This week you will write the Proposed Study and Budget sections of your Grant Proposal. The Proposed Study section will resemble a typical methods section like the one you would write in an empirical paper (except that the data have not yet been collected). In this section you will describe the study that you are proposing to conduct to test your hypothesis.

You will also write the Budget Justification section and the Budget for your grant proposal. The Budget Justification section will contain a description of your proposed budget including how grant funds will be used and justifying costs. Proposed costs must be reasonable, necessary and allocable to carry out the project's goals and objectives.

The Budget, which will be Appendix A of your grant proposal, will follow the format of the budget in the Sample Grant Proposal Template (Links to an external site.), Appendix A . There is also a Budget Calculation spreadsheet (Links to an external site.) that you can use to determine the direct and indirect costs for your proposed study.

After writing the Proposed Study, Budget Justification and Budget sections, combine them with the completed sections you have done in Weeks Two and Three (with feedback incorporated), and create the first draft of your grant proposal. Submit your draft grant proposal this week for the Week Five Grant Proposal - Peer Review assignment.

See the Grant Proposal Guidelines (Links to an external site.) for detailed instructions on writing your grant proposal. See the Sample Grant Proposal Template (Links to an external site.) as an example of an actual proposal and use it as a template for your grant proposal.
Carefully review the Grading Rubric (Links to an external site.) for the criteria that will be used to evaluate your assignment.

Grant Proposal Guidelines – Final Project

Grant Proposal Guidelines

Instructions: *This assignment involves preparing a grant proposal requesting support for a 12-month research project. The total amount of support you may request is $60,000 (including direct and indirect costs). You will choose a specific topic in neuroscience or neuropsychology and develop a grant proposal based on a review of the literature and identification of a research hypothesis. The grant proposal must be six to eight double-spaced pages in length (not including title page, references list, and appendix), 12-point font, and formatted according to APA style as outlined in the Ashford Writing Center. You must use at least 15 peer-reviewed sources in addition to the text.*

The components of your proposal are outlined below. View the Sample Grant Proposal to see an example of a completed proposal in APA format. ***Use the Grant Proposal Template to create your grant proposal.***

NOTE: All titles should be centered and all content should be formatted as in the Grant Proposal Template and the Sample Grant Proposal, not as outlined below in this guidelines document.

Title Page (1 page):

- Title of your grant proposal
- Your full name
- Course name and number
- Instructor's name
- Date submitted

Specific Aims: (1 page)

Clearly and concisely state the goals of your grant proposal. Summarize the expected outcome(s), including the impact that the results of the proposed research will exert on the research field(s) involved. List the specific objectives of your grant proposal (e.g., to test a stated hypothesis, create a novel design, solve a specific problem, challenge an existing paradigm or clinical practice, address a critical barrier to progress in the field, or develop new technology).

Background: (6 - 8 pages for Background, Significance, Proposed Study, and Budget Justification sections)

The goal of this section is to provide a well-developed literature review that provides the basis for the research problem and illustrates to the reader that you are knowledgeable about the scope of the theory. Research as many studies pertaining to the theory as possible, and summarize them in a succinct manner.

In most respects, this section is precisely what you do when you write the introduction section to a research paper. Your background section should clearly state the rationale for the topic you have chosen. It includes the literature review you conducted to identify an area of neuroscience or neuropsychology that has not yet been studied. At the end of this section, you should clearly specify your research hypotheses.

Significance:

Explain the importance of the problem or critical barriers to progress in the field that the proposed project addresses. Explain how the proposed project will improve scientific knowledge, technical capability, and/or clinical practice in one or more broad fields. Describe how the concepts, methods, technologies, treatments, services, or preventative interventions that drive this field will be changed if the proposed aims are achieved.

Grant Proposal Guidelines

Proposed Study:

This section will very much resemble a typical methods section like the one you would write in an empirical paper (except that the data have not yet been collected). You should describe the study that you are proposing to conduct to test your hypothesis. This section should include the following subsections:

- **Participants:** include a description of the population that will be used for the study. Point out any procedures, situations, or materials that may be hazardous to personnel and precautions to be exercised.
- **Procedures:** include a description of how the study will be conducted including any instruments that will be used and how the data will be collected.
- **Hypotheses and Analysis:** state hypotheses of the proposed study and general outline of how data will be collected and used to accomplish the specific aims of the project.

Budget Justification:

Provide a brief summary justifying your budget and the needs for the items listed in Appendix A: Budget. The actual numbers will be listed in Appendix A. The budget for this proposal is limited to $60,000.

References:

Cite a minimum of 15 peer-reviewed articles from the Ashford University Library or PubMed Central (PMC). All sources must be current (published within the 10 years unless it's a seminal work) and relevant to your topic. Format all sources in APA style as outlined in the Ashford Writing Center.

Appendix A: Budget: (see Grant Proposal Template, Appendix A)

A typical grant proposal has a very detailed budget. For our purposes here, you should include an appendix with a completed budget. Your figures are just an estimate so feel free to make up the budget numbers and figures. Use the template called Summary Proposal Budget in the Grant Proposal Template, Appendix A to create your budget. There is also an optional Budget Calculation Spreadsheet to help you calculate your figures. The goal of this exercise is for you to spend time thinking about the costs of conducting research. Here are some examples of expenses you could include:

Direct Costs:

- **Personnel**:
  - Graduate research assistant salary – 20-hours per week for 12 months is roughly $25,000 (this covers salary, tuition, and fringe benefits).
  - Principal Investigator Salary - make-up your annual salary and divide it by 12, then multiple this number by the number of months of salary you wish to pay yourself (this can range from 1-12 months; and from 10% to 100% effort).
- **Equipment:**
  - List major purchases (greater than $5000) that will be necessary to complete your project (e.g., computers, video equipment, physiological measures, expensive software, etc.) and costs.
- **Travel**
  - Conference Travel
  - Other (e.g., travel for research assistant if needed for study)
- **Participant Support**
  - Costs for subject participation (e.g., reimbursement for time, travel, etc.)
- **Other**
  - Computers or other equipment less than $5000
  - Miscellaneous Expenses (e.g., postage, phone bills, photocopying, etc.)

Indirect Costs:

Multiply the total direct costs budget by 0.375. This amount (37.5%) represents the indirect costs of your grant application. This money goes to the university toward operating costs, overhead, etc.

Total Costs:

Sum up your direct and indirect costs (must not exceed $60,000).

Sample

[Type over the sample text in this document to create your Grant Proposal. Delete these instructions before submitting your proposal.]

Effects of Internet Based Training on Cognition in Older Adults

Student A. Smith

PSY625: Biological Bases of Behavior

Instructor B. Jones, PhD.

September 19, 2014

THIS IS a Sample GRANT Proposal

Effects of Internet Based Training on Cognition in Older Adults

Sample

Specific Aims

The idea that maintaining high levels of cognitive activity protects the brain from neurodegeneration is not new, and much evidence has accumulated that people with high levels of cognitive ability and activity tend to maintain cognitive function well as they age (Hertzog et al. 2009). Beyond the idea of maintaining cognitive function in healthy aging, studies such as Verghese et al. (2003) found that higher levels of cognitive activity were associated with lower rates of dementia in a 21- year longitudinal study. While much of the data indicating higher levels of cognitive activity leads to better long-term function is necessarily correlational, a number of studies have begun to systematically assess the effect of cognitive interventions on cognitive function. The largest of these, the Advanced Cognitive Training for Independent and Vital Elderly (ACTIVE; Jobe et al. 2001) has found long lasting effects (5 years; Willis et al. 2006) of relatively short cognitive training activities (10 hours).

The specific aim of this proposal is to assess the effectiveness of A Fictitious Brain Training Program on research participants followed longitudinally who may be experiencing the very earliest signs of cognitive decline. Recent research tracking the trajectory of age related cognitive decline (e.g., Mungas et al. 2010) has suggested that it may be possible to identify cognitively healthy individuals at risk for significant imminent cognitive decline by examining baseline cognitive assessments or recent change, even though test scores do not reach the abnormal range.

Background

Techniques for maintaining and enhancing cognitive function in an increasingly aging

population are of great potential benefit to those who might suffer from Alzheimer's disease and related disorders and also to society as a whole. Higher cognitive function leads to better maintenance of activities of daily life, less need for chronic care, and direct improvements in quality of life. Research examining effective methods for cognitive enhancement is becoming increasingly prevalent and has led to a number of recent review studies, e.g., Hertzog et al. (2009), Lustig et al. (2009), Green & Bavalier (2008). These studies review evidence from both longitudinal studies of increased levels of mental activity on maintenance of cognitive function and intervention studies aimed at directly improving cognition with targeted cognitive training. For these cognitive interventions to provide widespread benefit, it is critical to identify who will gain from cognitive intervention studies and to assess methods of administering effective cognitive training.

In a large scale cognitive intervention study (ACTIVE), Ball et al. (2002) found that training increased cognitive function with as little as 10 hours of task-specific training and these gains were still evident 5 years later (Willis et al. 2006). However, none of the three types of training used in that study were found to generalize to the other types of cognitive function. Participants were trained on either verbal episodic memory, reasoning (pattern identification), or speed-of-processing (visual search skills). Gains were observed in the domain of training, but not on the other two domains. As noted by Salthouse (2006), this result is inconsistent with the strongest form of the "use it or lose it" hypothesis. However, it does hold promise for cognitive training interventions that train broadly across a wide variety of domains. The hypotheses implied by the "use it or lose it" hypothesis is that cognitive training is protective broadly against the cognitive decline associated with aging. The more commonly observed specific areas of training improvement suggest an analogy to physical fitness training: the brain should not be

thought of as a single "muscle" to be strengthened but as a collection of individual abilities that could each be improved through "exercise." In addition, the analogy could be extended to the idea that cognitive training "exercise" should be thought of as an activity to be engaged in on a regular basis, not as a single intervention.

The cognitive training that will be used in the proposed project is based on an internet delivered set of activities designed by the company BrainExercise. The training is based on practice across a wide range of cognitive abilities, and by being highly available via the internet, is also available for regular follow-up re-training to maintain benefits. With this type of intervention, even if a cognitive intervention training does not provide a global benefit and delay decline across all types of cognition, training can be used across many areas to increase overall function. The ability to deliver cognitive training via the internet becomes important logistically since the benefit of training may depend on regular access to a broad array of cognitive activities. In the successful ACTIVE study, training was administered in face-to-face sessions requiring significant personnel and logistical support.

The issue of identifying tasks suitable for cognitive training with memory-impaired patients is an important one. In a follow-up reanalysis of the ACTIVE study data, Unverzagt et al. (2007) found that patients scoring >1.5 standard deviations low on memory tests did not benefit from the verbal episodic memory training in ACTIVE. In addition to seeing cognitive training as a method for delaying or reducing the onset of memory disorders such as MCI or AD (as in Verghese et al. 2003), suitable interventions to try to rehabilitate memory function or train compensatory strategies may provide an important benefit to MCI and AD patients. Numerous studies have suggested that elderly who are currently cognitively within the normal range, but on the lower end of the range are at risk for subsequent cognitive decline, including

the development of Alzheimer's Disease (Rubin et al, 1998; Sliwinski, Lipton, Buschke, & Stewart, 1996).

Older participants who score within normal cognitive ranges but who exhibit personal cognitive decline within that normal range are also at higher risk for the later development of Alzheimer's Disease (Villemagne et al, 2008; Collie et al, 2001). The most at-risk group of currently healthy elderly may be those who have shown some cognitive decline and are now at the bottom of the healthy range. Since this proposal is to investigate at the effectiveness of cognitive training in patients at risk for Alzheimer's Disease, the ideal comparison groups are healthy older adults who are at increased risk relative to their age group (cognitively normal, but lower scoring) and those who are cognitively normal and exhibiting no current evidence of memory impairment.

Significance

The proposed research will use an online-based software company to administer a structured intervention of cognitive skill training to patients experiencing some memory decline. Prior intervention studies have typically provided cognitive training in individual or small-group environments with the patients physically present with a trainer. If interventions based on training via the internet are shown to have similar benefits, many more people can gain these benefits since the labor involved in administering this type of training is much lower. In addition, improvements in the type of training administered can be made centrally and more quickly positively impact many more patients. For the pilot intervention study proposed here, we will be working with the Brain Science division at A Fictitious Company. The Fictitious program is a home-based, computerized, cognitive training program in which a customized training plan is developed for each participant based on an initial baseline cognitive assessment and ongoing

training progress. The training plan is based on 21 different tasks that each focus on one or two of 14 different specific cognitive abilities. To collaborate on examining the effectiveness of their training plan, they are making available licenses for all study participants to access the training program without cost. In addition, all performance data on all compliance, cognitive assessments and performance on training components will be available for collaborative analysis to assess efficacy of specific training elements in our study population.

The ability to deliver cognitive training via the internet holds tremendous promise for making training benefits available widely. Concerns about the task-specificity of benefits and the need for consistent training to maintain cognitive function can be met by making training easily available at home. The proposed research will work with the cognitive science research group of the A Fictitious company to assess the effectiveness of their targeted, individually customized cognitive training methods to improve cognitive functions in patients engaged in long-term outcome research at the Brain Center at an Important University.

Proposed Study

Participants:

Forty cognitively normal participants will be recruited, including 20 participants scoring 1 SD below age and IQ-adjusted norms on neuropsychological tests of memory (Rentz et al. 2004), and 20 participants scoring no worse than .5 SD below adjusted norms. Participants will be recruited from A University. The patients will be randomly assigned to two groups: intervention and waitlist (baseline) control. The intervention group will receive cognitive training via Fictitious Brain Training Program over a two month period. The waitlist control will not initially receive training. However, since we expect that the training will provide benefits to the patients, participants in the waitlist control group will be given access to the Fictitious Brain

Sample

Training Program software at the end of the protocol following the "post-training" assessment. This ensures fair and ethical treatment of groups as well as providing additional data about the effectiveness of the Fictitious Brain Training Program.

There are no major risks to patients who participate in the research. The training program is designed to be self-paced so that patients can manage fatigue or frustration. Patients may elect to stop participating in the study at any time. The potential benefits of the proposed research are considerable. The study protocol may provide a treatment to slow or reverse the cognitive decline associated with MCI (and Alzheimer's Disease) using the internet, making this treatment broadly and inexpensively accessible.

Procedures:

Once identified as a candidate for enrollment, patients will be met with in person at their residence. Patients will have the training protocol described and provide informed consent if they wish to enroll. Availability of necessary internet access will be assessed. Once enrolled, patients will be provided with a license to access The Brain Training Program and a research assistant will guide them through the initial setup process. The intervention will follow the standard Brain Training Program practice: initial assessment on a range of cognitive functions followed by 24 20-minute training sessions over approximately 8 weeks. The rate of training sessions recommended is 3 sessions per week but is ultimately chosen by the patient.

These sessions are followed by a re-assessment within the Brain Training Program of performance on their identified group of 14 cognitive functions.

Participants' self-rating of quality of life will be assessed with a Quality of Life-Alzheimer's disease (QoL-AD) scale described by Logson et al. (2002). While the current participants do not require an assessment of quality of life appropriate for cognitively impaired

individuals, all cognitive training improvement in these participants will also be compared with a group of patients who have a diagnosis of MCI and who are currently involved on an ongoing assessment of A Fictitious Brain Training Program. The same set of performance improvement instruments will be used in both studies to provide maximum comparability across all groups.

Hypotheses & Analysis:

The intervention group is expected to exhibit reliably higher scores on all post-training assessments than the waitlist control group. Scores on the Fictitious Brain Training Program cognitive assessments are very likely to improve reflecting the training invested in those specific cognitive tasks. Improvements on specific cognitive assessments will be compared to estimates of improved domain-specific performance available via the Brain Training Program.

For the current population of cognitively normal participants who might be showing the first signs of memory impairment, changes in self-rating of their quality of life (via the QoL-AD) will be examined carefully. While improvements in activities of daily life may not be significantly improved as these patients are not generally impaired, increases in general cognitive function may lead to better overall quality of life by improving problem solving, language comprehension and general attention skills. Improvements on this measure would be a key indicator of the potential of cognitive training to provide significant benefits to older adults.

Assessment of improvement will be made for only participants who complete the training course of 24 sessions. Performance of patients who do not complete the training will not indicate whether the training is effective at improving cognitive function. However, the drop-out rate is a key element to assess for evaluating the overall effectiveness of internet-delivered cognitive training. High rates of drop-out (e.g., >25%) may indicate that the cognitive training needs to be adjusted in difficulty to meet the needs of older adults or that additional support (e.g., more

patient contact) is needed to guide the patients through the training. An important element of the current project is the assessment of difficulty of completing the training and obtaining feedback from participants about their experiences with the online cognitive training.

Budget Justification

Funding is requested for a half-time graduate research assistant to be responsible for all aspects of subject recruitment, training and data collection. Addition funding of 10% is requested for the principal investigator who will oversee the study and conduct data analysis and publication of results.

Travel funding is requested for the PI to attend one national meeting to present the preliminary results of the study. Additional travel expenses are requested to pay for costs of transportation by the research assistant to each subject's home.

Subject payment of $50 for each subject (40 total) is requested to reimburse subjects for their participation time.

Funding is requested for an Apple Laptop computer (15" with retina display, 2.8 GHz processor, 1 TB hard drive) that will be used for data collection and analysis. Additional funding will be used to purchase the Quality of Life Scale and office supplies.

See Appendix A: Budget for detailed budget figures.

Sample

References

Ball, K., Berch, D. B., Helmers, K. F., Jobe, J. B., Leveck, M. D., Marsiske, M., . . . Willis, S. L. (2002). Effects of cognitive training interventions with older adults: a randomized controlled trial. *JAMA: Journal of the American Medical Association*, *288*(18), 2271-2281.

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Salthouse, T. (2006). Mental exercise and mental aging: Evaluating the validity of the "use it or lose it" hypothesis. *Perspectives on Psychological Science*, 1(1), 68-87.

Sliwinski, M., Lipton, R. B., Buschke, H., & Stewart, W. (1996). The effects of preclinical dementia on estimates of normal cognitive functioning in aging. *Journal of Gerontology: Series B Psychological Sciences and Social Sciences*, *51*(4), P217-P225.

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Verghese, J., Lipton, R. B., Katz, M. J., Hall, C. B., Derby, C. A., Kuslansky, G., . . . Buschke, H. (2003). Leisure activities and the risk of dementia in the elderly. *New England Journal of Medicine*, *348*(25), 2508-2516

Villemagne, V. L., Pike, K. E., Darby, D., Maruff, P., Savage, G., Ng, S., . . . Rowe, C. (2008). Aβ deposits in older non-demented individuals with cognitive decline are indicative of preclinical Alzheimer's disease. *Neuropsychologia,* 46(6), 1688-1697.

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Sample

Appendix A: Budget

SUMMARY PROPOSAL BUDGET

	FOR INSTITUTION USE ONLY	
ORGANIZATION	PROPOSAL NO.	DURATION (MONTHS)
PRINCIPAL INVESTIGATOR (PI)/PROJECT DIRECTOR Instructor B. Jones, PhD	AWARD NO.	
A. PERSONNEL: PI/PD, Co-PIs, Faculty, Graduate Assistants, etc. List each separately with name and title.		Funds Requested By Proposer
1. Instructor B. Jones, PhD ($90,000/year) - 10% effort for 12 months		$9,000
2. Research Assistant (RA) - 50% effort for 12 months		$25,000
TOTAL SALARIES		$34,000
B. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING $5,000.) None		
TOTAL EQUIPMENT		$0
C. TRAVEL 1. DOMESTIC - PI attendance at national meeting		$1,500
2. OTHER - Travel for RA to participants home		$1,000
TOTALTRAVEL		$2,500
D. PARTICIPANT SUPPORT		$2,000
1. STIPENDS $ 50		
2. TRAVEL		
3. SUBSISTENCE		
4. OTHER		
TOTAL NUMBER OF PARTICIPANTS (40) TOTAL PARTICIPANT COSTS		$2000
E. OTHER DIRECT COSTS		
1. MATERIALS AND SUPPLIES- Computer for patient training, data collection and analysis		$3200
2. OTHER Quality of Life scale		$1200
3 OTHER Office supplies		$736
4. OTHER		
TOTAL OTHER DIRECT COSTS		$5,136
F. TOTAL DIRECT COSTS (A THROUGH E)		$43,636
G. TOTAL INDIRECT COSTS (F&A) (Rate = 37.5%)		$16,364
H. TOTAL DIRECT AND INDIRECT COSTS (F + G)		**$60,000**

Annotated Bibliography

Angelia Bell

Psy 625

Professor Donaghy

Week Two assignment

Specific Aim

Dementia is psychophysiological disorder that causes deterioration in thinking, behavior, and memory, and the ability to conduct daily activities. Although the disorder is mainly common among older adults, researchers believe that it is not associated with normal ageing processes, thus it can sometimes be an indication of psychophysiological syndromes, which implies that there is room for research-based prevention and treatment approaches (World Health Organization, 2019). As such, this project for grant request is aimed at conducting further research on the causes, manifestation and appropriate interventions that can Research has proven that dementia as social, economic, physical, and psychological impacts on the lives of its victims, including their family members, and can also interfere with their careers.

Aim 1

The first aim of the study is to investigate the different causes of dementia, and to examine their manifestation in different parts of the brain though the aid of magnetic resonance imaging (MRI) scans of the brain.

Aim 2

The second aim is to conduct different tests among substantial number of respondents in different socioeconomic contexts, to determine the disparities among the sample, and to recommend the best interventions for each category in the emerging themes. Research has shown that there are different other causative factors that increase vulnerability to dementia apart from old age and traumas that affect the brain. They include but not limited to: smoking, lack of enough exercises, alcohol, unhealthy diet, high blood sugar level, and low-density lipoprotein cholesterol, depression, and cognitive inactivity.

The study to be conducted will uncover different causes of dementia, how they are manifested among different individuals, and the best interventions for different cases of the disorder. The study will also unveil new dimension in the diagnosis of the disorder depending on the causative agent and propose appropriate proactive approaches through which dementia can be managed across different categories of people and stages of the disorder.

Annotated Bibliography

Annear, M. J., Toye, C., McInerney, F., Eccleston, C., Tranter, B., Elliott, K. E., & Robinson, A. (2015). What should we know about dementia in the 21st Century? A Delphi consensus study. ***BMC geriatrics*****,** ***15*****(5), 1-13.**

Annear et al. (2015) explore different ways through which healthcare experts in neuroscience can reach consensus regarding how the classification of different forms of dementia and their corresponding symptoms. The study was prompted by the increase in the number of experts in neuroscience, and the increase in the scope through which dementia is currently being classified to establish consistence in the classification of disorder and contemporary knowledge of it. The researchers collected three rounds of data from experts in neuroscience in a Delphi study that was conducted online. The experts selected a set of 36 statements about the disorder that were fundamental for understanding dementia, which were placed in different categories. The largest category concerned aspects of care for dementia victims, and what their caregivers should understand; symptoms of dementia; assessment and diagnosis criteria; and treatment and intervention plans (Annear et al., 2015). The study is significant in care for dementia patients since it has established guidelines of care and classification of the nature of the disorder, which

increases accuracy in diagnosis and care for dementia patients. The classification can also be used to develop community educational programs.

Harrison, J. K., Fearon, P., Noel-Storr, A. H., McShane, R., Stott, D. J., & Quinn, T. J. (2015). Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE) for the diagnosis of dementia within a secondary care setting. ***Cochrane Database of Systematic Reviews*****, (3), 1-54.**

Harrison et al. (2015) discusses the extent to which informant questionnaire for cognitive decline in the elderly (IQCODE) can be applied reliably to accurately determine the likelihood of dementia development among people who have not yet developed dementia but are classified as high-risk population, such as the elderly or people who have suffered from stroke. The study approach involved searching databases for studies in which respondents were required to respond to questionnaires, and libraries such as PubMed and Cochrane databases. The questionnaires were mainly tailored to suit cognitive tests, screening, and vulnerability to dementia. Although the search yielded significant results that could be used for future studies on dementia development over time, the authors conclude that the studies that were assessed could not be used to accurately develop precise recommendations about the use of IQCODE for dementia diagnosis. The study is crucial for the understanding the gap that exists in dementia studies, especially in the detection phase where early interventions can be implemented.

Haslam and Sabah. (2013). Preservation of person-specific knowledge in semantic memory disorder: a longitudinal study in two cases dementia. ***Journal of Neuropsychology. 2013*****(7). 132-138.**

The article provides results of a study on semantic dementia done over a period of six years involving two respondents. Haslam and Sabah (2013) studies the way progressive semantic dementia is expressed in patients be analyzing magnetic resonance images (MRI). The initial semantic knowledge and person-specific knowledge of the respondents was the same in the beginning of the study. However, after a period of six years, there were significant changes in the memory capacities of the respondents in that there was double dissociation in which semantic knowledge had changed whereas person-specific knowledge did not change. The results of the study prove the speculation that the right hemisphere plays a big role supporting person-specific knowledge. The findings of the study can be used to explain why person-specific knowledge is preserved whereas general semantic knowledge is lost using the concept of double dissociation. Nevertheless, the research used only two participants, which lowers the reliability of the findings.

Killin, L. O., Starr, J. M., Shiue, I. J., & Russ, T. C. (2016). Environmental risk factors for dementia: a systematic review. *BMC geriatrics*, *16*(1), 175-203.

Following the unexplainable causes of dementia after other risk-factors such as old age and stroke have been identified, Killin, Starr, Shiue and Russ (2016) examine environmental risk factors that could trigger the development of dementia among non-vulnerable populations. The authors conduct searches in databases such as Web of Science and PubMed for research articles about environmental risk agents for dementia. The authors excluded studies that combined dementia with other studies. The result of the search exposes air quality, poisonous metals and other substances, and occupational risk factors. The leading environmental risk factors were exposure to aluminum, pesticides, magnetic and electric fields, silicon, and deficiency in vitamin D (Killin et al., 2016). The study is important in analyzing root causes of dementia in that it

unifies studies on the environmental causative agents, which makes it possible to plan for preventive approaches that can minimize the occurrence of dementia through restricting the use of such causative environmental agents.

Lewczuk, P., Riederer, P., O'Bryant, S. E., Verbeek, M. M., Dubois, B., Visser, P. J., ... & Jack Jr, C. R. (2018). Cerebrospinal fluid and blood biomarkers for neurodegenerative dementias: an update of the Consensus of the Task Force on Biological Markers in Psychiatry of the World Federation of Societies of Biological Psychiatry. ***The world journal of biological psychiatry*****, *19*(4), 244-328.**

The article discusses the current state of events regarding blood biomarkers and cerebrospinal fluid in the assessment, diagnosis, and treatment for people with dementia. Since the integration of Alzheimer's disease into dementia spectrum is one phenomenon that Lewczuk et al. (2018) site as aspects that can bring confusion in the diagnosis of dementia since some practitioners can apply multiple interventions where only one is necessary. Biomarker techniques are a range of technologies that have been advanced in recent times to for early identification of neurodegenerative disorders. The authors discuss different types of biomarkers, which include but not limited to: predictive biomarkers applicable in pre-clinical stages; diagnostic biomarkers used in accurate differential diagnosis; prognostic biomarkers applied in prognostic processes and probabilistic healing (Lewczuk et al., 2018). Different ethical issues have been highlighted regarding the use of recently modeled biomarkers, which include but not limited to: dilemma concerning disclosure of biomarker status regarding risk-benefit analysis that can cause uncertainty; and interventional studies require disclosure of prognosis biomarkers applied, which can cause anxiety to patients, or make them change their mind. The article can used to gain current information concerning the current state-of-the-art interventions.

Na, R., Yang, J. H., Yeom, Y., Kim, Y. J., Byun, S., Kim, K., & Kim, K. W. (2019). A Systematic Review and Meta-Analysis of Nonpharmacological Interventions for Moderate to Severe Dementia. *Psychiatry investigation*, *16*(5), 325-336.

The article provides alternative nonpharmacological approaches that neuropsychologists can apply to treat people living with dementia, especially during the early stages of the disorder, or its mild forms. Na et al. (2019) raise concerns that pharmacological interventions do not work effectively as expected, thus nonpharmacological interventions should be explored. Through literature search in credible databases such as PsycINFO, Na et al. (2019) performed meta-analyses on randomized controlled trials, and further applied the inverse variance method to estimate standardized mean difference. The results suggest that non-pharmacological interventions improved the daily quality of lives of people living with dementia. Such nonpharmacological therapies include but not limited to music, light therapy, and exercise therapy. This study is important since it can be used to select appropriate nonpharmacological interventions that caregivers can utilize for people with mild to medium forms of dementia. It can also be used to break overreliance on pharmacological treatment that sometimes impact negatively on the dementia victims.

Orrell, M., Yates, L., Leung, P., Kang, S., Hoare, Z., Whitaker, C., ... & Pearson, S. (2017). The impact of individual Cognitive Stimulation Therapy (iCST) on cognition, quality of life, caregiver health, and family relationships in dementia: a randomised controlled trial. *PLoS medicine*, *14*(3), 1-22.

Orrel et al. (2017) studies the effects of the individual cognitive stimulation therapy (iCST) on different aspects of life of people living with dementia. The main aspects of

consideration are: the quality of life; cognitive abilities; socioeconomic relationship; and psychological health of caregivers. The authors applied the single-blind-pragmatic randomized controlled trial across eight study regions. The findings of the research indicate that there is no significant effect caused by iCST on the quality of life, and the cognition among people living with dementia. This suggestion goes against the findings of some researches that have linked good relations between caregivers and dementia victims with high quality of life of dementia victims. Nevertheless, the authors found that the iCST improves caregivers' quality of life and improves personal relations between caregivers and dementia patients. The study findings can be used to provide justification for the use of iCST in giving caregivers motivation and strengthening the relationship between caregivers and patients.

Possin, K. L., Kim, H., Geschwind, M. D., Moskowitz, T., Johnson, E. T., Sharon, J. S., ... & Hess, C. P. (2017). Egocentric and allocentric visuospatial working memory in premotor Huntington's disease: A double dissociation with caudate and hippocampal volumes. ***Neuropsychologia, 101*****, 57-64.**

The article evaluates different ways through which the brain presents information and links the channels with the likely part of the brain responsible for the activities. There are two types of spatial information that the authors use in the study, which include allocentric and egocentric information. Ellocentric information refers to individual-related data whereas allocentric relate to landmark-based coordinates. Possin et al. (2017) administers both memory coordinates to people with premotor Huntington's disease, which is closely related to caudate nucleus atrophy. The authors apply segmentation algorithm based on multiatlas approaches. The findings suggest that people with Huntington's disease had significant higher impairments on egocentric coordinates of the brain's information presentation. Caudate volumes were correlated

by egocentric accuracy, specifically the dorsolateral caudate region. Furthermore, the right part got denser afferents as compared to the left dorsolateral prefrontal cortex (Possin et al., 2017). On the other hand, the allocentric memory correlated with hippocampal capacity especially in the part posterior and intermediate regions that compactly connect with posterior parietal cortices. The study results support double dissociation, which sheds light on the how the working memory is controlled.

Surr, C. A., Walwyn, R. E., Lilley-Kelly, A., Cicero, R., Meads, D., Ballard, C., ... & Downs, M. (2016). Evaluating the effectiveness and cost-effectiveness of dementia care mapping™ to enable person-centred care for people with dementia and their carers (DCM-EPIC) in care homes: study protocol for a randomised controlled trial. *Trials*, *17*(1), 300-317.

Surr et al. (2016) discuss methods through which relatives, friends, and caregivers for dementia patients can positively improve the quality of life of the people living with the disease. The Dementia Care Mapping (DCM) is an approach that the authors use as a dementia-control tool that can be used to give person-centered care. The authors apply multiple research approaches in study, which include but not limited to: multiple-center approach; randomized controlled trials; and Usual Care. The study is important since it explores different ways through which stakeholders "can apply to determine the source and degree of agitation given that victims of dementia are easily agitated, and that agitation contributes to 90% of their non-conformity with social and work-related issues" (Surr et al., 2016). Application of multiple research approaches in the study makes it more valid and makes its findings more reliable since the multiple study approach enhances data saturation, which increases the rates to which the results of the study can be generalized.

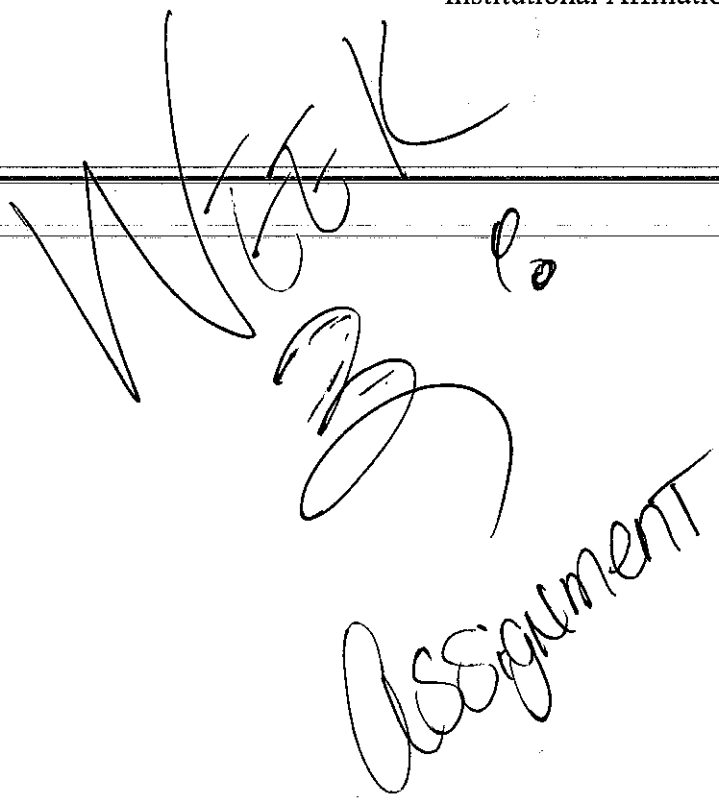
Taylor, J. P., Firbank, M., & O'Brien, J. T. (2016). Visual cortical excitability in dementia with Lewy bodies. *The British Journal of Psychiatry, 208*(5), 497-498.

Taylor, Firbank and O'Brien (2016) study the relationship between excitability the visual cortex and Lewy bodies among people suffering from dementia. The authors suggest that hallucinations that dementia patients often experience can be related to alterations in the visual system. Nevertheless, the authors raise concerns that cortical excitability appears normal among people with dementia with Lewy body when excitability is measured using transcranial magnetic stimulation, and functional magnetic resonance imaging stimulation of basal visual regions. The authors suggest that there occurs double dissociation regarding phosphate threshold and functional MRI regarding visual activation. The results indicate that the loss of inhibition in dementia with relation to Lewy body can be a significant predisposing factor for visual hallucinations and dysfunctions. This study is important in researches involving the association between causative factors of memory loss with cognitive abilities, which can aid in predicting dementia among vulnerable groups upon detection of related symptoms.

Grant Proposal

Name

Institutional Affiliation



Grant Proposal

Background

Maintenance of high living standards for people living with dementia is crucial for ensuring that the victims live with as little stress as possible. Efforts to improve personal and professional lives of dementia victims has been an issue that calls for serious attention with regards to establishing standards that aid in reducing dependence, and stresses experienced by the victims as a result of the disorders' devastating effects on personal and professional life of the victims. Researchers such as Annear et al. (2015) have emphasized on the quality of life regarding care for the victims and what caregivers ought to understand about the disorder in order for them to take care of the victims in the best possible ways. Furthermore, there are different kinds of symptoms manifested in dementia patients that often cause confusion among experts in the field of neuroscience since there are varying methods through which dementia disorders are diagnosed and understood. Although dementia mostly affects the aged more than the younger populations, the disorder is not directly caused by old age, which indicates that the causative agents are multifactorial. Harrison et al. (2015) raise concerns that the current studies that have been conducted on the diagnosis of dementia have not been developed accurately to accommodate known standard procedures such as the informant questionnaires.

There is a need to preserve person-specific semantic memory among dementia victims. Studies conducted on progressive semantic dementia have provided clues on the nature and effects of the disorder depending on the type of memory preserved after some time span. For instance, Haslam and Sabah (2013) used magnetic resonance imaging (MRI) of the brain to analyze semantic and person-specific knowledge among people who were at risk of dementia. Forgetfulness among people living with dementia can be reduced by applying cognitive training

programs. Group therapy has been shown to reduce depression and stress among dementia victims. The group approach can significantly give victims consolation in that the victim since the victims console themselves in groups in that in that they do not feel as if the disorder is unique to individuals but that which can affect any body. Furthermore, the victims share their experiences thereby reducing the level of fatigue experienced by individual victims. The different causative agents of dementia include but not limited to Alzheimer's disease, traumatic experiences that affect the brain and those that result from accidents. As such, it is necessary to incorporate the causative agents of the disorder when deciding on the best appropriate plan for to remedy the disease. Patients can be taught to learn how to read again when they are suffering from dementia and Balint's Syndrome through specialized training sessions that emphasize on cognitive regeneration by ensuring that the patients combine phonemes and phonemes in that they combine letters to read words, and combine words to create sentences. Alternatively, patients van is made to effectively manage the symptoms and also aid in the process of making medications and treatment plans for patients suffering from the disorder.

In the last five years, there has been an upsurge of studies that seek to explore strategies and approaches of managing and improving the quality of life of people suffering from dementia. However, these studies only focus on diagnosis and treatment of dementia and balint syndrome. As a result, there is still paucity of research on the methods of managing the standards of living or quality of life of persons with dementia. For instance, Caravaglios et al. (2015) observe that Balint syndrome commonly exhibits itself in terms of severe disturbance of visual spatial evaluation such as impaired oculomotor behavior, optic ataxia, as well as simultanagnosia. Nonetheless, it is rare to observe complete syndromes. Therefore, partial versions of the syndrome are commonly recorded by health professionals. In an effort to explore and describe

the nature of Balint's syndrome with three main neuropsychological elements as a result of infarction in watershed between the anterior and the posterior cerebral artery areas, Caravaglios et al. (2015), found that Balint's syndrome is a rare phenomenon. Consequently, Caravaglios et al. (2015) state that the disorder is not easy to evaluate with the utilization of common and standardized clinical instruments and tools. After undertaking a clinical evaluation following three days of the post stroke, the researchers found a severe impairment in various visual spatial tasks including reading, writing, describing visual scenes, and the voluntary gaze-shifts. Nonetheless, only a minor improvement in visual spatial tasks such as describing visual scenes was found.

The classical neurological assessment tool is commonly used to explore the progress and state of patients suffering from Balint's syndrome. According to Caravaglios et al. (2015), the classical neurological assessment tool is effective in examining comprehensively the senses, mortality, balance, and language. Nonetheless, the researchers observe that it is much less focused on exploring cognitive functions. As a result, Caravaglios et al. (2015) suggest the need to develop accurate evaluation tools for the presence of cognitive and behavioral impairments.

The Balint's syndrome has also been linked to other complications such as the Diffuse Lewy Body Disease. In an effort to explore cases of co-presentation of Balint's syndrome and Diffuse Lewy Body Disease, the Falcorner et al. (2014) examined the implications of whether the presence of Balint'S syndrome should suggest Diffuse Lewy Body disorder. According to Falcorner et al. (2014), Diffuse Body Lewy disease is commonly pathologically chaarcterised by the presence of Lewy Bodies, which are subcortircally found in the basal ganglia that is similar to the Parkinson's Disease and cortically within the parieto-occipital areas that are same as the Alzheimer's disease. The researchers postulate that this problem theoretically account for

concomitant presence of the Parkinsonian symptoms and dementia. In the same way, Falconer et al. (2014) observe that the Balint's triad of simultagnosia, oculomotor apraxia, and optic ataxia are reflective of the damages that have been brought to the bilateral temporo-occipital lobes. When it comes to Balint's syndrome, any potential damages inflicted in the area can result in the stereotypic triad, which can take the form of ischemia, atrophy, or neurodegeneration as is the case with DLBD.

Neuropsychological interventions have been widely used in providing care and management of Balint's syndrome. Heutink, Indorf and Cordes (2018) state that visual agnosia and Balint's syndrome are sophisticated forms of neurological problems of the higher visual systems. These problems have the potential to generate a significant effect on the patients' life. According to Heutink, Indorf and Cordes (2018), the rehabilitation of persons with Balint syndrome is a significant effort that can allow the participation in every activity despite the impairment. Nonetheless, there is an unclear body of literature regarding the rehabilitation of Balint's syndrome. In response to this scarcity of knowledge, Heutink, Indorf and Cordes (2018) undertook a systematic review tom provide an overview of the widely sued literature that describe treatment and care models, and their levels of efficacy with respect to Balint's syndrome. Using databases such as Psychinfo, Amed, and Medline, the researchers gathered 22 articles that met the standards for inclusion into the study. The scholars only incoroporated studies that described acquired disorders. The findings of the review indicated that there are some information that is available on the main subcategories of Balint's syndrome and agnostic that can be used by health professionals and psychologists for evidence-based guidance. When it comes to the types of rehabilitation and management of Balint's syndrome, Heutink, Indorf and Cordes (2018) found that compensatory models and approaches have proven over time to be

important in many cases. Furthermore, the utilization of restorative training has, on the other hand, normally generate mixed outcomes. Thus, Heutink, Indorf and Cordes (2018) infer that while management and care strategies are still rare, there is need for a scientific foundation of the methods of rehabilitating and managing Balint's syndrome and visual agnosia. Because of the complexities associated with neurological disorders and the nature of impairments, the neuropsychological rehabilitation is a challenging affair. This is particularly true when it comes to the need to rehabilitate the visual disorder, since it is multifaceted because the visual challenges may occur at lower or higher functional levels.

According to Heutink, Indorf and Cordes (2018), vision is normally adversely affected for patients who suffer from neurological challenges. For instance, Heutink, Indorf and Cordes (2018) remark that approximately 30 percent of patients with acquired brain damages often exhibit defects in vision. Moreover, approximately 20 percent of patients who suffer from cerebrovascular acquired brain injury or traumatic brain injury have a higher likelihood of developing visual impairments. Furthermore, Heutink, Indorf and Cordes (2018) state that visual perceptual problems can have adverse effects on a person's spatial orientation, learning, as well as motor activities. This problem can in turn negatively affect an individual's independence, social participation, as well as vocational life. To respond to these challenges, Heutink, Indorf and Cordes (2018) propose the utilization of two major neuropsychological rehabilitation strategies. The first approach is referred to as restoration, which is a tool that can be employed to improve a specific function through training the impaired functions, thus improving the damaged brains structures. The second strategy, which is compensation, involves utilizing an intact functionality to perform the process of compensating for the losses of other parts. In the process, the defective function itself is not targeted, but the functioning on an activity and participation

level is instead enhanced. Depending on the degree of patient's impairment the environmental adaptation, such as signposting a route, can also be utilized in case the patient's capacity to learn compensatory models is limited. In many situations, combination of these models can be essential in a rehabilitation procedure.

In view of the above, Balint;s syndrome is widely considered to be a rare neurological problem that is strongly linked to the damage of the parieto-occipital damage. Moscote-Salazar et al. (2016) observe that the neurological problem is exhibited clinically through the availability of a hemi-spatial negligence. Such a lesion is often within the inner parts of the parieto-occipital bilaterally in many situations. However, the lesions may also be compromised angular convolutions, which include the dorso-lateral sections of the occipital lobe as the superior right parietal lobule. Using cases study approach, Moscote-Salazar et al. (2016) explore the story of a 61-year-old man who suffered from traumatic brain damage and was diagnosed with right parieto-occipital confusion after radiologic assessment. After undertaking a physical assessment, the researchers found that the results were reflective of Balint's syndrome. Shortly after subjecting the patient to 12 months of post-injury and administering him with a 4-month outpatient rehabilitation, the results indicated that the patient significantly improved from Balint's syndrome within a period of eight months following the beginning of the symptoms.

Moscote-Salazar et al. (2016) assert that in spite the adverse impacts of Balint's syndrome on the connections between the cortical areas of vision and motor pre-rolandic regions, in lesions of such areas are not the only primary sensory and motor failures that take place. Moreover, the researchers decry the scarcity of more integrated sensorimotors, where there are alterations of the two major visual channels of sensorimotor integration. In this respect, the connections of occipito-parietal dorsal that supports the task of processing spartial information

and occipito-temperol ventral stream for the identification of objects leading to what is widely recognized Balint's syndrome. This problem is clinically identified by way of three major signs and symptoms. First, the patient exhibits a psychic gaze palsy or simultanagnosia. For instance, the patient may have the capacity to see individual objects but no other objects within their vicinity even within the same lines of sight and timeline. The second sign and symptom of the disease is ataxia, which is also commonly referred to as spatial disorientation. Spatial disorientation manifests itself in terms of the patient's inability to reach the objects that they observe or had previously recorded their locations verbally. Nonetheless, the patients may still be capable of identifying and locating all parts of their body by way of touching and proprioception. Thirdly, the oculomotor apraxia in which there is a defect of the eye movements and focusing saccades patients, resulting in direct visual movements. Moscote-Salazar et al. (2016) observe that an intersecting component of the syndrome si the unilateral form of the injury. Usually, Balint's syndrome is often observed in bilateral lesions. Contemporary studies commonly attribute the occurrences of Baliant's syndrome with other multiple disorders and procedures. According to Moscote-Salazar et al. (2016), these disorders may include tumors of the Central Nervous System, metastases, as well as toxoplasmosis in AIDs patients. Further, the superior partial lobe is widely identified as one of the major areas for the visual control of movements. Having considered the expansive body of literature on Balint's syndrome, it is important to explore strategies of maintaining high living standards of persons with dementia.

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