**Integrating Neuroscience Into Counseling Psychology: A Systematic Review of Current Literature**

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**Author’s Note**

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**Abstract**

A systematic review was carried out to investigate what themes current academic journal publications discuss in relation to the integration of neuroscience into counseling psychology. After initial database searches, a thematic analysis was carried out on the available literature, determining the key themes and subjects of discussion across the data.Twenty-one publications were carried through to synthesis, with four main themes emerging. These were Biopsychosocial Topics of Discussion, Implications of Integration, Neuroscience Education and Integrating Neuropsychology. Further subthemes were discussed, providing a richer description of the publication content focus.There is currently a small body of literature associated with this paradigm. However, the literature available provides education and evidence of a number of topic areas in which neuroscience can be integrated into counseling psychology, as well as highlighting that recent publications may signal a reawakening of an earlier interest in the paradigm.

**Keywords:** counseling psychology, neuroscience, integration, systematic review

**Background Introduction**

There has been a recent growth of research publications which demonstrate that neurobiological knowledge can be utilized within therapy (e.g., Cozolino, 2010; McHenry, Sikorski, & McHenry, 2014). Each discipline of neuroscience has something to add to the growing understanding of how the neural constructs of our brain relate to and affect our mental health. For example, affective neuroscience continues to demonstrate how different regions within the brain form systems which, through neurotransmitter chemicals, generate consciousness and affect that drives our everyday living as humans, both positively and negatively (Panksepp, 2005, 2010, 2011a/b; Panksepp & Biven, 2012). Additional to the literature, there are societies and groups developing around the world, geared towards integrating the fields of neuroscience and various forms of psychotherapy (e.g., see http://www.neuropsychotherapist.com and http://www.neuropsa .org.uk).

An increased understanding in the neural make-up of the brain and mind has helped develop two key findings for psychotherapists and psychologists, brain plasticity (neuroplasticity) and epigenesis. Brain plasticity relates to the ability of the brain to reproduce new neurons and create reorganizations of neural networks throughout its lifetime (Begley, 2009). Epigenesis relates to research demonstrating that the expression (activation) of many genes depends on a person’s environment and social experiences, which trigger the transcription of gene variations (Szyf, McGowan, & Meaney, 2008). These two concepts are often used to explain how psychotherapy can help peoples’ mental health (and brain) develop into healthier and positive states.

Numerous studies have shown, through the use of neuroimaging techniques, the benefits which psychotherapy can have on a person’s brain and subsequent wellbeing (Peres & Nesello, 2008). Karlsson (2011) suggested that there had been (at the time of writing) 20 studies demonstrating how cognitive behavior therapy (CBT), dialectic behavior therapy (DBT), psychodynamic psychotherapy, and interpersonal psychotherapy affect brain function in patients suffering from a wide range of psychological issues, including depression, anxiety and borderline personality disorder (e.g., Beutel, Stark, Pan, Silbersweig, & Dietrich, 2010; Felmingham et al., 2007; Furmark et al., 2002; Lai, Daini, Calcagni, Bruno, & De Risio, 2007; Martin, Martin, Rai, Richardson, & Royall, 2001; Paquette et al., 2003; Schwartz, Stoessel, Baxter, Martin, & Phelps, 1996).

However, despite the growing interest relating to integrating neuroscience and psychotherapy, the question remains as to whether the integration of neuroscience has been undertaken within *counseling psychology* in particular. It should be noted that the present work is primarily focused on neuroscience, rather than neuropsychology. These two fields are often referred to as one and the same; however they are also defined differently. Neuropsychology generally involves working with a neurological client population, often with a keen emphasis on assessment (British Psychological Society, n.d), though it is recognized that clinical neuropsychologists also work with medical, neurodevelopmental and psychiatric conditions, as well as other cognitive and learning disorders (Barth et al., 2003). This somewhat differs from neuroscience, a general branch of scientific enquiry, which can be related to all research and client populations (Bear, Connors, & Paradiso, 2003; Cozolino, 2010). It is this wide scope of applicability which has perhaps propelled neuroscience into so many different areas of psychotherapy.

Like all psychological disciplines, counseling psychology holds a range of philosophical underpinnings and values which provide it with an identity. Although other applied psychological disciplines such as clinical and educational are historically associated with neuroscience research (e.g., autism, Moldin, Rubenstein, & Hyman, 2006), perhaps the importance of the subjective human experience underpinning the counseling psychology philosophy (Woolfe, Strawbridge, Douglas, & Dryden, 2010) may provide the ripest avenue for enhancing an understanding and support of our species. As previously suggested, “it would seem appropriate that studies of the human brain should rely heavily on the subjective and holistic experience of what it means to be human” (Goss, 2015, p.12), something which counseling psychologists are particularly well equipped to provide research input on.

 The integrative and pluralistic (Cooper & Mcleod, 2011) approaches of counseling psychology could be well placed in helping to develop and deliver neurologically informed therapies. Counseling psychologists are often trained to utilize and develop research in order to inform their psychotherapeutic practice (Woolfe et al., 2010). Furthermore, many psychologists and psychiatrists have already begun the work of integrating neuroscience into their disciplines (e.g., Van Der Kolk, 2006; Viamontes & Beitman, 2006a, 2006b; Hart, 2008). An increased understanding of neuroscience could potentially improve a counseling psychologist’s communication and effectiveness within multidisciplinary team working environments.

This suggests that a potential rich tapestry of both therapeutic and research benefit can be harnessed within each individual discipline of neuroscience and counseling psychology, if the two became further integrated. It would seem appropriate that an important first step of investigating the paradigm of integrating neuroscience into counseling psychology is to review the available literature on the topic, in an attempt to understand the current landscape. The *Journal of Counseling Psychology* published a 2014 special edition consisting of papers discussing the integration of neuroscience into counseling psychology. Each paper in that issue focused on a specific topic of discussion, such as a particular theoretical concept or client population. The aim of the current work is to take a holistic view of not only the papers released in that special edition, but of any other papers which discuss the integration of neuroscience into counseling psychology, in an attempt to provide the discipline of counseling psychology with an understanding of the current view on integration.

As such, this research will undertake a systematic review in order to address the following research question:

1. What themes do current academic journal publications discuss in relation to the integration of neuroscience into counseling psychology?

This will in turn help to inform what potential directions, if any, counseling psychologists can take in relation to integrating neuroscience into their research and practice, highlighting any professional issues which may be discussed in the advantages, disadvantages and challenges of integration.

**Method**

**Search Procedures**

After an initial scoping review, publication searches were carried out using electronic database Psycinfo. Psycinfo is the American Psychological Association (APA) database for abstracts and citations of behavioral and social science research, covering 2,561 APA and non-APA journals, including common journals used for the dissemination of counseling psychology research (see Gordon & Hanley, 2013). Table 1 highlights some of these common journals. Psycinfo also covers 217 neuroscience journals (APA, 2015).

Table 1

*Names of common journals covered in Psycinfo search*

|  |
| --- |
| Journals Searched |
| *The Counseling Psychologist* |
| *Journal of Counseling Psychology* |
| *Counselling Psychology Review* |
| *Counselling Psychology Quarterly* |
| *Counselling and Psychotherapy Research Journal* |
| *European Journal of Psychotherapy & Counselling* |
| *Psychology and Psychotherapy: Theory, Research and Practice* |
| *American Psychologist* |
| *Journal of Applied Psychology* |
| *Health Psychology* |
| *Journal of Vocational Behavior* |
| *International Journal for Educational and Vocational Guidance* |

 The search terms used were ‘counseling psycholog\*’ OR ‘counselling psycholog\*’, AND, ‘neuro\*’. Truncation was used on the word ‘psycholog’ to ensure that all plurals of psychology where included (e.g., psychologist, psychologists), and on the word ‘neuro’ to ensure all possible variations of neuro related papers were included in the search (e.g., neuroscience, neurology, neurobiology).

**Inclusion and Exclusion Criteria**

In line with typical systematic review requirements (Hanley & Cutts, 2013; Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009), inclusion and exclusion criteria were applied to the search results. Included items had to be published within the last 25 years, written in English, contain a relevant variation of counseling (or counselling) psychology and neuroscience (i.e., neuroimaging, neuropsychology or neurology) within the title or abstract, and be a published research article or article reply in a peer reviewed academic journal.

**Quality Appraisal**

Assessing the methodological quality and relevance of publications to be analyzed is a key part of the systematic review process (Higgins & Green, 2011). There are a number of “off the shelf” quality appraisal (QA) tools available for systematic reviews; however these tools are generally shaped towards appraising qualitative and quantitative research articles. It was apparent from the scoping review that this body of articles consisted primarily of theoretical and discussion papers, with only two formal quantitative research papers. Given that current literature suggests there is no formal process for quality appraising theoretical articles (Campbell et al., 2014), my quality appraisal system was developed out of combining the existing Evidence for Policy and Practice Information and Coordinating Centre criteria (EPPI-Centre, 2010), along with the guidance of previously published systematic reviews of theoretical papers (Bonell et al., 2013; Campbell et al., 2014). The EPPI-Centre created a set of quality appraisal guidelines, based on the work of David Gough (2007). The aim is for the researcher to determine the quality appraisal of articles in relation to three distinct criteria. The first criterion (a) is assessing the quality of the methodology undertaken for a piece of research, i.e., qualitative, quantitative or theoretical review. The second (b) is assessing the relevance of an articles methodology in relation to the research question. The third criterion (c) involves assessing the overall focus of the article, in relation to the research question under current review. The final stage (d) involves collating the outcomes of these three criteria and ordering them into some form of weighting and scoring. I added additional assessment questions to these criteria using Bonell et al.’s (2013) guidance for quality appraising theoretical review articles. This was to bolster the validity and consistency of my QA process. Table 2 demonstrates the quality appraisal requirements, along with the source of the requirement. Given that the nature of the review was to address the topics of discussion, the same quality appraisal criteria were applied to the two quantitative papers, with less focus on whether they were quantitatively sound in their methodology and more on their relevance to the present research question. I used a weighting of high, medium or low for each of the criteria a, b and c. If the overall score (d) averaged over medium i.e., at least one high and two mediums, then the article was carried forward to synthesis. I provided a brief explanation comment for those articles which did not pass the QA process. Appendix A outlines the quality appraisal process for the articles.

Table 2

*Quality Appraisal Criteria for Assessing Relevant Articles Found in Psychinfo Search*

|  |  |
| --- | --- |
| Criteria | Source |
| a = The trustworthiness of the results judged by the quality of the study within the accepted norms for undertaking the particular type of research design used in the study (methodological quality) | EPPI-Centre (2010) |
| whether or not the constructs are well specified | Bonell et al. (2013) |
| whether these assumptions are implicit or explicit. | Bonell et al. (2013) |
| b = The appropriateness of the use of that study design for addressing the systematic review's research question (methodological relevance) | EPPI-Centre (2010) |
| c = The appropriateness of focus of the research for answering the review question. (topic relevance) | EPPI-Centre (2010) |
| relevance to the review question  | Campbell et al. (2014) |
| d = Judgment of overall weight of evidence (WoE) based on the assessments made for each of the criteria a-c.A synthesis brings together the findings of studies reviewed so that the conclusions of the review are based upon the studies as a whole. | EPPI-Centre (2010) |

**Data Synthesis Procedure**

Given that the primary aim of my research was to review what the common themes of discussion are within the literature, a thematic analysis was seen as appropriate. An inductive approach was taken in that I undertook a “process of coding the data without trying to fit it into a preexisting coding frame, or the researcher’s analytic preconceptions” (Braun & Clarke, 2006, p. 12). The reason for this approach is that I wanted to remain open to whatever themes emerged from the data. I wanted to allow the literature to speak for itself. The thematic analysis in this research aligned with the six phase process laid out by Braun & Clarke (2006), with coding geared towards the semantic level. Computer software pack QSR International’s NVivo 10 was used to carry out the thematic analysis.

**Ethical Considerations**

Ethical approval was obtained from the university ethics department. This secondary research only considered studies available in the public domain. The research adhered to the Health and Care Professions Council Standards of Conduct, Performance and Ethics (HCPC, 2008) and the British Psychological Society Ethical Principles for Conducting Research (British Psychological Society, 2010).

**Results**

Figure 1 below outlines the literature search process. It is based on the “Preferred reporting items for systematic reviews and meta-analyses” (PRISMA) flow chart proposed in Moher et al. (2009), an evidence based approach to determining minimum reporting requirements for systematic reviews and meta-analyses. Table 3 outlines the publications which were carried through to data synthesis and analysis.

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*Figure 1.* PRISMA data flow chart of literature search and review from Moher et al. (2009), highlighting the process of inclusion and exclusion of articles

Table 3

*Literature Carried Through to Synthesis*

|  |  |  |
| --- | --- | --- |
| Author | Title | Research Type |
| Agresti (1992) | Integrating neuropsychological training into a counseling psychology curriculum. | Theory/discussion |
| Corazzini (1992) | To be a counseling psychologist or a counseling neuropsychologist. | Theory/discussion/comment |
| Kemp (1992) | Counseling Center Psychologists in Neuropsychology: Counseling Neuropsychology | Theory/discussion |
| Larson (1992) | Neuropsychological counseling in hospital settings. | Theory/discussion/comment |
| Larson & Agresti (1992) | Counseling psychology and neuropsychology: An overview. | Theory/discussion |
| Malec (1992) | Consumer protection in the expansion of clinical neuropsychology. | Theory/discussion/comment |
| Paulsen (1992) | Counseling psychology and neuropsychology: A true integration. | Theory/discussion/comment |
| Woody (1992) | Malpractice in counseling neuropsychology. | Theory/discussion/comment |
| Lopez, Ryan, & Sumerall (1998)  | Research contributions of counseling psychologists to neuropsychology. | Quantitative/survey |
| Judd & Wilson (1999) | Brain injury and identity-the role of counselling psychologists. | Theory/discussion |
| Ryan, Lopez & Lichtenberg (1999) | Neuropsychological training in APA-accredited counseling psychology programs. | Quantitative/survey |
| Fairfax (2007) | Testing times: Counselling psychology and the neuropsychological perspective. A personal view | Theory/discussion |
| Rizq (2007) | Tread softly: Counselling psychology and neuroscience | Theory/discussion |
| Rumble (2008) | Knowing the brain, unknowing the body: A response to Rizq, R. (2007). "Tread softly: Counselling psychology and neuroscience." Counselling Psychology Review, 22, 5-18 | Theory/discussion/comment |
| Coutinho, Silva, & Decety (2014) | Neurosciences, empathy, and healthy interpersonal relationships: Recent findings and implications for counseling psychology  | Theory/discussion |
| Fine & Sung (2014) | Neuroscience of child and adolescent health development | Theory/discussion |
| Goncalves & Perrone-McGovern (2014) | A neuroscience agenda for counseling psychology research | Theory/discussion |
| Sampaio & Lifter (2014) | Neurosciences of infant mental health development: Recent findings and implications for counseling psychology | Theory/discussion |
| Simon-Dack & Marmarosh (2014) | Neurosciences and adult health behaviors: Recent findings and implications for counseling psychology | Theory/discussion |
| Wright & Diaz (2014) | Neuroscience research on aging and implications for counseling psychology | Theory/discussion |
| Goss (2015) | The importance of incorporating neuroscientific knowledge into counselling psychology: An introduction to affective neuroscience | Theory/discussion |

**Data Synthesis**

Following application of the inclusion and exclusion criteria, 30 articles remained. The majority of articles were excluded because they were not peer reviewed academic papers (e.g., dissertation abstracts). Additionally, many studies did not meet the title or abstract criteria, including a number of articles which had ‘neurotic’ in their title or abstract, a subject not deemed as a relevant ‘neuro’ truncation relating to neuroscience. The QA process was applied to the 30 articles and nine more were removed. These articles were removed either because they did not meet the requirements of being an academic article (e.g., there was a book review and a transcript from an interview) or because they were not relevant to the research question. Some studies met the requirement of having counseling psychology and ‘neuro’ in the title or abstract, however it was found that this was merely mentioning the titles of counseling psychology and clinical neuropsychology, rather than any link to the topic under review in this research (e.g., Viecili, MacMullin, Weiss, & Lunsky, 2010). Appendix A further outlines the reasons for their removal. There were 21 studies remaining. A thematic analysis was carried out on the papers to obtain the key themes which were being discussed. A decision was made to not code the title, abstract or reference sections of each paper. The main focus was on the body of text as this was seen as the primary source of data.

Following a period of familiarizing myself with the material, initial coding was carried out across the literature, geared towards obtaining a rich description of the data set. As discussed, this was data led (inductive), in that the coding was based on whatever presented in the transcript material, rather than using a theory to drive the coding (Braun & Clarke, 2006; Howitt & Cramer, 2011). However, given that the aim was to elicit headline themes of discussion, coding was carried out at a high semantic level, i.e., coding was used to identify the general topic of discussion across paragraphs of text, as opposed to the specific details or underlying concepts (Braun & Clarke, 2006). Coding was applied to specific phrases and words, as well as being used to provide a summary of longer pieces of text. This was to ensure that the key themes of discussion were captured both in the literal use of words within headings *and* through the summary of paragraph discussions. Codes were then collated into their associated themes, creating four main themes. Although some of the subthemes were particular to certain items of literature, the main themes were reviewed to check that they were relevant across the entire data set. The themes were then defined and refined, “identifying the ‘essence’ of what each theme is about (as well as the themes overall), and determining what aspect of the data each theme captures” (Braun & Clarke, 2006, p. 22).

The four main themes found were Biopsychosocial Topics of Discussion, Implications of Integration, Neuroscience Education and Integrating Neuropsychology. Appendix B provides an illustrative view of these themes and their subthemes.

**Theme 1 – Biopsychosocial topics of discussion.** The aim of this theme was to provide an overview of the key biological, psychological and social topics discussed across the identified literature. Often, discussions combined these three viewpoints into an overall biopsychosocial model of human functioning.

***Theme 1.1 – Neuroscience of....*** Throughout the publications there was consistent discussion around the biological neuroscience view of psychological topics. Authors presented information on what the past and present neuroscience literature tells us on a range of topics, including adult mental health, affect, aging, attachment, cognition, dementia, depression, developmental, empathy, exercise, infant mental health, language, learning, memory, mindfulness, motor development, multisensorial integration, oxytocin, pain, relationships, social behavior, therapy, toxic stress, trauma, pediatrics and personality. An example of how these topics were coded can be seen in the following two extracts for the “neuroscience of empathy”. Coding was applied to the words within a heading:

The Neurobiological Correlates of Empathy: Central Biomarkers (Coutinho, Silva, & Decety, 2014, p. 542)

Coding was also applied to sections of paragraphs, to summarize the overall topic of discussion:

Different neurobiological systems seem to be involved in the various dimensions of empathy. Like any other higher order psychological functions, empathy involves the activity of several brain cortical and subcortical areas, as well as the activity of the autonomic nervous system, hypothalamic- pituitary-adrenal axis, and endocrine systems. In what follows, we conduct a brief revision of the neuronal biomarkers of different dimensions of empathy. The bottom-up dimensions of empathy, such as the emotional contagion by which we are able to vicariously experience the feeling of disgust, pain, reward, and joy felt by others, has been extensively studied (e.g., Bernhardt & Singer, 2012; Singer, Critchley, & Preuschoff, 2009). The process of emotional sharing not only facilitates the communication between members of the same species but also promotes, under some circumstances, helping behaviors toward the other (Decety, Norman, Berntson, & Cacioppo, 2012). (Coutinho et al., 2014, p. 542)

This mixed style of heading and paragraph coding was carried out for all themes and subthemes.

***Theme 1.2 – General psychosocial topics*.** A number of codes highlighted general discussions around typical psychosocial concepts. These discussions differed from those in subtheme 1.1, in that they were not neuroscience orientated. Topics included affect/emotion, attachment, attention, cognition, empathy, emotional intelligence, memory, relationships and theoretical models such as theory of mind:

Within the context of counseling psychology, empathy is typically defined as the ability to experience and understand the feelings of the other person and is associated with a set of therapist’s behaviors such as unconditional acceptance of the client’s experience, active listening, and nonjudgmental communication (Coutinho et al., 2014, p. 542)

***Theme 1.3 – Specific topics.*** Whereas the items coded in subtheme 1.2 discussed general concepts of psychosocial theories, this subtheme highlights more specialist and specific topics that were discussed within the literature. Examples include the adolescent brain, aging, dementia, depression, infant mental health, PTSD and the brain’s reward system. The primary difference between this subtheme and the previous one is that in general, the topics discussed in subtheme 1.2 can be applied to generate psychosocial theories of topics presented in this theme, e.g., how empathy or attachment (subtheme 1.2) impacts the adolescent brain (subtheme 1.3).

**Theme 2 – Implications of integration.** A prominent discussion throughout the papers related to the subject of integrating neuroscience into counseling psychology, highlighting the implications of integrating the two disciplines, including discussions on the challenges and positives of integration.

***Theme 2.1 – Implications for counseling psychology.*** A consistent discussion related to the implications of neuroscience knowledge for counseling psychologists. Implication, as used here, is descriptive of the different ways with which counseling psychologists can integrate neuroscience into their work. Discussions in this subtheme included collaborative working between counseling psychologists and neuroscientists:

By working together, counseling psychologists and cognitive neuroscientists may be able to determine through research which interventions (e.g., physical activity, Alzheimer’s Association, 2013; social or mental engagement, Wang et al., 2002) are most effective for a specific biomarker based on the phases of AD. (Wright & Diaz, 2014, p. 537)

Two other main subsections of this theme related to the implication of neuroscience for counseling psychologist’s clinical practice…

Similar to studies already reviewed in this article, oxytocin could be administered to clients with different attachment styles in order to explore how oxytocin moderates the relationship between the therapy alliance and treatment process and outcome. Counseling psychologists could begin to address the questions regarding how individual differences, such as history of early trauma or attachment style, impact oxytocin levels and the effectiveness of psychotherapy. (Simon-Dack & Marmarosh, p. 530)

…as well as research:

We think that the physiological linkage is an example of a research hypothesis that should be further explored by new research paradigms in the field of counseling psychology. (Coutinho et al., 2014, p. 545)

***Theme 2.2 – Challenges.*** One aspect of discussion related to the challenges of integrating neuroscience into counseling psychology. These challenges include bridging neurophysiology and counseling psychology, conflict with identities, dangers of neuroscience, different discourses, issues with neuroscience research, lack of neuropsychology training, lack of research showing integration, impact on training and supervision requirements, incompleteness of neuroscience knowledge, overcoming resistance and “neurosceptic[s]” (Rizq, 2007, p. 7), reductionist view of neuroscience and the danger of neuroscience being used to try and complete knowledge about a client.

***Theme 2.3 – Positives.*** Somewhat opposing the items in theme 2.2, a number of codes related to the positives of integrating neuroscience into counseling psychology. These included the benefit of neuroscience to counseling psychology, the benefit of counseling psychology to neuroscience, evidence based interventions, improving interventions, the need for a multidiscipline approach and neuroscience research supporting counseling psychology. One common way in which neuroscience research has helped support counseling psychology is how neuroimaging techniques have been used to show the positive effects of therapy on brain structures:

A more recent review by Barsaglini, Sartori, Benetti, Pettersson- Yeo, and Mechelli (in press) went a step further by concluding that brain networks found to be dysfunctional in psychological disorders were normalized after effective psychotherapeutic intervention. (Gonçalves & Perrone-McGovern, 2014, p. 507)

**Theme 3 – Neuroscience education.** The literature often provided the reader with information and education on neuroscience.

***Theme 3.1 – Neuroscience research techniques.*** A number of publications discussed techniques used in neuroscience research:

A number of tools have been developed to study human brain activity during the performance of cognitive tasks. These tools include neuroimaging techniques, such as positron emission tomography (PET) and functional magnetic resonance imaging (fMRI), as well as electromagnetic recording techniques, which include electroencephalography (EEG), event-related potentials (ERPs), and magnetoencephalography (MEG). (Wright & Diaz, 2014, p. 535)

Discussions related to both description of the techniques and research in which the techniques were used:

It is important to understand that functional magnetic resonance imaging (fMRI) and positron emission tomography (PET) do not directly measure neural activity. The areas that “light up” in the brain on magnetic resonance imaging (MRI) scans are those where blood oxygenation are changing, and their temporal proximity is strikingly lax (up to 7 s). Spatially these areas may be distant from the exact location where neural activity occurs (Pike, 2012). (Fine & Sun, 2014, p. 522)

EEG/ERP studies have revealed that angry prosody elicits a more negative ERP component than does happy or neutral prosody in 7-month-old infants (Grossmann, Striano, & Friederici, 2005). (Sampio & Lifter, 2014, p. 515)

There were also discussions on how animal models and research are used to inform neuroscience.

***Theme 3.2 – Neuroscience concepts.*** Just like the general (counseling) psychology themes of empathy, attachment, memory etc. identified in subtheme 1.2, there were some consistent neuroscience concepts which came up throughout the literature. These were biomarkers, epigenetics, mirror neurons, neurogenesis & synaptogenesis and neuroplasticity. The concepts were often discussed in relation to their use within counseling psychology:

This position, based on evidence for the ongoing neuroplasticity of the brain, well beyond the traditional ‘critical’ periods of infancy and childhood, clearly is one that has direct relevance for the learning that takes place in psychotherapy (Rizq, 2007, p. 12)

***Theme 3.3 – General neuroscience education.*** Similar to subtheme 1.1, a lot of data provided an education on neuroscience information. A number of concepts helped the reader learn about various neuroscience paradigms, including brain (mind, description and development), face specialization, factors influencing brain development (social, environmental), genes, neurotransmitters and the social brain:

The attention control network is a frontoparietal network (i.e., connection between lateral prefrontal cortex, dorsal anterior cingulate, and dorsal parietal regions) involved mostly in executive functioning (e.g., working memory; goal-directed attention; performance monitoring). Common symptoms of deregulation of this network are inattention, working memory problems, and behavior programing deficits (e.g., schizophrenia, attention-deficit/hyperactivity disorder, major depressive disorder). (Gonçalves & Perrone-McGovern , 2014, p. 509)

**Theme 4 – Integrating neuropsychology.** Although the focus of this analysis was on the more broadly applicable field of neuroscience, a number of papers focused solely on the integration of counseling psychology and neuropsychology. As such, an entire theme emerged on this subject.

***Theme 4.1 – The benefit of integrating neuropsychology.*** Similar to how subtheme 2.3 outlined the positives of integrating *neuroscience* into counseling psychology, a subtheme emerged for a number of codes discussing the benefits of integrating with *neuropsychology*. Coding within this theme highlighted the benefit of neuropsychology to counseling psychology, the different settings in which counseling psychologists can utilize neuropsychology, how counseling psychologists can implement neuropsychology, an indication that counseling psychologists want and have already begun working in neuropsychological roles, the benefit for research, as well as outlining the multiple skills that counseling psychologists can bring to neuropsychological teams and clients:

 The counseling psychologist can play an important role in helping educate the family about the consequences of brain injury…constructive reframing of the problem can be crucial in minimizing interpersonal conflict. (Larson, 1992, p. 561)

In summary, the rehabilitation unit or hospital provides fertile ground for mutually beneficial interactions between neuropsychology and counseling psychology. (Larson, 1992, p. 569)

***Theme 4.2 – The dangers of neuropsychology.*** This subtheme highlighted the risks and dangers that counseling psychologists need to be mindful of when integrating with neuropsychology. This includes the danger of false expertise:

The fundamental concern raised by any proposal to expand training opportunities in neuropsychology is the potential that such minimum training will be inappropriately used…as evidence of expertise in neuropsychology. (Malec, 1992, p. 620)

This notion of false expertise is not only a danger to the patient, but counseling psychologists must also be aware of the increased occurrences of litigation that can occur within the medical world:

Certainly neurological patients can benefit from counseling psychology services…there will however, be legal risks, which must be countered by astute judgements…and absolute adherence to professional standards (Woody, 1992, p. 639)

Additional codes in this theme highlighted the financial lure of neuropsychology tempting counseling psychologists to work outside of their qualification, as well as the potential views of a medical focus taking counseling psychologists from their philosophical roots.

***Theme 4.3 – Implementing neuropsychology into counseling psychology training.*** A number of discussions related to whether neuropsychology should be implemented into counseling psychology, the answer generally being yes:

Counseling psychology doctoral students have expressed a rather consistent interest in receiving such training…Agresti argues that is possible to include such training in the counseling psychology curriculum. (Larson & Agresti, 1992, p. 552)

Other codes highlighted discussions on how that implementation can be undertaken, including a view that counseling psychologists’ training should provide them with a minimum level of proficiency in neuropsychology, as opposed to fully specialized training. It is in postdoctoral training that practitioners can become fully qualified as neuropsychologists, should they wish:

Thus, the primary goals of neuropsychology training in counseling psychology programs should be (a) to provide minimal proficiency in this area, and (b) to prepare students for competitive neuropsychology training programs at the internship and postdoctoral levels *after which* specialization in neuropsychology may be sought. (Paulsen, 1992, p. 627)

This subtheme also highlighted the ethical considerations for counseling psychologists training in neuropsychology:

[C]ounseling psychologists who currently work with LD and other cerebral-dysfunctional students have an ethical responsibility to acquire training or increased competence in neuropsychology. (Kemp, 1992, p. 578)

***Theme 4.4 – what does it mean to our identity?.*** A number of discussions centered on what the traditional view of a counseling psychologist identity is, as well as highlighting the focus that counseling psychology has often given to discussing its identity. Suggestions were made that there should be less focus and fear of losing our identity, and that counseling psychologists can maintain their core professional position when diversifying into other areas, such as neuropsychology:

Even though counseling psychology is changing, there is a fundamental core to the profession that is part of its identity and does not allow us to become counseling neuropsychologists…One does not have to change one’s identity to take on a subspecialty. (Corazzini, 1992, p. 643)

***Theme 4.5 – neuropsychology education.*** Similar to subtheme 3.3, which discussed how the literature provided a general education on neuroscience, this subtheme highlights that a number of papers provided a general education on neuropsychology, including specific case examples of how a counseling psychologist can use neuropsychology…

The following clinical example illustrates how one college student was assessed using a neuropsychological approach…and how the information obtained was used. (Kemp, 1992, p. 583)

…as well as education on neuropsychological assessment and the role of a neuropsychologist:

Below I have provided a brief description of a neuropsychologist’s role based on my experience and suggestions by Snyder and Nussbaum (2000). (Fairfax, 2007, p. 45)

**Discussion**

The aim of this research was to undertake a systematic review in order to discover what themes current academic journal publications discuss in relation to the integration of neuroscience into counseling psychology. The four main themes found were Biopsychosocial Topics of Discussion, Implications of Integration, Neuroscience Education and Integrating neuropsychology. These headline themes provide a somewhat general flavor of the types of things discussed within the literature; however it is the subthemes which provide a richer description.

In some sense, there was a secondary underlying research question in terms of exploring just how much (if any) literature is actually available on the paradigm of integrating neuroscience into counseling psychology. The research question was kept fairly open in that the main objective was to get a general understanding of what the literature was discussing in relation to the paradigm. The literature search returned 21 papers which were deemed eligible for synthesis, suggesting that it is a fairly young paradigm. One thing that stood out was that there were almost two distinct periods of publications. The first period consisted of eight papers which all came from a special edition of SAGE journal *The Counseling Psychologist*, focused on exploring the growing involvement of counseling psychology within neuropsychology (Agresti, 1992; Corazzini, 1992; Kemp, 1992; Larson, 1992; Larson & Agresti, 1992; Malec, 1992; Paulsen, 1992; Woody, 1992). This set of papers greatly influenced the fourth theme, Integrating Neuropsychology. There were also two other papers published later in the 1990’s, which focused on this integration of counseling psychology and neuropsychology (Lopez, Ryan, & Sumerall, 1998; Ryan, Lopez, & Lichtenberg, 1999). The second distinct period consisted of six papers which were published in 2014, all in a special edition of the American Psychological Association *Journal of Counseling Psychology*, focusing on the integration of counseling psychology and neuroscience (Coutinho, Silva, & Decety, 2014; Fine & Sung, 2014; Goncalves & Perrone-McGovern, 2014; Sampaio & Lifter 2014; Simon-Dack & Marmarosh, 2014; Wright & Diaz, 2014). Only two of the remaining papers (Goss, 2015; Rizq, 2007) provided a similar level of discussion to those papers released in the two special edition publications. Judd and Wilson (1999) was geared towards discussing the experience of clients suffering acquired brain injury (ABI), Rumble (2008) was a reply to Rizq’s (2007) article, and Fairfax (2007) focused on more of a personal view on neuropsychology and counseling psychology.

The findings propose two initial general items for reflection. The first is that, given the source location of the papers, America is currently more involved than other countries in exploring the integration of counseling psychology and neuroscience, although it should be noted that Goss (2015) has a contemporary United Kingdom based publication which, along with Fairfax (2007) and Rizq (2007), suggests that there is some movement in the United Kingdom related to the paradigm. The second is that perhaps the *Journal of Counseling Psychology* special edition in 2014 signals that an earlier flame of integrating counseling psychology and neuroscience, sparked in the 1992 special edition of *The Counseling Psychologist*, is beginning to gather oxygen and increase its light.

All themes indicate that there is an opportunity for neuroscience (and neuropsychology) to be integrated into counseling psychology research and clinical practice, perhaps through a biopsychosocial approach to human functioning and experience. It is suggested that neuroscience can provide an evidence base for the work of scientist-practitioner orientated counseling psychologists, which can in turn develop their communications with medically orientated multidisciplinary colleagues. Larson (1992) proposed various roles for counseling psychologists to undertake in neuropsychological settings, including psychoeducating clients and their families by interpreting neurologist data, discussing how assessed deficits may impact their subjective experience as well as mediating conflicts which may arise between the client and consultant. Counseling psychologists can also provide support for the adjustments that the client and family will have to make in the wake of acquired neurological conditions (Larson, 1992). It is suggested that an understanding of neuroscience may improve counseling psychologists’ work within a range of client populations, including people with learning disability, neuropsychological conditions, children, adolescents and older adults. It should also be noted that counseling psychology can in turn contribute to neuroscience, helping to bring differing perspectives such as focusing on subjective experiences, the role of culture, and clinically orientated ecological evidence to help illuminate neuroscience research further (Coutinho et al., 2014; Fine & Sung, 2014; Goss, 2015; Rizq, 2007; Wright & Diaz, 2014).

The literature also discusses a number of challenges to integrating neuroscience into counseling psychology. One such discussion related to the danger of false expertise, meaning that there is a danger a counseling psychologist may think they know more than they actually do on the subject of neuroscience (and neuropsychology) and will work outside of their competency. This could prove to be a danger to the client, for obvious reasons. Counseling psychologists must also be aware of the increased occurrence of litigation within the medical world and the added importance of working within their competency boundaries (Malec, 1992; Woody, 1992). As such, a suggestion is made to integrate neuroscience into doctoral and qualified training courses to help counseling psychologists familiarize themselves to at least a base level of knowledge that maintains ethical practice (Goss, 2015; Paulsen, 1992). However, developing familiarity and personal levels of competence across a range of subjects is a key part of training as a counseling psychologist (Health and Care Professions Council, 2015). Some practitioners will be more skilled in certain models of therapy and some will specialize in certain client populations, therefore, counseling psychologists’ training and supervision is one that should already provide a framework of support for ensuring they work within their individual competency boundaries.

The findings indicate that a key challenge to integration could be counseling psychology’s fear of losing its identity as a humanistic psychology if it was to adopt a medically orientated approach such as neuroscience. However, a number of authors suggested that this fear is unfounded and unnecessary, and that neuroscience is part of taking a pragmatic, holistic perspective of clients (Goss, 2015; Rizq, 2007). Counselling psychologists can maintain their core professional position when diversifying into other areas, including neuroscience (Agresti, 1992; Corazinni, 1992; Larson & Agresti, 1992; Paulsen, 1992) and neuroscience more broadly (Goss, 2015).

**Limitations of the Current Study**

As with any systematic review, there is a risk that there are some articles which may have been missed. A key limitation to this work is that I have only included articles which have a truncation of ‘counseling psychology\*’ and ‘neuro\*’ in their title or abstract. It is possible that there are papers discussing the integration of neuroscience with clinical or educational psychology, vocational decision making, counseling or psychotherapy, which may have high relevance and links to counseling psychologists. However, given that I was interested in investigating the potentially unique integration which counseling psychologists can both bring to *and* take from neuroscience, it was important to keep strict parameters on including counseling psychology specific literature. Perhaps this highlights the importance of counseling psychologists identifying the name of our discipline within the title or abstract of their publications, helping to ensure that multidiscipline readers are aware of the wide ranging and unique contributions which we can bring to developing the wellbeing and mental health of our clients. Additionally, adhering to the inclusion requirement of either the title or abstract containing counseling (or counselling) psychology reduced the risk of the inclusion parameters becoming blurred and unmanageable; that said, a number of key vocational, clinical and educational journals where included within the Psycinfo search.

By using the Psycinfo database, which covers 2,561 APA and non-APA journals as well as 217 neuroscience journals (APA, 2015), I hope to have captured as many relevant APA and non-APA journals as possible in my search. However, there is always a possibility, as with any systematic review, that an applicable journal may have been missed.

 The exclusion of pre-1990 material could be seen as a limitation to this research, however there were two primary reasons that I maintained a 25 year inclusion criteria on publications. The first was that it is only within the last 20 years or so that neuroimaging techniques have allowed us to enter into greater depth and understanding of the brain (Damasio, 2011), therefore publications pre-1990 could be seen as somewhat skeptical in their body of neuroscience evidence. The second was that the discussions of any papers published beyond 25 years ago may no longer be relevant to the present situation of counseling psychology and as such, the results would not be applicable to our contemporary position as a discipline. Even the 1992 publications are 23 years old and as such, it is hard to determine whether their discussions are truly relevant to the current landscape of counseling psychology, however, it was felt that their inclusion was required to demonstrate an element of the historical discussions which have occurred, as well as to highlight a previous special edition journal focus related to the paradigm under investigation in this review.

Although the focus of this analysis was on the more broadly applicable field of neuroscience, I decided to include articles on neuropsychology, as it felt important to highlight all forms of discussions which have previously occurred between counseling psychology and any aspect of the neuro field. It is possible that this led to a limitation in the work, in that I was somewhat biased in wanting to portray neuropsychology as distinct from neuroscience and as such, this may have influenced me in creating a separate theme specifically for all of the neuropsychology discussions. However, overall, the themes allow the distinct discussions of neuropsychology and neuroscience to be heard, whilst acknowledging that both have a place in the overall review of literature in this paradigm.

 Although articles had to be published in a peer reviewed journal, there is a possibility that Rumble’s (2008) publication was only reviewed by the editor, as it was a reply article to a previous publication. The peer review process for a reply article will depend on the particular publishing journal; however, this limitation is not expected to have a great impact on the overall results.

**Implications for Future Research**

The themes also identify the areas and topics in which integration is currently being discussed, e.g., empathy and aging. A number of themes and subthemes evidence that the literature provides an education for readers. This suggests that counseling psychologists can use the available publications to educate themselves in neuroscience, particularly in relation to counseling psychology. One particularly useful direction for future work would be to carry out the same research methodology but to focus the research question on exploring the specific neuroscience topics. The present work is purposefully limited in its output in that its aim was to determine the general topics of discussion. One of the thematic outputs is that the literature provides education on a range of neuroscience disciplines and topics. It would perhaps be useful for counseling psychologists to have a collation of the specific details of information and education. For example, in Coutinho et al. (2014), I extrapolated that there was a discussion on the neuroscience of empathy. The next stage for a review would be to extrapolate what specific brain areas, neurotransmitters etc. are discussed in relation to empathy and indeed, what specific brain areas are discussed throughout all of the other publications. The benefit of carrying out this sort of analysis across the whole data set is that it may provide insight into what the common brain regions and processes are that counseling psychologists should focus their learning on, i.e., what are the current neuroscience hot topics which could be integrated into personal, doctoral and continual professional development (CPD) training. Concepts such as neuroplasticity and neurogenesis are all items which can be of benefit to counseling psychologists (Coutinho, Silva, & Decety, 2014; Fine & Sung, 2014; Goncalves & Perrone-McGovern, 2014; Sampaio & Lifter, 2014; Simon-Dack & Marmarosh, 2014; Wright & Diaz, 2014). However, this further level of analysis was beyond the scope of the present work. In reality, there are a number of subthemes for which a further detailed analysis would prove useful. A further example would be how the present work has extrapolated discussions on the benefits and challenges of integrating neuroscience into counseling psychology. Although I have lightly touched upon these, another future direction for research could be to analyze the specific details of these benefits and challenges, potentially helping to improve the integration of the two disciplines.

In relation to the fourth theme on neuropsychology, given that the majority of publications contributing to this theme came out in 1992, it would be useful for further research to investigate if the landscape for integrating neuropsychology into counseling psychology training and practice has altered over the last 23 years. There is no doubt that neuroscience education is needed for those practitioners who wish to work in a neuropsychological setting, therefore, perhaps a continuation of the recent 2014/15 publications on counseling psychology and neuroscience will serve to support the movement of counseling psychologists wishing to train and work in neuropsychology.

It is worth noting that the majority of papers were theoretical discussion papers. There were only two quantitative research articles relating to this paradigm, both of which were surveys about the counseling psychology profession, as opposed to a quantitative testing of a hypothesis based on neuroscientific information. This is perhaps further evidence of the infancy of the paradigm. It is also possible that counseling psychologists may have carried out experimental work which utilizes the integration of neuroscientific information, but have not published it specifically under the title or domain of counseling psychology. Anecdotal evidence suggests that one reason for this may be that there is a lack of counseling psychology journal reviewers available who have the expertise to review detailed neuroscientific studies. If this is this the case, perhaps this is a consideration for editorial teams when selecting peer reviewers, or perhaps it is merely a case of being patient whilst more of our colleagues become further familiarized with neuroscience research. However, this is something which would perhaps benefit from further research inquiry in order to determine whether it is widely evidenced.

Finally, it could be advantageous for future research to seek a collective set of views from a number of counseling psychologists on the topic of integrating neuroscience into their work, exploring practitioners’ contemporary experiences of the subject. This may help shed further light on what the current training and occupational landscape is in regard to neuroscience, potentially indicating whether any further actions for integration between the disciplines of counseling psychology and neuroscience would be useful for practice, research and clients.

**References**

Agresti, A. A. (1992). Integrating neuropsychological training into a counseling psychology

 curriculum. *The Counseling Psychologist. 20*, 605-619. doi:10.1177/0011000092204004

American Psychological Assoication. (February, 2015). PsycINFO journal coverage list

 [Website post]. Retrieved from

 http://www.apa.org/pubs/databases/psycinfo/coverage.aspx

Bear, M. F., Connors, B.W., & Paradiso, M. A. (Eds.). (2007). *Neuroscience: Exploring the*

 *brain*. (3rd ed.). Baltimore, MD: Lippincott Williams & Wilkins.

Begley, S. (2009). *The plastic mind*. London: Constable & Robinson.

Beutel, M. E., Stark, R., Pan, H., Silbersweig, D., & Dietrich, S. (2010). Changes of brain

 activation pre- post short-term psychodynamic inpatient psychotherapy: An fMRI study of

 panic disorder patients. *Psychiatry Research: Neuroimaging, 184*, 96-104.

 doi:10.1016/j.pscychresns.2010.06.005

Bonell, C., Jamal, F., Harden, A., Wells, H., Parry, W., Fletcher, A., …Moore, L. (2013).

 Systematic review of the effects of schools and school environment interventions on

 health: Evidence mapping and synthesis. *Public Health Research, 1*(1).

 doi:10.3310/phr01010

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research*

 *in Psychology*, *3*, 77-101. doi:10.1191/1478088706qp063oa

British Psychological Society (n.d.) Careers: Neuropsychology [web page].

 Retrieved from http://careers.bps.org.uk/area/neuro

British Psychological Society (2010). *Ethical principles for conducting research with human*

 *participants*. Retrieved from

 http://www.bps.org.uk/sites/default/files/documents/code\_of\_human\_research\_ethics.pdf

Campbell, M., Egan, M., Lorenc, T., Bond, L., Popham, F., Fenton, C., & Benzeval, M.

 (2014). Considering methodological options for reviews of theory: illustrated by a review

 of theories linking income and health. *Systematic Reviews, 3*, 114.

 doi:10.1186/2046-4053-3-114.

Cooper, M., & Mcleod, J. (2011). *Pluralistic counseling and psychotherapy*.

 London: SAGE.

Corazzini, J. G. (1992). To be a counseling psychologist or a counseling neuropsychologist.

 *The Counseling Psychologist. 20*, 640-644. doi:10.1177/0011000092204008

Coutinho, J. F., Silva, P. O., & Decety, J. (2014). Neurosciences, empathy, and healthy

 interpersonal relationships: recent findings and implications for counseling psychology.

 *Journal of Counseling Psychology, 61*, 541-548. doi:10.1037/cou0000021

Cozolino, L. (2010). *The neuroscience of psychotherapy: Healing the social brain* (2nd ed.).

 New York: Norton.

Damasio, A. (2011). *Self comes to mind: Constructing the conscious brain*. London: Vintage.

EPPI-Centre. (2010). EPPI-Centre methods for conducting systematic reviews. London: EPPI

 Centre, Social Science Research Unit, Institute of Education, University of London.

 Retrieved from http://eppi.ioe.ac.uk/cms/LinkClick.aspx?fileticket=hQBu8y4u

 VwI%3d&tabid=184&mid=6164

Fairfax, H. (2007). Testing times: Counseling psychology and the neuropsychological

 perspective. A personal view. *Counseling Psychology Review, 22*(4), 44-48.

Felmingham, K., Kemp, A., Williams, L., Das, P., Hughes, G., Peduto, A., & Bryant, R.

 (2007). Changes in anterior cingulate and amygdala after cognitive behavior therapy

 of posttraumatic stress disorder. *Psychological Science,* *18*, 127-129.

 doi:10.1111/j.1467-9280.2007.01860.x

Fine, J. G., & Sung, C. (2014). Neuroscience of child and adolescent health development.

 *Journal of Counseling Psychology, 61*, 521-527. doi:10.1037/cou0000033

Furmark, T., Tillfors, M., Marteinsdottir, I., Fischer, H., Pissiota, A., Langstrom, B., &

 Fredrikson, M. (2002). Common changes in cerebral blood flow in patients with social

 phobia treated with citalopram or cognitive-behavioral therapy. *Archives of General*

 *Psychiatry*, *59*, 425-433. doi:10.1001/archpsyc.59.5.425

Gonçalves, Ó. F. & Perrone-McGovern, K. M. (2014). A neuroscience agenda for counseling

 psychology research. *Journal of Counseling Psychology, 61*, 507-512.

 doi:10.1037/cou0000026

Gordon, R., & Hanley, T. (2013). Where do counseling psychologists based in the UK

 disseminate their research? A systematic review. *Counseling Psychology Review, 28*(4),

 7-16.

Goss, D. (2015). The importance of incorporating neuroscientific knowledge into counselling

 psychology: An introduction to affective neuroscience. *Counselling Psychology Review,*

 *30*, 52-63.

Gough, D. (2007). Weight of evidence: a framework for the appraisal of the quality and

 relevance of evidence. *Research Papers in Education, 22*, 213-228.

 doi:10.1080/02671520701296189

Hanley, T., & Cutts, L. (2013). What is a systematic review? *Counseling Psychology*

 *Review, 28*(4), 3-6.

Harrison, N. A., & Critchley, H. D. (2007). Affective neuroscience and psychiatry. *The*

 *British Journal of* *Psychiatry, 191*, 192-194. doi:10.1192/bjp.bp.107.037077

Hart, S. (2008). *Brain, attachment, personality: An introduction to neuroaffective*

 *development*. London: Karnac Books.

Higgins, J. P. T. & Green, S. (Eds). (2011). *Cochrane handbook for systematic reviews of*

 *interventions (Version 5.1.0)*. Retrieved from http://handbook.cochrane.org/

Health and Care Professions Council (HCPC). (2008). Standards of conduct performance and

 ethics. Retrieved from http://www.hcpc-uk.org/publications/standards/index.asp?id=38

Health and Care Professions Council (2015). *Standards of proficiency:*

 *Practitioner psychologists* (3rd ed.). London: Health and Care Professions Council.

 Retrieved from http://www.hcpc- uk.co.uk/assets/documents/10002963SOP\_

 Practitioner \_psychologists.pdf

Howitt, D., & Cramer, D. (2011). *Introduction to Research Methods in Psychology* (3rd ed.).

 Essex: Pearson Education Ltd.

Judd, D. P., & Wilson, S. L. (1999). Brain injury and identity: the role of counselling

 psychologists. *Counselling Psychology Review*, *14*(3), 4-16.

Karlsson, H. (2011, August 11). How Psychotherapy Changes the Brain [Web log post].

 Retrieved from

 http://www.psychiatrictimes.com/psychotherapy/how-psychotherapy-changes-brain

Kemp, A. D. (1992). Counseling center psychologists in neuropsychology: Counseling

 neuropsychology. *The Counseling Psychologist, 20*, 571-604.

 doi: 10.1177/0011000092204003

Lai, C., Daini, S., Calcagni, M., Bruno, I., & De Risio, S. (2007). Neural correlates of

 psychodynamic psychotherapy in borderline disorders: A pilot investigation.

 *Psychotherapy and Psychosomatics, 76*, 403-405. doi:10.1159/000107572

Larson, P. C. (1992). Neuropsychological counseling in hospital settings. *The Counseling*

 *Psychologist. 20*, 556-570. doi:10.1177/0011000092204002

Larson, P. C., & Agresti, A. A. (1992). Counseling psychology and neuropsychology: An

 overview. *The Counseling Psychologist. 20*, 549-555. doi:10.1177/0011000092204001

Lopez, S. J., Ryan, J. J., & Sumerall, S. W. (1998). Research contributions of counseling

 psychologists to neuropsychology. *Journal of Clinical Psychology. 54*, 781-783.

 doi:10.1002/(SICI)1097-4679(199810)54:6<781::AID-JCLP4>3.0.CO;2-K

Malec, J. F. (1992). Consumer protection in the expansion of clinical neuropsychology. *The*

 *Counseling Psychologist. 20*, 620-625. doi:10.1177/0011000092204005

Martin, S. D., Martin, E., Rai, S. S., Richardson, M. A., & Royall, R. (2001). Brain blood

 flow changes in depressed patients treated with interpersonal psychotherapy or

 venlafaxine hydrochloride: Preliminary findings. *Archives of General Psychiatry, 58*,

 641-648. doi:10.1001/archpsyc.58.7.641

McHenry, B., Sikorski, A. M., & McHenry, J. (2014). *A Counselor's Introduction to*

 *Neuroscience*. New York: Routledge.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & The PRISMA Group. (2009). Preferred

 reporting items for systematic reviews and meta-analyses: The PRISMA Statement*. PLoS*

 *Med 6*(7). doi:10.1371/journal.pmed1000097

Moldin, S. O., Rubenstein, J. L. R., & Hyman, S. E. (2006). Can autism speak to

 neuroscience?. *The Journal of Neuroscience, 26*, 6893-6896.

 doi: 10.1523/JNEUROSCI.1944-06.2006

Barth, J. T., Pliskin, N., Axelrod, B., Faust, D., Fisher, J., Harley, J. P., ...Silver, C. (2003).

 Introduction to the NAN 2001 definition of a clinical neuropsychologist: NAN policy and

 planning committee. *Archives of Clinical Neuropsychology, 18*, 551-555.

 doi: 10.1016/S0887-6177(02)00146-4

 Panksepp, J. (2005). Affective consciousness: Core emotional feelings in animals and

 humans. *Consciousness and Cognition, 14*, 30-80. doi:10.1016/j.concog.2004.10.004

Panksepp, J. (2010). Affective neuroscience of the emotional BrainMind: evolutionary

 perspectives and implications for understanding depression. *Dialogues in Clinical*

 *Neuroscience, 2010, 12*, 533-545.

Panksepp, J. (2011a). Cross-species affective neuroscience decoding of the primal

 affective experiences of humans and related animals. *Plos ONE, 6*(9), 1-15.

 doi:10.1371/journal.pone.0021236

Panksepp, J. (2011b). The basic emotional circuits of mammalian brains. Do animals have

 affective lives? *Neurosciences & Biobehavioural Reviews, 35*, 1791-1804.

 doi: 10.1016/j.neubiorev.2011.08.003

Panksepp, J., & Biven, L. (2012). *The archaeology of mind: Neuroevolutionary origins of*

 *human emotions*. New York: W. W. Norton.

Paquette, V., Lévesque, J., Mensour, B., Leroux, J. M., Beaudoin, G., Bourgouin, P., &

 Beauregard, M. (2003). ‘Change the mind and you change the brain’: Effects of cognitive

 behavioral therapy on the neural correlates of spider phobia. *NeuroImage, 18*, 401-409.

 doi:10.1016/S1053-8119(02)00030-7

Paulsen, J. S. (1992). Counseling psychology and neuropsychology: A true integration. *The*

 *Counseling Psychologist. 20*, 626-634. doi:10.1177/0011000092204006

Peres, J., & Nasello, A. (2008). Psychotherapy and neuroscience: Towards closer

 integration. *International Journal of Psychology, 43*, 943-957.

 doi:10.1080/00207590701248487:

Rizq, R. (2007). Tread softly: Counseling psychology and neuroscience. *Counseling*

 *Psychology Review, 22*(4), 5-18.

Rumble, B. (2008). Knowing the brain, unknowing the body: A response to Rizq, R. (2007).

 "Tread softly: Counseling psychology and neuroscience.". Counseling Psychology

 Review, 22, 5-18. *Counseling Psychology Review. 23*(3), 70-73.

Ryan, J. J., Lopez, S. J., & Lichtenberg, J. W. (1999). Neuropsychological training in APA

 accredited counseling psychology programs. *The Counseling Psychologist, 27*, 435-

 442. doi:10.1177/0011000099273007

Sampaio, A. & Lifter, K. (2014). Neurosciences of infant mental health development: Recent

 findings and implications for counseling psychology. *Journal of Counseling Psychology,*

 *61*, 513-520. doi:10.1037/cou0000035

Schwartz, J. M., Stoessel, P. W., Baxter, L. R. Jnr., Martin, K. M., Phelps, M. E. (1996).

 Systematic changes in cerebral glucose metabolic rate after successful behaviour

 modification treatment of obsessive-compulsive disorder. *Archives of General Psychiatry,*

 *3*, 109-113. doi:10.1001/archpsyc.1996.01830020023004

Simon-Dack, S. L. & Marmarosh, C. L. (2014). Neurosciences and adult health behaviors:

 Recent findings and implications for counseling psychology. *Journal of Counseling*

 *Psychology, 61*, 528-533. doi:10.1037/cou0000020

Szyf, M., McGowan, P., & Meaney, M. (2008). The Social environment and the epigenome.

 *Environmental and Molecular Mutagenesis, 49,* 46-60. doi:10.1002/em.20357

Van Der Kolk, B. A. (2006). Clinical implications of neuroscience research in

 ptsd. *Annals of The New York Academy of Sciences*, *1071*, 277-293.

 doi:10.1196/annals.1364.022

Viamontes, V. I. & Beitman, B. D. (2006a). Neural substrates of psychotherapeutic change

 part I: The default brain. *Psychiatric Annals, 36*, 225-237. Retrieved from

 http://www.healio.com/psychiatry/journals/psycann

Viamontes, V. I., & Beitman, B. D. (2006b). Neural substrates of psychotherapeutic change

 part II: Beyond default mode. *Psychiatric Annals, 36*, 238-247. Retrieved from

 http://www.healio.com/psychiatry/journals/psycann

Viecili, M. A., MacMullin, J. A., Weiss, J. A., Lunsky, Y. (2010). Predictors of psychology

 graduate student interest in the field of developmental disabilities. *Journal of Mental*

 *Health Research in Intellectual Disabilities, 3*, 190-201.

 doi:10.1080/19315864.2010.524725

Woody, R. H. (1992). Malpractice in counseling neuropsychology. *The Counseling*

 *Psychologist. 20*, 635-639. doi:10.1177/0011000092204007

Woolfe, R., Strawbridge, S., Douglas, B., & Dryden, W. (Eds.). (2010). *Handbook of*

 *counseling psychology* (3rd ed.)*.* London: SAGE.

Wright, S. L. & Díaz, F. (2014). Neuroscience research on aging and implications for

 counseling psychology. *Journal of Counseling Psychology, 61*, 534-540.

 doi:10.1037/cou0000024

Appendix A

Quality Appraisal Process

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Title | Author | Criterion A | Criterion B | Criterion C | QA Approved | Comment |
| Neurosciences, empathy, and healthy interpersonal relationships: Recent findings and implications for counseling psychology. [References]. | Coutinho, Silva, Decety (2014) | High | High | High |  | Approved |
| The importance of incorporating neuroscientific knowledge into counselling psychology: An introduction to affective neuroscience. [References]. | Goss (2015) | High | High | High |  | Approved |
| Neuroscience research on aging and implications for counseling psychology. [References]. | Wright & Diaz (2014) | High | High | High |  | Approved |
| Neurosciences and adult health behaviors: Recent findings and implications for counseling psychology. [References]. | Simon-Dack & Marmarosh (2014) | High | High | High |  | Approved |
| Neuroscience of child and adolescent health development. [References]. | Fine & Sung (2014) | High | High | High |  | Approved |
| Neurosciences of infant mental health development: Recent findings and implications for counseling psychology. [References]. | Sampaio & Lifter (2014) | High | High | High |  | Approved |
| A neuroscience agenda for counseling psychology research. [References]. | Goncalves & Perrone-McGovern (2014) | High | High | High |  | Approved |
| What are the striking parallels between cognitive neuroscience and spiritual traditions? Or why counselling psychologists should embrace transpersonal psychology Dr Ho Law in conversation with Professor Les Lancaster. | Law, Ho (2011) | Medium | Low | Medium | X | Transcript from an interview, rather than an academic paper |
| Predictors of psychology graduate student interest in the field of developmental disabilities. [References]. | Viecili, MacMullin, Weiss, & Lunsky (2010) | High | Low | Low | X | This does not relate to the research question |

Appendix A Continued

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Title | Author | Criterion A | Criterion B | Criterion C | QA Approved | Comment |
| Psychology graduate student training in developmental disability: A Canadian survey. [References]. | Weiss, Lunsky, & Morin (2010) | High | Low | Low | X | This does not relate to the research question |
| Providing effective supervision in clinical neuropsychology. [References]. | Stucky, Bush, & Donders (2010) | Medium | Low | Low | X | This does not relate to the research question |
| Knowing the brain, unknowing the body: A response to Rizq, R. (2007). "Tread softly: Counselling psychology and neuroscience." Counselling Psychology Review, 22, 5-18. [References]. | Rumble (2008) | Medium | High | High |  | Approved |
| Testing times: Counselling psychology and the neuropsychological perspective. A personal view. [References]. | Fairfax (2007) | Medium | High | High |  | Approved |
| Tread softly: Counselling psychology and neuroscience. [References]. | Rizq (2007) | High | High | High |  | Approved |
| The future of our profession: Time to remember our history. | Van Scoyoc (2005) | Medium | Medium | Low | X | This does not relate to the research question, only one brief mention of neuropsychology |
| Supervision in neuropsychological assessment: A survey of training, practices, and perspectives of supervisors. | Shultz, Pedersen, Roper, & Rey-Casserly (2014) | High | Medium | Low | X | This does not relate to the research question, there are four brief mentions of counseling psychology, the paper is focused on clinical neuropsychology supervision |
| How counselling psychologists are perceived by NHS clinical psychologists.. | Lewis & Bor (1998) | High | Medium | Low | X | Topic does not relate to research question, only one mention of neuro, which is in the abstract |
| Recommendations for the inclusion of training about persons with HIV disease in counseling psychology graduate programs. | Werth (1993) | High | High | Low | X | Very brief mention of the neuro aspects of HIV, however very little relevance, paper is more about working with HIV as a CP |

Appendix A Continued

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| Title | Author | Criterion A | Criterion B | Criterion C | QA Approved | Comment |
| Counseling psychologists in general hospital settings: The continued quest for balance and challenge. | Bernard (1992) | High | Medium | Low | X | Paper is about the experience of a CP within a VA center - very brief mention of neuropsychological testing for one line |
| Brain injury and identity-the role of counselling psychologists. | Judd & Wilson (1999) | High | High | Medium |  | Approved |
| Neuropsychological training in APA-accredited counseling psychology programs. | Ryan, Lopez, & Lichtenberg (1999) | High | High | Medium |  | Approved |
| Research contributions of counseling psychologists to neuropsychology. | Lopez, Ryan, & Sumerall (1998) | High | High | Medium |  | Approved |
| Malpractice in counseling neuropsychology. | Woody (1992) | High | High | Medium |  | Approved |
| Counseling psychology and neuropsychology: A true integration. | Paulsen (1992) | High | High | Medium |  | Approved |
| Consumer protection in the expansion of clinical neuropsychology. | Malec (1992) | High | High | Medium |  | Approved |
| To be a counseling psychologist or a counseling neuropsychologist. | Corazzini (1992) | High | High | Medium |  | Approved |
| Integrating neuropsychological training into a counseling psychology curriculum. | Agresti (1992) | High | High | Medium |  | Approved |
| Neuropsychological counseling in hospital settings. | Larson (1992) | High | High | Medium |  | Approved |
| Counseling psychology and neuropsychology: An overview. | Larson & Agresti (1992) | High | High | Medium |  | Approved |
| Counseling center psychologists in neuropsychology: Counseling neuropsychology. | Kemp (1992) | High | High | Medium |  | Approved |

Appendix B

Illustration of themes and sub-themes

