based | Course: | | Instructor: | |
| Research conducted by another university/agency | | | | |
| MSU Sponsor: | | | Email: | |

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| **Funding Information** | | | | | |
| Is the project receiving grant funding? | | Yes  No | | (If yes, specify source) | |
| Institutional funds | Departmental funds | | Donation/Gifts | | Personal funds |
| No cost study | Other funds (describe): | | | | |

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| **Provide a summary of your project purpose, rationale, and potential benefits**.  *What are the study objectives? Why is this research important? How will this project contribute to the discipline?*  *How do the potential benefits justify any possible risks incurred by participants in the study?* |
| Judgments of learning (JOLS) are commonly used to investigate questions related to memory and metamemory. Traditionally, JOLs have been assumed to be neutral measures having little or no effect on later remembering. Thus, making JOLs was not thought to influence memory. However, a growing body of research has begun to show that JOLs are reactive on learning, such that participants who make JOLs while completing a study task often show different patterns of test performance compared to participants who silently read items instead of making judgments (see Double et al., 2018). Thus, JOLs modify memory for studied items, likely by calling attention to aspects of stimuli that might otherwise be ignored (see Ericcson & Simon, 1993).  Studies investigating the mechanisms behind JOL reactivity have commonly used cue-target word pairs. These studies have revealed a consistent pattern of reactivity: When pairs are semantically related (e.g., mouse – cheese), making JOLs improves memory for the target item (Janes et al., 2018; Halamish & Undorf, 2023; Maxwell & Huff, 2022; Soderstrom et al., 2015). However, few studies have directly assessed the effects of making JOLs on memory for single-item lists. As a result, current theories of JOL reactivity primarily focus on explaining the role intrinsic cues as an underlying factor for reactivity to occur on cue-target pairs (e.g., Soderstrom et al.’s, 2015 cue-strengthening account). Thus, it remains unclear whether the relatedness effects driving JOL reactivity with cue-target pairs would similarly affect categorized (i.e., related) word lists.  Recently, Senkova and Otani (2021) tested for reactivity using categorized and uncategorized (i.e., unrelated) word lists for participants making JOLs, pleasantness ratings, or a control task in which participants simply assigned a random number to each item (Experiment 1) and participants making JOLs, completing an imagery task, or the control task (Experiment 2). Across experiments, participants making JOLs had greater free-recall relative to participants in the control group. Importantly, recall benefits were greater for categorized lists, suggesting that the presence of list-wise relatedness facilitated reactivity. Additionally, both deep encoding comparison groups also improved free-recall relative to participants in the no-JOL control group. Because both pleasantness ratings and imagery tasks are classic item-specific tasks based on the item-specific/relational framework (Einstein & Hunt, 1980; Hunt & Einstein, 1981), Senkova and Otani argued that positive JOL reactivity reported on categorized wordlists reflected an item-specific process rather than a relational encoding process. Considered alongside findings investigating the effects of relatedness on reactivity with cue-target pairs (e.g., Halamish & Undorf, 2023; Maxwell & Huff, 2022), it is likely that JOL reactivity reflects different underlying processes based on the type of stimuli that participants study.  Although it is evident that making JOLs benefits recall of related but not unrelated cue-target pairs, less is known about the effects of these judgments on categorized and uncategorized lists. As such, the proposed study will first attempt to replicate findings from Senkova and Otani (2021) demonstrating that categorized lists show a greater memorial benefit versus uncategorized lists using both free-recall (Experiment 1A) and recognition testing (Experiment 1B). Next, Experiments 2A and 2B will use the Deese-Roediger-McDermott false memory paradigm (Deese; 1959; Roediger & McDermott, 1995), which will allow for an assessment item-specific and relational processes on JOL reactivity while also investigating whether JOLs could additionally be reactive on false memory for related but non-presented lures. Overall, if JOLs strengthen pre-existing item relations, participants who make JOLs at encoding should show improved memory for categorized but not uncategorized word lists. Separately, false memory for related lures should similarly be inflated for JOL participants. As such, this pattern of results would provide strong evidence that memory benefits from making JOLs primarily reflect a relational process. |

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| **Description of Participants and Recruitment** | | | | | |
| Adults | | Children under 18 years old | | | Senior citizens ( over 65 years old) |
| Hospital/institutional patients | | Other (specify): | | | |
| Estimated # | Age range | | Gender | Other information (source, vulnerability) | |
| 480 | 18-35 | |  | MSU Texas Undergraduate students (see below for more information) | |
| Explain inclusion or exclusion criteria (e.g. sex/gender, race, age, religion) | | | | | |
| Individuals will be excluded from participation if they do not meet the age requirement (e.g., younger than 18 years of age) or if they decline to consent to the study. | | | | | |
| Explain how the participants will be recruited or solicited (e.g. ads, announcements). Also indicate whether other organizations/agencies (e.g. schools, hospitals) are involved in this research and any recruitment procedures you must follow to comply with the outside agency’s guidelines.  *Verbatim copies of recruitment materials must be submitted with this application.* | | | | | |
| Participants will be recruited via Prolific (www.prolific.co), an online platform which connects researchers with individuals who are paid to complete scientific studies, surveys, etc. Interested participants will navigate to the study via a weblink. Only participants who agree to the informed consent will be eligible to participate. | | | | | |
| Describe the nature of compensation given to participants | | | | | |
| Participants will be compensated at a rate of $4.00/half hour. Funds will be provided from a recently acquired intramural grant (acceptance letter is attached to this application). | | | | | |

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| **Description of Study Procedures** | | | |
| Project and Data Collection Dates | | | |
| Anticipated beginning of project | January 2024 | Anticipated ending of project | August 2024 |
| Specify where and how the data will be stored  *(HHS policy requires that all data be kept in a secure location for a minimum of three years upon study completion.)* | | | |
| Data collection will be conducted onine using Collector, an open source program for conducting web-based psychology experiments. Data will be stored on a secure server. Files will be password protected, and only the researchers listed on this proposal will be able to access the data. Data will contain no identifying information, and participants will not be able to be indentifed based on their individual responses. | | | |

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| **Provide a summary of your research procedures and methods of data collection**.  *Describe your methods of data collection. What will the participants in your study do or experience? How long will it take them to complete all study procedures? Please indicate if participation is voluntary or not. Also describe whether the procedures assess standard educational practices or use data that will be collected even if the study is not conducted. (Supporting materials (e.g.data sheet, inventories, questionnaires, surveys, interviews)*  *must be submitted with your application).* |
| Overview:  This study is planned as a four-experiment package. First, Experiments 1A and 1B will investigate whether JOL reactivity effects observed on related cue-target pairs extend to related word lists. Next, Experiments 2A and 2B will test whether DRM lists, which present participants with a series of related words which converge on a strongly related but not presented critical lure, also demonstrate memory changes as a function of JOLs. Importantly, the use of DRM lists in Experiments 2A/2B allows for a replication/extension of any potential memory benefits observed in Experiments 1A/1B while also assessing whether JOLs are potentially reactive on false memories, which, to date, has not been explored. Finally, because JOL reactivity effects may differ based on how memory is assessed, Experiments 1A and 2A will assess learning via open-ended, free-recall testing, while Experiments 1B and 2B will gauge memory via recognition testing.  Participants:  For each experiment, 120 participants will be recruited. Participants will be recruited from Prolific (www.prolific.co) and will be compensated at a rate of $4.00/half hour. Participants will be randomly assigned to one of three encoding groups: An item-level JOL group (n = 40) in which participants will provide JOLs after studying each word, A global-level JOL group in which participants will make one JOL per list, following the completion of each 12-item study list (n = 40), and a no-JOL group in which participants will silently read each item (n = 40). This sample size was based on an a priori power analysis conducted using G\*POWER 3.1 software (Faul, Erdfelder, Buchner, & Lang, 2009), which suggested that a sample of 120 participants per experiment would be sufficient to detect small main effects and interactions (d = .28). Additionally, the 40 participants per group requirement was modeled after previous sample sizes used for online JOL reactivity studies (e.g., Maxwell & Huff, 2022; 2023). All participants will be required to be native English speakers who have obtained at least a high-school level degree or equivalent.  Materials:  Experiments 1A/1B: The stimuli in Experiments 1A and 1B will be eight 12-item word lists. These lists will consist of four categorized lists taken from the Van Overschelde et al.’s (2004) Category Norms and four uncategorized lists in which all words are unrelated. In addition to relatedness, lists will be checked for other factors which could potentially influence later memory, including word length, frequency, and concreteness.  Participants will study two of each list type (48 items total), which will be presented in a random order. Counterbalanced versions of the experiment will be developed which alternate which set of two lists that participants study.  Next, two memory tests will be developed. For Experiment 1A, a series of free-recall tests will be developed based on each list. Specifically, participants will be instructed to recall the previously presented words. For Experiment 1B, participants will complete a 96-item “OLD-NEW” recognition test. This test will include all 48 previously studied items as well as the 48 items from the non-studied lists, which will serve as distractors. Thus, the only difference between Experiments 1A and 1B is the method of testing.  Experiments 2A/2B: In Experiments 2A and 2B, the eight word lists used in Experiments 1A/1B will be replaced with twenty 12-item DRM lists taken from Roediger et al. (2001). Like the previous experiments, counterbalanced versions of the experiment will be made, with participants studying a total of 10 lists. Additionally, participants will be tested via free-recall (Experiment 2A) or recognition testing (Experiment 2B). Free-recall testing will utilize the same instructions as previously reported. The recognition test will consist of 80 items: 30 studied items (taken from positions 2, 5, and 8 in each list), 30 non-studied distractors (taken from positions 2, 5, and 8 in each non-studied list), and 10 critical lures corresponding to each of the 10 studied lists, and 10 critical lures corresponding to the 10 non-studied lists. All other aspects of Experiments 2A/2B will be identical to Experiments 1A/1B.  Procedure:  Experiment 1A: Following informed consent, participants will be instructed to study a series of words and will be informed that their memory for each word will later be tested. Participants in the JOL groups will then receive further instructions to judge their ability to remember the items they are studying for a later test. Specifically, participants in the item-JOL group will be instructed to make JOLs following the presentation of each word. JOLs will be framed as a probability estimate of correctly remembering each word on a later test (0 = will NOT remember; 100 = WILL remember). Separately, participants in the global JOL group will be asked to provide a single JOL following the presentation of each word list. Thus, the two JOL groups will differ in both the number of JOLs they provide per list (one per item vs. one per list) and the timing of the JOL. Participants in the no-JOL group will be informed of the memory test but will not be tasked with making memory judgments. For all groups, study will be self-paced, with participants pressing the ENTER key to advance to the next word.  After receiving their respective encoding instructions, participants will begin the first study list. Immediately following this list, participants will complete a 30 second filler task in which they will be asked to list as many words beginning with a random letter as they can within the time limit (e.g., list all words that begin with the letter “M”). Immediately afterwards, participants will complete a free-recall test, in which they will be asked to type as many words from memory as they remember from the previously studied list. Following completion of the first study-test cycle, participants will advance to the next study phase. After completing the final cycle, participants will be debriefed. The total experiment is expected to take 30 minutes to complete.    Experiment 1B: Experiment 1B will utilize the same procedure described above, with the exception that the free-recall tests will be replaced with a single “OLD-NEW” recognition test, which will occur following the final study list. Items on the recognition test will be randomly presented, and participants will not be timed.    Experiment 2A: Experiment 2A will follow the same general procedure outlined in Experiment 1A, except that the four-word lists will be replaced with 10 DRM lists. All other aspects of the procedure, including the use free-recall testing, will be identical to Experiment 1A.    Experiment 2B: Experiment 2B will follow the same general procedure outlined in Experiment 1A, except that the four-word lists will be replaced with 10 DRM lists. All other aspects of the procedure, including the use of recognition testing, will be identical to Experiment 1B. |
| **Elaborate on procedures that ensure confidentiality and anonymity of participants**. |
| All identifying information used to track participation will be stored in a separate file from participants' experimental data. The PI will not be able to match individual responses to ID numbers. |

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| **Risks to participants in the study***.* | | |
| Will participants be asked for information they might consider to be personal or sensitive?  Yes  No | | |
| Will participants be presented with materials or exposed to social interactions that might be consider offensive, threatening, or degrading?  Yes  No | | |
| Does the study involve deception?  Yes  No | | |
| Estimate overall risk level to participants  (consider psychological, social, physical, or legal risk)  *Minimal risk means exposure to harm no greater than encountered in ordinary daily life,*  *or in the performance of routine physical or psychological examinations.* | | |
| Less than minimal | Minimal | More than minimal |
| Explain determination of risk level (i.e. describe potential risks). *Include statements made to participants that may be misleading or deceptive.*  Explain methods to minimize/control risk of harm. *Include verbatim statements given during debriefing.* Justify research, if risks to participants exceed minimal levels. | | |
| Participants are not at risk of physical or psychological harm, and the present study makes no use of deception. The only risk to participants is slight boredom due to the repetitive nature of the task. | | |

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| **Informed Consent Procedures**  *Include copies of written consents and scripts for verbal consent with application.* | | |
| Written informed consent | Verbal consent | Consent of parent or guardian |
| Not applicable (e.g. if participation is not voluntary, research using existing materials) | | |
| Implied consent (explain) | | |

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| Principal Investigator Assurance Statement |

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| By signing below, I certify that information above is complete and accurate. I understand that as Principal Investigator, I have definitive responsibility to conduct the study in an ethical manner, protecting the rights and welfare of human participants in strict adherence to the study’s protocol and the Department of Health and Human Services Code of Federal Regulations. I will submit modifications and/or changes to the IRB committee as necessary and comply with all policies and procedures enforced by the Midwestern State University IRB. |

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| Principal Invesigator: |  | Date: |
| Faculty Advisor or Sponsor: |  | Date: |
| Co-Investigator: |  | Date: |
| Co-Investigator: |  | Date: |
| Department Chair: |  | Date: |

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| You may insert electronic signatures or print, sign, and scan the signed document to create a signed electronic copy.  Once completed, applicants should forward all necessary materials to their department chair for review. Once the department chair approves the research, the chair may forward the application to the college IRB representative. Forwarding the application to the IRB will indicate the chair’s review and approval of the research. If the department chair prefers the applicant submit the application to the IRB, their approval must be indicated in writing along with the application. |

1. All investigators need a Human Subjects Training Certificate.

   For a free online training course, please go to <http://phrp.nihtraining.com/users/login.php> [↑](#footnote-ref-1)