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# Integrating Neuroscience Research into Social Work

Esteban Solis

# INTEGRATING NEUROSCIENCE RESEARCH INTO SOCIAL WORK

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A Project

Presented to the

Faculty of

California State University,

San Bernardino

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In Partial Fulfillment

of the Requirements for the Degree

Master of Social Work

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by

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## ABSTRACT

Historically, the field of social work has implemented a bio-psycho-social perspective to conceptualize mental illness, and to further investigate how biological, psychological and social factors contribute to client circumstances. Although, the biopsychosocial model aims to emphasize all three areas, in social work, psycho-social realms receive more attention while biological factors—particularly neurological ones receive less. Research and recent findings from neuroscience can enhance social work's understanding of mental health and improve education, training and practice. However, very limited literature of cross-disciplinary collaborations between social work and neuroscience exists and the rationale for that is unclear. This study seeks to fill this gap and identify factors/barriers that hinder such process and encourage the field of social work to incorporate neuroscience research.

This study assessed forty-nine social work student's (n= 49) opinions about integrating neuroscience into social work education and evaluated the level of knowledge social work students have in the area of neuroscience. The quantitative findings indicated that social work students recognized the value of neuroscience research in the subjects of childhood trauma, human behavior, substance use and psychotherapy. In addition, social work students reported high levels of interest, perceived benefits for career success and overall advantages about learning neuroscience material. Conversely, findings also revealed that social work students perceived this integration as difficult,

overwhelming and requiring too much effort. Which could help further understand the resistance of social work to incorporate such material and thus, allow future research to build upon this study. Overall, the discoveries of this project allowed for a fair assessment of social work student opinions on the subject matter, prompted further research and brought awareness to the topic.

ACKNOWLEDGEMENTS

First and foremost, I am extremely grateful to the forty-nine students that participated in my study- your contributions are very much appreciated and will propel the field of social work forward. In addition, I would like to thank my esteemed research supervisor Thomas Davis. I appreciate your invaluable advice, endless support, and patience during this process. Your passion and immense knowledge have encouraged me to make an impact in this field and help others. I will never forget your famous words, “You didn’t choose social work, social work chose you.”

Lastly, this immense accomplishment would not have been possible without the support and love of my dear family, amazing friends and loved ones. With the grace of God, I was able to complete this rigorous, yet beautiful journey which began two years ago; and although it was filled with challenges, worry and endless nights of hard work, I would not trade this experience for anything else. To many future accomplishments and continued success- *Gracias!*

*Esteban Solis*

# DEDICATION

To the Latino/a boy or girl that doesn't believe they belong in these spheres or academic arenas- you do. The number of Latinos in the United States is growing at a rapid pace, and we need you to help represent us in different educational disciplines. Trust me, you have what it takes, even if you're made to believe otherwise. So, take the leap of faith because if not, you will never know your true potential. *Nosotros Pertenecemos y Si Se Puede!*

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# CHAPTER ONE

# PROBLEM FORMULATION

## Introduction

In 1977, George Engel conceptualized the biopsychosocial model to account for social and psychological factors, which the Biomedical model at that time lacked when assessing for mental illness (Engel, 1977). Since then, the bio-psycho—social model has been utilized in social work, to identify how biological, social and psychological factors interact and contribute to social problems (Maynard et al., 2017). The intended goal of such holistic approach was to enhance the accuracy of assessments in mental health, and thus, diagnose and treat clients more effectively. However, despite the addition of a biopsychosocial approach in social work, psycho-social realms have received more attention, while biological factors—particularly neurological ones—have received less (McCutcheon, 2006; Saleebey, 1992; Vaughn et al., 2013, as cited in Maynard et al., 2017). Given the recent neuroscience revolution, which provided a greater understanding of how the brain processes information with new brain-imagining techniques (Van Der Kolk, 2014); this proposal calls for an emphasis to incorporate neuroscience research, into social work education.

Neuroscience is a subdivision of biology focused on understanding the brain and the nervous system, which is valuable in advancing knowledge of human thought, emotion, and behavior (Farmer, 2009). A neuroscience

perspective can provide a common language and understanding that links social work more closely with scientific professions to enhance social work's understanding of biological factors that contribute to mental illness (McFadden, as cited in Turner, 2017). Now more than ever, cross-disciplinary collaborations are essential because of the mental health crisis the Coronavirus Disease 2019 (Covid-19) created. Social distancing and stay-at-home orders, which began in March of 2020 impacted the profession of social work immensely. From, August 2020 through February 2021, percentages of anxiety and depressive disorder symptoms in adults increased from 36.4% to 41.5%, and the percentage of reports indicating unmet mental health care increased from 9.2% to 11.7% (Vahratian et al., 2021). This can be attributed to the economic, social, and political unrest Covid-19 created; especially since, statistics for anxiety and depressive disorder symptoms among U.S adults were lower in 2019, compared to 2020 (during the global pandemic) (Czeisler et al., 2021).

Given the recent increase of mental illness in the United States, and the fact that social workers are the largest group of mental health providers in the nation (Heisler & Bagalman, 2015). Social workers have an obligation to use their knowledge, skills, and values acquired through training and experience to address such issues and help people struggling with mental illness (National Association of Social Workers [NASW], 2017). In addition, since social work's primary mission is to enhance the well-being of all people, with an emphasis on those who are vulnerable, oppressed, and living in poverty (NASW, 2017). This

further requires social workers to help address the high rates of depression and anxiety people are currently experiencing.

Social workers are not expected to interpret brain scans, collect blood, saliva, and other biomarker data, but the profession must include neuroscience research to investigate how biological characteristics interact with the social environment and contribute to mental illness (Eack et al., 2018). Afterall, all the things we see, do, feel, and understand, are all processed by the brain. In fact, research shows that gene variants (or change in the DNA sequence), along with specific environmental influences, can increase the risk for substance use and mental health issues (Enoch, as cited in Matto & Strolin-Goltzman, 2010). Which serves as an example of neuroscience findings that can be used in social work today.

Moreover, given that current mental health interventions do not assure complete, “Client-defined functional recovery” (Wojtalik et al., 2018). It would be remiss to not incorporate neuroscience research to improve the efficacy of available interventions. Increasing emphasis on biological factors of the biopsychosocial model, and specifically introducing neuroscience research offers a holistic approach to combat the current mental health crisis, and, overall, improve social work practice. Afterall, the profession must continue to improve practice methods and advance understanding of mental health.

Furthermore, the Council on Social Work Education (CSWE) requires educational institutions to engage in practice-informed research and research

informed practice as *competency Four* of the educational competencies (CSWE, 2015). In the *Specialized Practice Curricular Guide for Trauma-informed Social Work Practice*, part of the 2015 EPAS curricular guide resource series, competency four references neurobiology research as essential to explain the bio-psycho-social and cultural factors related to trauma. As shown, Institutions must provide quality social work education, by meeting competency four and conducting neurobiological research to develop competent trauma-informed social work practice. Further validating the importance of neuroscience research in social work practice and education. Therefore, the objective of this study is to promote cross-disciplinary collaborations with neuroscience and social work, to promote a true biopsychosocial model and advance knowledge in mental health across the field of social work.

## Purpose of the Study

The purpose of this exploratory study is to assess social work students' opinions about integrating neuroscience research into social work education. Since the topic is relatively new, there is limited research that investigates social work students' beliefs about neuroscience literature; therefore, an exploration is necessary to increase understanding as to what students think about neuroscience; and most importantly, what social work students think about integrating neuroscience into social work curriculums. This study aims to test social work students' level of knowledge in neuroscience, explore beliefs about

integrating neuroscience into social work education and encourage the profession of social work to incorporate neuroscience research to better understand mental health.

Since there is limited attention directed towards biological factors in social work, and specifically research on the brain and how it relates to mental health. This study will show how important the biological part of mental health is in social work. In addition, the study will help bring awareness to the much-needed integration of neuroscience in social work practice. Afterall, the brain is an integral part of human behavior, thought and emotion; and enhancing knowledge in this area will immensely benefit social work practice, as well.

This study implemented a quantitative design, given the various benefit outcomes that exist. This method allowed for a larger sample size, which involved more people to generalize the results across the field of social work. In addition, a quantitative method made the dissemination of surveys easier, cost-effective and quicker. Lastly, it was important to maintain participant confidentiality, and the surveys did not require meeting with participants in-person, and thus, ensured participant confidentiality.

## Significance for Social Work

Mental health includes emotional, psychological, and social well-being, and it affects our thoughts, feelings and behaviors (Centers for Disease Control and Prevention [CDC], 2021). Moreover, mental health plays a critical role in

every stage of our life starting from childhood and adolescence through adulthood (CDC, 2021). When mental illness is present, the conditions can be severe and persistently disabling, which places barriers on individuals' ability to live a healthy life and achieve personal goals, such as maintaining employment and living independently (Wojtalik, Eack, Smith & Keshavan, 2018). Social work plays an essential role in empowering such clients to live a healthy life and combat mental illness. Therefore, providing effective treatment for clients with mental health disorders is imperative for social work, and crucial for clients struggling with mental illness.

Introducing neuroscience research can allow social workers to account for biological information to promote client recovery and healthy living. As part of the six core values outlined in the NASW code of ethics, the value of competence, requires social workers to continually expand their knowledge base and competence in order to make meaningful contributions to the profession and those they serve (NASW, n.d). Implementing neuroscience content into social work education would require students, professionals and educators to broaden their knowledge and implement biology which can lead to innovative contributions. In addition, it would prepare future social workers with a higher level of competence for practice and most importantly, help treat clients more effectively. Given the significant advancements in neuroscience that have taken place in the last three decades; the findings can be used to move the field towards a greater understanding of mental health; especially since the

information is available and social workers are expected to uphold the core value of competence.

# CHAPTER TWO

# LITERATURE REVIEW

## Introduction

The field of social work has not utilized or implemented neuroscience research into school curriculums, despite significant advances in neuroscience and the availability of extensive literature that exist. The following section will introduce various methods in which social work can implement neuroscience research and findings to benefit education and improve practice. Findings and information from neuroscience will be presented in a succinct manner along with different social work concepts, like intervention strategies, mental health diagnoses, education curriculums and social work theories. Although, the goal is to encourage social work to incorporate neuroscience into education, the literature also reviews how neuroscience findings and research can benefit practice.

### Social Work Education

Egan and others (2011) emphasized the growing field of neuroscience and the important implications it has for social work education. The authors highlighted the lack of neuroscience knowledge in the course: Human Behavior in the Social Environment (HBSE), which is offered in many social work programs. As a result, the writers provided examples on how to incorporate

neuroscience information into HBSE curriculum and the significance of such integration.

According to Egan and others (2011) The National Association of Social Workers endorsed neuroscience as a necessary component in HBSE curricula; yet very few social work textbooks cover the subject of neuroscience. This gap in curriculum, if addressed, could assist social work students understand the role of the brain in human development. Egan and others (2011) explained that it is important as social workers to learn about the brain's formation from birth to adulthood and its functions, because human behavior is influenced by both the brain and social environment.

Furthermore, the authors highlighted sensitive periods (SP) in brain development, in which a structure or area of the brain is receptive to input from environmental stimuli. During these SP, the brain is developing and making connections from the outside world, and if disrupted, it can cause problems in the future. To show how sensitive periods of the brain (and overall neuroscience knowledge) can be applied to social work education, researchers illustrated an example of a client scenario that can be used in HBSE courses. Example: Juan a 10-month-old Mexican American boy, is not able to develop a proper attachment with his mother Maria, because she has been experiencing crying spells and feelings of sadness after the departure of her husband. When introducing neuroscience, one can assume that this is a sensitive period for Juan, in which he must form an attachment with his mother, so that in the future he can have the

ability to form healthy attachments with others. Since the mom is struggling and cannot provide the child with the proper support during a sensitive period in his development, this can lead to negative consequences. As shown knowledge from neuroscience and social work can be used to assessed if Juan's mother is adequately forming a healthy attachment with Juan.

Mason and others (2020) argued that the 2015 CSWE EPAS did not explicitly require the application of neuroscience into social work, but the CSWE (2018) guide, *Specialized Practice Curricular Guide for Trauma-informed Social Work Practice*, did draw on the importance of neurobiology in understanding and intervening with clients who have experienced trauma. The authors specifically pointed out that social workers should engage in research-informed practice and practice-informed research about neurobiology; to fulfill one of the competencies. In addition, Mason and others (2020) established that neurobiology content is also necessary when assessing and intervening with individuals, families, groups and communities. Given the references of neurobiology in the CSWE guide, it is important to include such material in education because many clients deal with trauma and particularly in the area of child welfare.

Social Work Practice

Yorke and Bergere (2018), argued that multidisciplinary dialogue between neuroscience and social work can bring academics and researchers together and open new areas of inquiry (Yorke & Bergere, 2018). The authors stressed that knowledge of neuroscience is important for social work practice and vice versa.

To illustrate an example of neuroscience integration into social work practice, the authors discusseded the impact of childhood stress; where they used different research projects from social work and Neuroscience to find common ground. The authors discovered that behaviors related to emotional and cognitive disorders in children along with changes to brain development can derive from exposure to material stress during fetal development of these individuals. Such findings could help social work clinicians when assessing children to diagnose and treat them more precisely and effective. With the use of brain development knowledge and social work concepts, clinicians will possess a greater skill set.

Matto and Strolin-Goltzman (2010) encouraged the social work profession to make use of biomedical knowledge and technological advances from social neuroscience to inform psychosocial treatment development. Researchers used an example of a substance abuse treatment that was created by social neuroscientific research. Schneider et al. (2001) (as cited in Matto and Strolin-Golztman) conducted a treatment outcome study that examined the effects of CBT and pharmacological treatment on cravings and brain region activation in a sample of alcohol dependent patients. Schneider et al. (2001) found that the subjects exposed to psychosocial and pharmacological treatment, experienced changes in neurobiological functioning, which was evident through brain imaging. On the other hand, people who did not receive such treatment had no change in brain functioning. This blended methodological approach of social neuroscience research can help develop new treatment models given the availability to

biomedical technology like brain scans, and overall neuroscience knowledge, which can benefit substance abuse programs in social work.

Gibson (2020) conducted an analysis, in which he reviewed mainstream English- language academic journal articles that incorporated neuroscience in the title, abstract or keywords, with a focus on those published most recently and/or those that incorporated neuroscience at the core of their arguments relating to social work. Gibson (2020) found that discussion of brain research and biopsychosocial practice have been beneficial for substance use, trauma, and health care. Additionally, the author discovered that neuroscientific findings could advocate for: (1.) using meditation and mindfulness techniques; (2.) using different strategies in working with children at different ages; and (3.) understanding how trauma can affect people in multiple ways on an everyday basis. Overall, Gibson (2020) argued that social workers contribute knowledge of human relationships and communities, while neuroscience researchers incorporate knowledge of brain mechanisms which can help explain such relationships. The perspective of this article which highlights the benefits of neuroscience to social work and vice versa is very useful. It helps to not disqualify or ignore the contributions both disciplines can provide each other.

Montgomery (2013) supported the need for clinical social work interventions to incorporate recent neuroscience findings (Montgomery, 2013). The author highlighted the advancement of brain-imagining technology from “the decade of the brain”, which now, allows clinicians to use evidence-based

measurements to test left hemisphere (Cognitive) and right hemisphere (Affective/Emotion) brain functions. Furthermore, the researcher used neuroscience discoveries to explain psychodynamic concepts and illustrate the benefit it has for social work practice. According to the author, the regulation of affect involves an important arousal system in the brain and body called the autonomic nervous system (ANS).

An example of the connection between ANS arousal difficulties and psychopathology are personality disorders. Schizoid personality disorder unconsciously attempts to sustain low levels of arousal, whereas, histrionic personality disorder attempts to maintain higher levels of arousal (Montgomery, 2013). This information is critical for clinicians when working with clients with personality disorders. For clients with schizoid personality disorder, an intervention must be used to elevate the affect and mood (use of sympathetic branch) and for the client with histrionic personality disorder, clinicians will need to attempt to lower the affect (use of the parasympathetic branch). As shown, such neuroscience findings can enhance clinicians' understanding of personality disorders to develop interventions and advance social work practice.

Wojtalik, Eack, Smith & Keshavan (2018), reviewed practical ways in which neuroimaging methods can help identify individuals who are at risk for mental illness, improve current psychosocial and pharmacological interventions, and personalize approaches to mental health care. In particular, the authors looked at how the area of cognitive neuroscience, which is a sub-division of

neuroscience, informs mental health treatment. The researchers found that neural symptoms are present in the brain years before the onset of mental health conditions, which can be detected through abnormal patterns in brain activation while performing a task, and/or reduced grey matter volumes in regions supporting cognitive functions (Wojtalik, Eack, Smith & Keshava, 2018). This can be used for early detection of people at risk for mental illness and have the potential to make mental health diagnostic models more accurate.

In cognitive neuroscience, Magnetic resonance imaging (MRI) is a technique used to assess the structure and functions of the brain; which produces a high-resolution image that shows grey matter, white matter and cerebrospinal fluid (Wojtalik et al., 2018). According to the authors, this tool can be effective in identifying neural treatment targets for mental health interventions. MRIs provide in vivo measurements of brain function and structure during mental health treatments, which allows them to understand the neurobiological mechanisms of mental illness and thus, create more informed interventions through a bio-psycho-social approach.

Moreover, the researchers proposed that using cognitive neuroscience research could personalize mental health treatment. As mentioned, neuroimaging instruments give more insight about a person's neurobiology; therefore, this can help practitioners select proper treatment protocols the first time that work quicker for clients. For example, in a case of early phases of schizophrenia, having greater amount of cortical gray matter (the outermost layer

of gray matter in the brain) at the start of cognitive remediation (method used to improve cognitive function) was associated with an accelerated improvement in social cognition (Wojtalik et al., 2018). Knowing this information, with the use of MRIs could help practitioners present these interventions to similar clients and personalize the treatment to make it more effective.

Theories Guiding Conceptualization

In 1968, an Australian biologist named Ludwig von Bertalanffy introduced the General systems theory which could be universally applied to many fields. The general systems theory emphasized that a system is a complex of interacting elements and that they are open to and interact with their environments (Bertalanffy, 1968). The basic assumption of this theory is that systems have elements with their own function and structure, which come together to from a whole; and when one element changes, it creates change in other parts of the system. The assumptions of this theory can help social work explain mental illness through a bio-psycho-social approach which shows how all three elements interact with each other to create a sum or outcome. In addition, the general systems theory aims to develop generally applicable concepts, as opposed to concepts specific to one field of knowledge (Bertalanffy, 1968). Which aligns with one underlying intention of this study, to integrate neuroscience with social work to create broadly applicable concepts and enhance the conceptualization of mental illness.

## Summary

Despite the neuroscientific advances presented in this chapter, neuroscientists do not completely understand the brain given that it's the most complex organ in the human body. In fact, researchers claim that an adult human brain is estimated to contain 100 billion neurons, which is comparable to the number of stars in the milky way galaxy (Wojtalik, Eack, Smith & Keshavan (2018). This helps illustrate the complexity of the brain and how much we still need to learn. However, with the advances of brain imaging technologies and new findings related to mental health, social work must begin to introduce neuroscience material into curriculums to open areas of inquiry between both disciplines and gain a greater understanding of mental health.

# CHAPTER THREE

# METHODS

## Introduction

This study evaluated social work students' opinions about integrating neuroscience findings and research into social work education. The preceding paragraphs demonstrate the plan utilized to conduct the research, as illustrated by the following sections: Study design, sampling, procedures, data collection and instruments, protection of human rights, data analysis and summary.

## Study Design

There is limited research linking neuroscience and social work as a multidisciplinary approach to increase understanding of how biological, social, and psychological mechanisms contribute to mental illness. The concept appears credible and extremely beneficial in theory, but the process of translating neuroscientific literature into social work curriculums has been stagnant. However, other social sciences like psychology have found common ground with neuroscience, as evident by the extensive literature that exist. Therefore, the barriers that have not allowed neuroscience to integrate into social work education must be explored.

Since this phenomenon is a contemporary issue in the social work community, it was recommended and most appropriate to engage in exploratory research. Given the nature of this type of research, where the purpose is to

explore or become familiar with the basic facts, people and concerns involved- it clearly aligned with the objectives of this study (Grinnell, & Unrau, 2018). After all, the cause of resistance for integrating neuroscience research into social work education is not clear and the goal was to find out what is occurring. In addition, exploratory research is utilized to develop techniques and provide direction for future research (Grinnell, & Unrau, 2018), which this study provided (a section in chapter five will include recommendations for future research).

The study followed a quantitative design since it was more feasible given the distinct features, which include a low cost, ability for larger sample size and simpler measuring instruments. Therefore, the study did not cause financial hardship on the researcher since an online survey was implemented at no cost. Secondly, a quantitative design allowed for more social workers to participate in the study. And lastly, the researcher was not present during data collection and the data was sent directly to Qualtrics, which required less energy on behalf of the researcher, and helped maintain participant confidentiality.

Sampling

A non-probability sampling approach was implemented in this study since the topic is specific in nature, and it required individuals with unique qualifications. The researcher recruited participants from different universities. In order to meet the criteria, participants were required to be in a bachelor's or master level social work program. Moreover, the desired number of participants for this study was 100; however, there were 73 responses and only 49 surveys

were accepted because the other 24 surveys were incomplete. The sample pool was intended to be diverse with students from different universities and different levels of education to be representative of social work students. This was imperative, given the aim of the study to evaluate the general opinions of social work students about integrating neuroscience into social work education.

Data Collection and Instruments

As mentioned, dialogue revolving neuroscience and social work is not common, and thus, lacks an established instrument to measure the intended variables pertaining to this study. Therefore, quantitative data was collected on a questionnaire; in which, the researcher developed Likert rating scale with closed-ended questions. In addition, a pretest was developed by the researcher containing basic information about neuroscience. This allowed the researcher to evaluate different domains which include, the opinions of social work students about integrating neuroscience research into social work curriculums and social work students' current degree of knowledge in neuroscience. The researcher worked alongside the appointed supervisor to ensure survey items had a high level of validity, however, some items required constant modifications and/or removal from the study. A pilot test was conducted to test the questions created by the researcher before the survey was distributed to social workers students.

The data collection was carried out through the survey platform called Quatrics provided by the researcher's university. This feature, which is available to all students, provided the researcher with an inexpensive form of data

collection, which was easy to navigate when creating the survey and sending it to potential participants. Secondly, this allowed participants to complete the survey on their time, and they had the opportunity to answer the questions more truthfully- since the researcher was not present to influence answers. For this study, the elimination of interview bias was significant to the findings, because the intent of this exploratory study was to evaluate what social workers know about neuroscience, and what their opinion is about integrating neuroscience into social work education.

Procedures

Firstly, the researcher sent an e-mail to the directors of the social work programs at various universities, requesting permission to involve both bachelor and master level social work students in the study. The email included the purpose of the study, procedural steps to carry out the research, and information about participant confidentiality. Once the researcher received approval on behalf of social work program directors, and IRB approval (reference Appendix C) a research flyer was created (reference Appendix D). The survey was created on Qualtrics and disseminated in multiple methods, the research flyer containing the link of the survey was posted on a GroupMe with social work students and e-mailed to other social work students from various universities. Once students agreed to participate, an email was sent with an Informed consent letter, which included information about participation in the study, along with the questionnaire and information about confidentiality.

To heighten response rates, four $50 gift cards from amazon were raffled to the entire group as a reward for completing the survey. The hope was that a gift card served as a small, yet significant motivator for respondents. In addition, emails were sent to students from various universities. In person or face to face meetings, were not required given the Covid-19 emergency, but the researcher did include personal contact information and research supervisor's contact information. However, participants did not have any questions and/or concerns but they were offered the option to email and/or meet in a private meeting (via zoom or Microsoft teams) with researcher, if they needed to. Once the desired number of surveys were gathered the next step was data analysis.

Protection of Human Subjects

To ensure the privacy of all participants, no identifying personal information (e.g., name, address, or student ID etc.,) was collected; Instead, subjects were assigned a number. However, e-mails were gathered to contact participants for the raffle, but the information was stored in a safe excel sheet. The researcher kept the excel sheet in his personal laptop, which required a password to access and once the data collection was finalized the file was deleted. Additionally, the inform consent letter described the entire process of the study and required consent on behalf of participants before taking the survey. During data collection, no participants requested to meet with the researcher for questions and/or concerns about the survey. Therefore, no Zoom, Microsoft teams' meetings, and/or private telephone calls were held.

## Data Analysis

Data collection began in December of 2021 and ended in March of 2022. Participants completed an online survey on Qualtrics, which allowed the researcher to store data before analyzing it on a different software. The study aimed to evaluate social workers' level of knowledge in neuroscience and assess social work students' opinions of integrating neuroscience into social work education. The collected data was analyzed using the statistical analysis program IBM SPSS Statistics 28.

The researcher used descriptive statistics for demographic variables which included, age, gender, race and education level. Further, descriptive statistics were utilized to measure frequencies of variables from both instruments to provide informative and summarized data sets. The frequencies in the Pre-test of neurosciences counted the number of times participants answered True, False or Don't know. Whereas, in the Likert rating scale questions, the frequency distributions scored how many times students answered: Strongly agree, Somewhat agree, Neither agree or disagree, Somewhat disagree and Strongly disagree.

## Summary

This study explored the knowledge levels of social work students in neuroscience and evaluated social work students' opinions about integrating neuroscience into social work education. The data that was collected on Qualtrics and analyzed through SPSS, helped the researcher identify discoveries

and draw conclusions. Such findings will be further explored in the following chapters.

# CHAPTER FOUR

# RESULTS

## Introduction

In this chapter, the data gathered from the surveys will be presented. This quantitative study was conducted to explore the level of knowledge social work students have in the area of neuroscience; and to investigate the opinions of social work students about integrating neuroscience research into social work learning. For this study, data collection began in December of 2021 and ended in March of 2022. The demographic characteristics of participants will be presented first, following an overview of the survey questions, which are divided into two sections: Pre-test of Neuroscience and Likert Rating Scale questions.

### Demographics

Participants consisted of forty-nine (n = 49) social work students. Thirty-eight (77.6%) of social work students were in a master's program and eleven (22.4%) were in a bachelor's program. A total of thirty (61.2%) respondents were female, eighteen (36.7%) identified as male, and one (2.0%) reported a non-binary status. Participants ranged from 18 to 65 years of age, with a mean age of 30.44. In table 1, the results indicate that 28.6% of participants reported an age from 18-24; the largest group of respondents, which is 38.8% reported ages from 25-34; whereas 18.4% of participants claimed an age between 35-44; and, lastly, 14.3% of individuals reported to be between the ages of 45-54.

In terms of categorical differences in race, the table shows that 46.9% of respondents were Hispanic/Latino, 28.6% of participants reported a Caucasian/White background, whereas 10.2% claimed an Asian background, and another, 10.2% of participants reported African American, and lastly, two individuals or 4.1% reported other.

Table 1: Participant Demographics

| *Variables* | *n* | *%* |
|---|---|---|
| Age | | |
| Under 18 | | |
| 18-24 years old | 14 | 28.6 |
| 25-34 years old | 19 | 38.8 |
| 35-44 years old | 9 | 18.4 |
| 45-54 years old | 7 | 14.3 |
| 55-64 years old | | |
| 65+ years old | | |
| Race | | |
| African American | 5 | 10.2 |
| Asian | 5 | 10.2 |
| Hispanic/Latino | 23 | 46.9 |
| Caucasian/White | 14 | 28.6 |
| Other | 2 | 4.1 |
| Gender | | |
| Male | 18 | 36.7 |
| Female | 30 | 61.2 |
| Non-binary | 1 | 2.0 |
| Prefer not to say | | |
| Education | | |
| BSW | 11 | 22.4 |
| MSW | 38 | 77.6 |
| Total | 49 | |

## Pre-Test of Neuroscience

One of the aims of this study was to gauge the level of knowledge social work students possess in neuroscience. Since the topic is new, limited research articles exist that encourage cross-disciplinary collaborations between social work and neuroscience. Therefore, the researcher created the following instrument with questions of basic neuroscience information and modified it along the process from feedback of research supervisor. All the information used to formulate the questions was retrieved from Rosemary Farmer's (2008) book, *Neuroscience and Social Work Practice: The Missing Link.*

Neuroscience is the study of the brain and nervous system?

The first question defined neuroscience, as the study of the brain and nervous system (Farmer, 2008). There are more sophisticated definitions of neuroscience; however, social work students do not have an extensive background in biology. Therefore, a simple definition with the two major components of neuroscience satisfied the requirement. The correct answer for this question was: True. Table 2 shows that all forty-nine participants answered the first question, and 81.6% (n=40) received a correct score, and 18.4% (n=9) failed to answer this question correctly.

A typical human brain weighs about 3 pounds.

According to Farmer (2008) a typical human brain weighs about three pounds and it's made up of soft tissue which includes gray and white matter. To be fair, question two only tested social work students on one component of the

brain's composition. The correct answer for this question was: True. In this section, 59.2% (n=29) of social work students answered correctly, 28.6% (n=14) failed to answer correctly, and 12.2 (n=6) participants reported "don't know".

Neuroplasticity is the brains' ability to make neural connections and evolve in response to life experiences.

Researchers have discovered the brain's ability to change and adapt as a result of life experiences, and is a term neuroscientist call neuroplasticity (Farmer, 2008). This concept describes how the brain develops from infancy to adulthood and how it can recover from brain injuries. The correct answer for this question was: True. For this section, 57.1% (n=28) of social work students received a correct score, 26.5% (n=13) of students answered incorrectly, and 16.3% of students reported "Don't Know".

The amygdala is primarily involved in the processing of emotions and memories associated with fear.

The amygdala regulates emotion and encodes memories, such as anger, fear, and sadness (Famer, 2008). This allows humans to remember emotional events from the past, which can help individuals recognize similar events in the future. In this question, social work students were tested on the function of the amygdala. The correct answer for this question was: True. Out of Forty-nine participants (n=49), forty-seven (n=47) students answered this question: 67.3% (n=33) received a correct score, 18.4% (n=9) answered incorrectly, 10.2% (n=5) claimed "Don't know and 4.1% (n=2) of social work students did not participate in

this question.

The amygdala is in the frontal lobe.

The amygdala is located deep in the temporal lobes and has an almond shape (farmer, 2008). This question was introduced to evaluate if social work students understood the structure of the brain and where the amygdala was located. The correct answer for this question was: False. In this section, 53.1% (n=26) of participants answered correctly, 22.4% (n=11) of students received an incorrect score, and 24.5% (n=12) reported “don’t know).

The central nervous system is made up of the brain and spinal cord.

The central nervous system (CNS) is comprised of the brain and spinal cord, which performs functions like receiving sensory information, processing information then sending out motor signals (Farmer, 2008). For this question the correct answer was: True. In this section, 65.3% (n=32) of social work students received a correct score, 24.5% (n=12) participants failed to answer correctly, and 10.2% (n=5) students reported “Don’t know”.

In general, the right hemisphere or side of the brain is responsible for speech.

The right hemisphere or right side of the brain is responsible for some cognitive functions that include attention, thoughts and emotions (Farmer, 2008). For this question the correct answer was: False. in this section, 40.8% (n=20) of participants answered incorrectly, 34.7% (n=17) of students received a correct score, and 24.5% (n=12) reported “Don’t know).

Table 2: Neuroscience Pre-test

| Variables | n | % |
|---|---|---|
| Neuroscience is the study of the brain and nervous system? | | |
| True | 40 | 81.6 |
| False | 9 | 18.4 |
| Don't Know | | |
| A typical human brain weighs about 3 pounds. | | |
| True | 29 | 59.2 |
| False | 14 | 28.6 |
| Don't Know | 6 | 12.2 |
| Neuroplasticity is the brains' ability to make neural connections and evolve in response to life experiences. | | |
| True | 28 | 57.1 |
| False | 13 | 26.5 |
| Don't Know | 8 | 16.3 |
| The amygdala is primarily involved in the processing of emotions and memories associated with fear. | | |
| True | 33 | 67.3 |
| False | 9 | 18.4 |
| Don't Know | 5 | 10.2 |
| Missing | 2 | 4.1 |
| The amygdala is in the frontal lobe? | | |
| True | 11 | 22.4 |
| False | 26 | 53.1 |
| Don't Know | 12 | 24.5 |
| The central nervous system is made up of the brain and spinal cord. | | |
| True | 32 | 65.3 |
| False | 12 | 24.5 |
| Don't Know | 5 | 10.2 |
| In general, the right hemisphere or side of the brain is responsible for speech. | | |
| True | 20 | 40.8 |
| False | 17 | 34.7 |
| Don't Know | 12 | 24.5 |

In general, the left hemisphere or side of the brain is responsible for emotion

The left hemisphere or right side of the brain is responsible for speech (Farmer, 2008). For this question the correct answer was: False. in this section, 42.9% (n=21) of participants answered incorrectly, 26.5% (n=13) of students received a correct score, 28.6% (n=14) reported “Don’t know”, and 2.0% (n=1) of respondents did not participate in this question.

Low levels of dopamine can be linked to depression

Studies have shown that individuals with low levels of dopamine, feel less motivated and excited about things, and are more likely to suffer from depression (farmer, 2008). For this question the correct answer was: True. In this section, 59.2% (n=29) of participants answered correctly, 26.5% (n=13) of students answered incorrectly, and 14.3% (n=7) reported “Don’t know”.

The sympathetic nervous system functions like a gas pedal in a car. It triggers the fight or flight response, providing the body with a burst of energy so that it can respond to perceived challenges.

The sympathetic nervous system activates the flight or fight response during a perceived threat or danger, which allows the body to respond (Farmer, 2008). For this question the correct answer was: True. in this section, 61.2% (n=30) of participants received a correct score, 20.4% (n=10) of students answered incorrectly, and 18.4% (n=9) reported “Don’t know”.

Table 3: Neuroscience Pre-test (continued)

| Variables | n | % |
|---|---|---|
| *In general, the left hemisphere or side of the brain is responsible for emotion.* | | |
| True | 21 | 42.9 |
| False | 13 | 26.5 |
| Don't Know | 14 | 28.6 |
| Missing | 1 | 2.0 |
| *Low levels of dopamine can be linked to depression.* | | |
| True | 29 | 59.2 |
| False | 13 | 26.5 |
| Don't Know | 7 | 14.3 |
| *The sympathetic nervous system functions like a gas pedal in a car. It triggers the fight or flight response, providing the body with a burst of energy so that it can respond to perceived challenges.* | | |
| True | 30 | 61.2 |
| False | 10 | 20.4 |
| Don't Know | 9 | 18.4 |

## Likert Rating Scale Questions

The primary goal of this research project was to assess the opinions of social work students about integrating neuroscience into social work education. In the following section, the instrument created to collect data about the opinions of social work students will be presented. The researcher created questions to measure how social work students believed neuroscience research could enhance their learning in four areas: Childhood trauma, human behavior,

substance abuse, and psychotherapy. Since these topics are common within the sphere of social work, it was important to evaluate if neuroscience could enhance learning. In addition, the instrument measured perceived difficulty/challenges in leaning about neuroscience; perceived benefits and advantages; and measured student interest levels in learning about neuroscience

This section will provide the scores for each question. In **question One**, "*As a social worker student neuroscience can enhance my learning in Childhood trauma*", social work students scored, 44.9% (n=22) for Strongly Agree, 38.8% (n=19) for Somewhat Agree, 12.2% (n=6) for Neither agree nor disagree, 4.1% (n=2) for Somewhat disagree, and missing scores for Strongly disagree. In **question Two**, "*As a social worker student neuroscience can enhance my learning in human behavior*", social work students scored, 53.1% (n=26) for Strongly Agree, 34.7% (n=17) for Somewhat Agree, 10.2% (n=5) for Neither agree nor disagree, 2.0% (n=1) for Somewhat disagree, and missing scores for Strongly disagree.

**In question Three**, "*As a social worker student neuroscience can enhance my learning in substance abuse*", social work students scored, 59.2% (n=29) for Strongly Agree, 30.6% (n=15) for Somewhat Agree, 6.1% (n=3) for Neither agree nor disagree, 2.0% (n=1) for Somewhat disagree, and 2.0% (n=1) for Strongly disagree. **In question Four**, "*As a social worker student neuroscience can enhance my learning in psychotherapy*", social work students scored, 38.8% (n=19) for Strongly Agree, 49.0% (n=24) for Somewhat Agree,

6.1% (n=3) for Neither agree nor disagree, 4.1% (n=2) for Somewhat disagree, and 2.0% (n=1) for Strongly disagree.

**In question Five**, "*As a social worker student neuroscience does not offer any advantage to me*", social work students scored, 2.0% (n=1) for Strongly Agree, 16.3% (n=8) for Somewhat Agree, 12.2% (n=6) for Neither agree nor disagree, 22.4% (n=11) for Somewhat disagree, and 44.9% (n=22) for Strongly disagree. **In question Six**, "*Learning about neuroscience is interesting*", 36.7% (n=18) for Strongly Agree, 30.6% (n=15) for Somewhat Agree, 16.3% (n=8) for Neither agree nor disagree, 16.3% (n=8) for Somewhat disagree, and scores were reported for Strongly disagree**. In question Seven**, "*Learning about neuroscience will benefit my career*", social work students scored, 36.7% (n=18) for Strongly Agree, 36.7% (n=18) for Somewhat Agree, 16.3% (n=8) for Neither agree nor disagree, 8.2% (n=4) for Somewhat disagree, and 2.0% (n=1) for Strongly disagree.

**In question Eight**, "*Learning about neuroscience requires too much effort*", social work students scored, 22.4% (n=11) for Strongly Agree, 40.8% (n=20) for Somewhat Agree, 22.4% (n=11) for Neither agree nor disagree, 14.3% (n=7) for Somewhat disagree, and no scores were recorded for Strongly disagree. **In question Nine**, social work students scored, 30.6% (n=15) for Strongly Agree, 46.9% (n=23) for Somewhat Agree, 16.3% (n=8) for Neither agree nor disagree, 4.1% (n=2) for Somewhat disagree, and 2.0% (n=1) for

Strongly disagree. **In question Ten**, "*Neuroscience is easy to learn*", social work students scored, 2.0% (n=1) for Strongly Agree, 6.1% (n=3) for Somewhat Agree, 22.4% (n=11) for Neither agree nor disagree, 40.8% (n=20) for Somewhat disagree, and 28.6% (n=14) for Strongly disagree. **In question Eleven** "*Integrating neuroscience material into social work curriculums will be overwhelming*", social work students scored, 20.4% (n=10) for Strongly Agree, 44.9% (n=22) for Somewhat Agree, 22.4% (n=11) for Neither agree nor disagree, 8.2% (n=4) for Somewhat disagree, and 4.1% (n=2) for Strongly disagree.

Table 4: Likert Rating Scale Questions

| *Variables* | *n* | *%* |
|---|---|---|
| As a social worker student neuroscience can enhance my learning in childhood trauma. | | |
| Strongly Agree | 22 | 44.9 |
| Somewhat Agree | 19 | 38.8 |
| Neither agree nor disagree | 6 | 12.2 |
| Somewhat disagree | 2 | 4.1 |
| Strongly disagree | | |
| As a social worker student neuroscience can enhance my learning in human behavior. | | |
| Strongly Agree v | 26 | 53.1 |
| Somewhat Agree | 17 | 34.7 |
| Neither agree nor disagree | 5 | 10.2 |
| Somewhat disagree | 1 | 2.0 |
| Strongly disagree | | |
| As a social worker student neuroscience can enhance my learning in substance abuse. | | |
| Strongly Agree | 29 | 59.2 |
| Somewhat Agree | 15 | 30.6 |
| Neither agree nor disagree | 3 | 6.1 |
| Somewhat disagree | 1 | 2.0 |
| Strongly disagree | 1 | 2.0 |
| As a social worker student neuroscience can enhance my learning in psychotherapy. | | |
| Strongly Agree | 19 | 38.8 |
| Somewhat Agree | 24 | 49.0 |
| Neither agree nor disagree | 3 | 6.1 |
| Somewhat disagree | 2 | 4.1 |
| Strongly disagree | 1 | 2.0 |
| As a social worker student neuroscience does not offer any advantage to me. | | |
| Strongly Agree | 1 | 2.0 |
| Somewhat Agree | 8 | 16.3 |
| Neither agree nor disagree | 6 | 12.2 |
| Somewhat disagree | 11 | 22.4 |
| Strongly disagree | 22 | 44.9 |

| *Variables* | *n* | *%* |
|---|---|---|
| Learning about neuroscience is interesting. | | |
| Strongly Agree | 18 | 36.7 |
| Somewhat Agree | 15 | 30.6 |
| Neither agree nor disagree | 8 | 16.3 |
| Somewhat disagree | 8 | 16.3 |
| Strongly disagree | | |
| Learning about neuroscience will benefit my career. | | |
| Strongly Agree | 18 | 36.7 |
| Somewhat Agree | 18 | 36.7 |
| Neither agree nor disagree | 8 | 16.3 |
| Somewhat disagree | 4 | 8.2 |
| Strongly disagree | 1 | 2.0 |
| Learning about neuroscience requires too much effort. | | |
| Strongly Agree | | |
| Somewhat Agree | 11 | 22.4 |
| Neither agree nor disagree | 20 | 40.8 |
| Somewhat disagree | 11 | 22.4 |
| Strongly disagree | 7 | 14.3 |
| Neuroscience is difficult to learn. | | |
| Strongly Agree | 15 | 30.6 |
| Somewhat Agree | 23 | 46.9 |
| Neither agree nor disagree | 8 | 16.3 |
| Somewhat disagree | 2 | 4.1 |
| Strongly disagree | 1 | 2.0 |
| Neuroscience is easy to learn. | | |
| Strongly Agree | 1 | 2.0 |
| Somewhat Agree | 3 | 6.1 |
| Neither agree nor disagree | 11 | 22.4 |
| Somewhat disagree | 20 | 40.8 |
| Strongly disagree | 14 | 28.6 |
| Integrating neuroscience material into social work curriculums will be overwhelming. | | |
| Strongly Agree | 10 | 20.4 |
| Somewhat Agree | 22 | 44.9 |
| Neither agree nor disagree | 11 | 22.4 |
| Somewhat disagree | 4 | 8.2 |
| Strongly disagree | 2 | 4.1 |

## Summary

The chapter reported participant demographics which included age, race, education level and gender. In addition, the Pre-test of neuroscience and Likert Rating Scales questions were introduced, along with the scores from participants. The researcher's assumption that most participants would score low on the pre-test, resulted false and social work students showed positive opinions about integrating neuroscience research into social work education. The next chapter will further explore the most salient findings and provide more insight and direction for future research.

# CHAPTER FIVE

# DISCUSSION

## Introduction

This chapter will present a discussion about the research findings from the results section. In addition, this chapter will cover the limitations experienced during the research process, some implications for social work and future recommendations for research. Overall, the study provided greater insight of social work students' opinions about integrating neuroscience into social work education.

## Discussion

### Childhood Trauma

The study found that 83.6% (n=41) of social work students agreed that neuroscience research could enhance their learning in the area of childhood trauma. This confirms the importance of neuroscience research to further understand childhood trauma in the field of social work, and particularly, child welfare. In social work, the child welfare system engages with children and adults who have experienced adversity and trauma on an everyday basis (Bunting et al., 2019). In fact, no other child-serving system encounters a higher percentage of service users with trauma histories, whether it be in family support, child protection, foster, kinship or residential care (Bunting et al., 2019). As a result,

the child welfare system has developed various practice and training models to become more trauma informed. Studies have discovered that childhood trauma has major implications for mental health in adulthood and can affect neurobiology.

In the Adverse Childhood Experiences (ACE) study, researchers discovered that adverse events in childhood were associated with multiple risk factors in adulthood that could lead to death (Felitti et al., 1998). Moreover, the ACE study found that childhood trauma disrupted neurological development in the hippocampus, and amygdala (Herzog & Schmahl, 2018). Neuroimaging findings found that individuals with a history of childhood maltreatment experience hyperactivity in the amygdala; and, had a reduction in volume of the hippocampus compared to non-maltreated individuals (Herzog & Schmahl, 2018). Such findings underscore the importance of neuroscience research in social work education to enhance student's learning in the area of childhood trauma.

Human Behavior

Nationally, social work programs (BSW and MSW) are required by the Council on Social Work Education (CSWE) to prepare students to acquire mastery in nine educational competencies (CSWE, 2015). In competency seven of the Educational Policy and Accreditation Standards (2015) social work students must demonstrate knowledge of human behavior and the social environment when assessing individuals, families, groups, organizations and

communities (EPAS, 2015). Such requirements must be satisfied, in order, for students to graduate from an accredited social work institution. In the current study, 87.7% (n= 43) of social work students agreed that neuroscience benefited their leaning in the subject of human behavior. Which might imply, that incorporating neuroscience findings into Human Behavior in the Social Environment (HBSE) courses, could help students obtain mastery in EPAS's (2015) competency seven.

Historically, social work theories have sought to conceptualize human behavior (e.g., attachment theory, social learning theory, Piaget's theory of cognitive development, and Erikson's stages of psychosocial development etc.,) but despite, all the available theoretical perspectives, human behavior is not completely understood. This might prompt further research to include biological components that influence behavior, to further social work's understanding of human behavior.

Substance Abuse

When observing results, 89.7% (n=44) of social work students within the study agreed that neuroscience research had the potential to enhance their understanding of substance abuse. Although, substance abuse disorders result from social and psychological factors, research findings have discovered that neurobiology also plays a big role in addiction. According to the U.S. Department of Health and Human Services (2016), substance use disorders result from changes in the brain that can occur with repeated use of alcohol or drugs.

Moreover, addiction is associated with changes in the function of brain circuits involved in pleasure (the reward system), learning, stress, decision making, and self-control (HHS, 2016).

The nucleus accumbens (NAc) known as the brains' reward system is a major source of pleasurable feelings, which releases dopamine and influences individuals' motivation and effort (Salgado & Kaplitt, 2015). Since dopamine lies at the center of the drug reward system and addictive drugs increase dopamine levels, users get stuck in an endless cycle of "chasing a high" and thus, becoming addicted. Viewing this issue through a neurobiological perspective can potentially reduce stigma and shame surrounding addiction. After all, research shows that users continuously chase euphoric effects, due to brain alterations that override decision making and influence behavior. This might suggest that more neuroscience research is needed in social work curriculums to, (1.) understand the neurobiology of substance abuse and addiction, and (2.) to reduce stigma and encourage more clients struggling with substance use disorders to seek treatment.

Psychotherapy

There are many types of psychotherapy, each with its own approach geared towards different clients; however, in this section the term 'psychotherapy' will be used in a general form to describe treatment for mental health problems (Mayo Clinic, 2016). Given the uprise of mental illness that occurred, as a result of Covid-19, and social work's huge responsibility to treat

mental health issues in the United States. Psychotherapies in social work must continue to develop and increase efficacy for client treatment and recovery. Results from this study indicate that 87.7% (n=43) of social work students agreed that neuroscience could enhance their learning in psychotherapy. This justifies the importance of including neuroscience research in social work education to improve psychotherapies and better prepare students to treat clients struggling with mental illness. To demonstrate this, an example of MSW students and alumni will be presented to show how a neuroscience-informed model was successfully implemented in practice with clients who endured developmental trauma.

Mason and colleagues (2020) introduced the Neurosequential Model of Therapeutics (NMT) to show how a client's neurobiological functioning may have been impacted by developmental trauma to inform intervention selection and sequencing (Mason et al., 2020). The NMT was intended to be a decision-making tool to guide students, when assessing for the best treatment interventions for clients who suffered from trauma. The model allowed clinicians (or students) to recognize the areas of the brain with significant disorganization, which then guided students to select appropriate interventions to target these vulnerable areas (Mason et al., 2020). The researchers found that students' perceptions of client behaviors changed (increased empathy), added legitimacy to intervention choices and increased students' confidence in educating others about trauma-related symptoms (Mason

et al., 2020). Although, some limitations and challenges did exist, the NMT demonstrates how neuroscientific models can assist social work in practice, to treat clients with mental health issues.

Learning Neuroscience

The main goal of this study was to evaluate social work students' opinions about integrating neuroscience into social work education. To measure this variable, and meet the study's objective, the research created various questionnaire items to assess student opinions (both positive and negative). Firstly, interest levels were investigated to measure how much interest social work students had about learning neuroscience material. The study found that 67.3% (n=33) of social work students agreed that learning about neuroscience was interesting. This might suggest that social work students would engage with neuroscience literature, since it appears appealing to them.

Moreover, when observing the perceived benefits neuroscience can have for student's careers. Findings discovered that 73.4% (n=36) of social work students agreed that learning about neuroscience could benefit their career. Which underscores the importance of including neuroscience into social work curriculums, to prepare students with more versatile skills sets that can be used in practice and lead to career success. Conversely, learning about neuroscience also posed challenges for social work students. The study discovered that 63.2% (n=31) of social work students agreed that learning about neuroscience required too much effort. This helps explain the resistance that exists to integrate

neuroscience into social work education and could inform the process of creating easier methods of learning that do not require much effort.

Furthermore, 65.3% (n=32) of social work students agreed that integrating neuroscience material into social work curriculums would be overwhelming, which provides further clarity on the resistance that exists on behalf of social work. Social work students have busy schedules and multiple school responsibilities, these findings might suggest that social work programs do not want to further complicate student lives- and make it more overwhelming for them. Overall this section provided greater insight on the challenges of integrating neuroscience into social work education, both positive and negative opinions were essential and can be used to inform further research.

## Limitations

Although, the researcher managed to recruit 49 participants, the study could have benefited from a larger sample size. In order to further explore the opinions of social work students, and conduct exploratory research, a larger pool of respondents is required to generalize findings. Results did include students from multiple universities, but most of the respondents were from one specific university (name confidential). Therefore, the results failed to represent the opinions of all social work students across all universities. However, the findings were quite interesting and made a good attempt to represent the opinions of social work students.

In addition, the topic concerning an integration of neuroscience research into social work education is new, and thus, lacks extensive literature and research to reference from. There were no evidence-based instruments available to measure the opinions of social work students on the given topic, as a result, the researcher had to create a Pre-test and Likert rating scale with questions. Which posed an issue of validity, and whether the created questionnaire items measured the intended variables. However, the instruments were approved by the research supervisor and still managed to collect the intended results.

Furthermore, data analysis only consisted of descriptive statistics, which measured frequencies for different variables. The data collected could have prompted additional methods of data analysis, to gain greater insight on the issue. However, for this exploratory study the techniques used satisfied the requirement. Lastly, most neuroscience articles contained scientific terms and concepts that were difficult to interpret and apply to the field of social work. Therefore, much effort was exerted attempting to grasp neuroscientific concepts and searching up neurobiological definitions.

## Implications for Social Work

The findings in this research suggest that integrating neuroscience research and literature, into social work curriculums will be challenging. In fact, 77.5% (n=38) of social work students agreed that it would be difficult to learn about neuroscience. Which further implies why social work has been hesitant to

incorporate these findings into curriculums and practice. However, despite these barriers, the study has also provided a plethora of beneficial outcomes that can result from this integration. Therefore, the lack of biology, particularly neuroscience in social work education must not be ignored, and efforts must take place to bridge such gap.

Future research must focus on translating neuroscience material into social work literature, in a manner that is easier to understand and apply. This could potentially assist to reduce feelings of discomfort that social work students experience when presented with this material. Afterall, many students reported that it would be overwhelming, difficult and would require too much effort to learn about neuroscience. However, students also showed great interest in learning about neuroscience, they identified the value of acquiring such knowledge for their careers and recognized the use of neuroscience when trying to conceptualize different social work concepts. Though it would be difficult to include neuroscience, students did acknowledge that such integration could benefit social work education, practice and research.

As shown, more emphasis on biological factors can promote a true holistic approach in social work and increase knowledge about mental health through a bio-psycho-social perspective. The profession's core values and educational core competencies, obligate social workers to promote wellbeing in vulnerable populations, with the knowledge and skills acquired through experience and education. Therefore, it's our ethical responsibility to use the available research

in neuroscience, to improve social work education, practice and training. This would position the field of social work to better treat clients and possibly reduce the rates of mental illness, that currently exist in the United States and around the world.

## Conclusion

The study sought to assess social work student's opinions about integrating neuroscience into social work education and gauge the level of knowledge social work students possessed in the area of neuroscience. Findings indicated that social work students perceived this integration as challenging but acknowledged the beneficial outcomes for social work education. Moreover, social work students showed higher levels of knowledge in neuroscience concepts from the results of the Neuroscience Pre-test, which was unexpected. Overall, the literature presented in this study served to bring awareness to the utility of neuroscience research not just in social work education, but in practice and research. Furthermore, the students' opinions allowed the researcher to explore the resistance that exists in social work and provide literature for future research.

# APPENDIX A

# SURVEY QUESTIONNAIRE

How old are you?

- ◯ Under 18
- ◯ 18-24 years old
- ◯ 25-34 years old
- ◯ 35-44 years old
- ◯ 45-54 years old
- ◯ 55-64 years old
- ◯ 65+ years old

What ethnicity do you identify with?

- ◯ African American
- ◯ Asian
- ◯ Hispanic/Latino
- ◯ Caucasian/White
- ◯ Other

How do you describe yourself?

- ◯ Male
- ◯ Female
- ◯ Non-binary
- ◯ Prefer not to say

Current social work program?

- ◯ BSW program
- ◯ MSW program

**Questionnaire items**

This section will measure social work students' knowledge of Neuroscience.

*Directions: Indicate whether each claim is true, false, or don't know.*

1. Neuroscience is the study of the brain and nervous system?

True False Don't Know

2. A typical human brain weighs about 3 pounds?

True False Don't Know

3. Neuroplasticity is the brains' ability to make new neural connections and evolve in response to life experiences?

True False Don't Know

4. The amygdala is primarily involved in the processing of emotions and memories associated with fear?

True False Don't Know

5. The amygdala is in the frontal lobe?

True False Don't Know

6. The central nervous system is made up of the brain and spinal cord?

True False Don't Know

7. In general, the right hemisphere or side of the brain is responsible for speech?

True False Don't Know

8. In general, the left hemisphere or side of the brain is responsible for emotion.

True False Don't Know

9. Low levels of dopamine can be linked to depression.

True False Don't Know

10. The sympathetic nervous system functions like a gas pedal in a car. It triggers the fight-or-flight response, providing the body with a burst of energy so that it can respond to perceived dangers.

True False Don't Know

5-point Likert scale: *This section will measure social work student's perception of integrating neuroscience into social work education.*

Directions: Rate your level of agreement with each statement.

| | Strongly disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| As a social work student neuroscience can enhance my learning in childhood trauma | | | | | |
| As a social work student neuroscience can enhance my learning in human behavior | | | | | |
| As a social work student neuroscience can enhance my learning in substance and drug abuse | | | | | |
| As a social work student neuroscience can enhance my learning in Psychotherapy | | | | | |
| As a social work student neuroscience does not offer any advantage to me | | | | | |
| Learning about neuroscience is interesting. | | | | | |
| Learning about neuroscience will benefit me in my career. | | | | | |
| Learning about Neuroscience requires too much effort. | | | | | |
| Neuroscience is difficult to learn. | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Neuroscience is easy to learn. | | | | | |
| Integrating neuroscience material into social work curriculums will be overwhelming. | | | | | |

Participant demographic questions, Neuroscience Pre-test, and Likert rating scale questions were created by Esteban Solis, 2022.

# APPENDIX B

# INFORMED CONSENT

CSUSB
WE DEFINE THE Future
School of Social Work
CALIFORNIA STATE UNIVERSITY, SAN BERNARDINO
5500 University Parkway, San Bernardino, CA 92407
909.537.5501 | fax: 909.537.7029
http://socialwork.csusb.edu

# Informed Consent

The study in which you are being asked to participate is designed to investigate social work students' perception of integrating neuroscience into social work. This study is being conducted by Esteban Solis, a graduate student, under the supervision of Dr. Thomas Davis, Professor in the School of Social Work at CSUSB This study has been approved by the Institutional Review Board at CSUSB.

**PURPOSE:** The purpose of the study is to investigate social work students' perception of integrating neuroscience research into social work.

**DESCRIPTION:** Participants will be asked to answer 21 questions on an online survey that will assess their perception of integrating neuroscience into social work education.

**PARTICIPATION:** Participation in this study is completely voluntary. If subjects decide to participate, they have the option to skip or decline to answer any questions. Now, if the survey causes any discomfort to participants at any time, they may withdraw from the study. There are no consequences for lack of participation.

**ANONYMOUS:** No personal information will be obtained from the participants in the study and all subjects will remain anonymous.

**DURATION:** The duration of the online survey is approximately 5-10 minutes.

**RISKS:** There are no foreseeable risks in completing this survey. Now, if participants feel uneasy or uncomfortable answering any questions, they have the option to skip or quit the study.

**BENEFITS:** There are no direct benefit to subjects participating in the study; however, the findings help influence the social work profession to incorporate neuroscience research.

**CONTACT:** If you have any questions related to the study, please contact Professor, Dr. Thomas Davis at tomdavis@csusb.edu

**RESULTS:** The findings from the study can be obtained by accessing CSUSB's Pfau Library ScholarWork Database at http://schalarworks.lib.csusb.edu/ after July 2022.

_____

Mark X Date

# APPENDIX C

# IRB APRROVAL LETTER

CALIFORNIA STATE UNIVERSITY
SAN BERNARDINO

January 25, 2022

**CSUSB INSTITUTIONAL REVIEW BOARD**
Administrative/Exempt Review Determination
Status: Determined Exempt
IRB-FY2022-102

Thomas Davis Esteban Solis
CSBS - Social Work
California State University, San Bernardino
5500 University Parkway
San Bernardino, California 92407

Dear Thomas Davis Esteban Solis:

Your application to use human subjects, titled "Integrating Neuroscience into Social Work" has been reviewed and determined exempt by the Chair of the Institutional Review Board (IRB) of CSU, San Bernardino. An exempt determination means your study had met the federal requirements for exempt status under 45 CFR 46.104. The CSUSB IRB has weighed the risks and benefits of the study to ensure the protection of human participants.

This approval notice does not replace any departmental or additional campus approvals which may be required including access to CSUSB campus facilities and affiliate campuses. Investigators should consider the changing COVID-19 circumstances based on current CDC, California Department of Public Health, and campus guidance and submit appropriate protocol modifications to the IRB as needed. CSUSB campus and affiliate health screenings should be completed for all campus human research related activities. Human research activities conducted at off-campus sites should follow CDC, California Department of Public Health, and local guidance. See CSUSB's COVID-19 Prevention Plan for more information regarding campus requirements.

You are required to notify the IRB of the following as mandated by the Office of Human Research Protections (OHRP) federal regulations 45 CFR 46 and CSUSB IRB policy. The forms (modification, renewal, unanticipated/adverse event, study closure) are located in the Cayuse IRB System with instructions provided on the IRB Applications, Forms, and Submission webpage. Failure to notify the IRB of the following requirements may result in disciplinary action. The Cayuse IRB system will notify you when your protocol is due for renewal. Ensure you file your protocol renewal and continuing review form through the Cayuse IRB system to keep your protocol current and active unless you have completed your study.

- **Ensure your CITI Human Subjects Training is kept up-to-date and current throughout the study.**
- **Submit a protocol modification (change) if any changes (no matter how minor) are proposed in your study for review and approval by the IRB before being implemented in your study.**
- **Notify the IRB within 5 days of any unanticipated or adverse events are experienced by subjects during your research.**

- **Submit a study closure through the Cayuse IRB submission system once your study has ended.**

If you have any questions regarding the IRB decision, please contact Michael Gillespie, the Research Compliance Officer. Mr. Michael Gillespie can be reached by phone at (909) 537-7588, by fax at (909) 537-7028, or by email at mgillesp@csusb.edu. Please include your application approval number IRB-FY2022-102 in all correspondence. Any complaints you receive from participants and/or others related to your research may be directed to Mr. Gillespie.

Best of luck with your research.

Sincerely,

*Nicole Dabbs*

Nicole Dabbs, Ph.D., IRB Chair
CSUSB Institutional Review Board

ND/MG

# APPENDIX D

# RESEARCH FLYER


CALIFORNIA STATE UNIVERSITY
SAN BERNARDINO
School of Social Work
PARTICIPANTS NEEDED FOR SOCIAL WORK RESERACH PROJECT
Social work graduate student from California State University, San Bernardino is conducting a research project to examine Social work student's perception of an integration of Neuroscience into Social work Education
*Participation in this study is voluntary and participant confidentiality will be maintained.
You may Qualify if You
• Are a social work student in a Bachelor's or Master's Program
Participation Involves
• Completing online Qualtrics survey
• 15-25 minutes of your time
Potential Benefits
• The chance to win 1 of 4 amazon gift cards worth $50
This study has been approved by the California State University, San Bernardino Institutional Review Board and is being conducted under the supervision of Dr. Thomas Davis
For more Information
Please contact Esteban Solis at 005979801@coyote.csusb.edu

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