

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

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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 performed on the available literature, determining the key themes and subjects of discussion across the data. A total of 21 publications were carried through to synthesis, with four main themes emerging: Biopsychosocial Topics of Discussion, Neuroscience Education, Integrating Neuropsychology, and Implications of Integration. Further subthemes are 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 evidence of a number of topic areas in which neuroscience can be integrated into counseling psychology. Recent publications may signal a reawakening of an earlier interest in the paradigm.

Keywords

counseling psychology, neuroscience, integration, systematic review

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There has been a recent growth of research publications demonstrating 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 drive our everyday living as humans, both positively and negatively (Panksepp, 2005, 2010, 2011a, 2011b; Panksepp & Biven, 2012). Additional to the literature, there are societies and groups developing around the world, geared toward 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 of the neural makeup of the brain and mind has helped develop two key findings for psychotherapists and psychologists, *brain plasticity* (neuroplasticity) and *epigenesis*. Brain plasticity refers to the brain's ability 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 people's mental health (and brain) develop into healthier and positive states.

Numerous studies have shown, through the use of neuroimaging techniques, the benefits that psychotherapy can have on a person's brain and subsequent well-being (Peres & Nasello, 2008). Karlsson (2011) suggested that there had been (at the time of writing) 20 studies demonstrating how cognitive behavioral therapy, dialectic behavior therapy, 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.), although 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 that 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 that 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. 59), an area in which counseling psychologists are particularly well equipped to conduct research.

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 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., Harrison & Critchley, 2007; Hart, 2008; Van Der Kolk, 2006; Viamontes & Beitman, 2006a, 2006b). 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 issue consisting of articles focused on the integration of neuroscience and counseling psychology. Each article in that issue addressed a specific topic, 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 articles released in that special edition, but also of any other articles that 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 this integration.

As such, in this research study, I undertook a systematic review 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. In addition, it has the potential to bring to light 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 journals. PsycINFO also covers 217 neuroscience journals (APA, 2015).

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 were included (e.g., psychologist, psychologists) and on the word “neuro” to ensure all possible variations of neuro-related articles 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, & PRISMA Group, 2009), inclusion and exclusion criteria were applied to the search results. Included items had to be published within the past 25 years, be written in English, contain a relevant variation of the words counseling (or counselling) psychology and neuroscience (i.e., neuroimaging, neuropsychology or neurology) within the title or

Table 1. Titles of Counseling Psychology–Oriented Journals Covered in PsycINFO

Journals Searched

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

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 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 toward appraising qualitative and quantitative research articles. It was apparent from the scoping review that this body of articles consisted primarily of theoretical and discussion articles, with only two formal quantitative research articles. Given that current literature suggests there is no formal process for appraising the quality of theoretical articles (Campbell et al., 2014), my QA 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 articles (Bonell et al., 2013; Campbell et al., 2014). The EPPI-Centre created a set of QA guidelines, based on the work of David Gough (2007). The aim is for the researcher to determine the QA of articles in relation to three distinct criteria. The first criterion is (a) assessing the quality of the methodology undertaken for a piece of research, that is, qualitative, quantitative, or theoretical review. The second criterion is (b) assessing the relevance of an article’s methodology in relation to the research question. The third criterion

involves (c) assessing the overall focus of the article in relation to the research question under current review. The final stage involves (d) 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. Given that the nature of the review was to address the topics of discussion, the same QA criteria were applied to the two quantitative articles, 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 criterion, a, b, and c. If the overall score (d) averaged over medium, that is, at least one high and two mediums, then the article was carried forward to synthesis.

Data Synthesis Procedure

Given that the primary aim of my research was to review what the common themes of discussion are within the literature, I conducted thematic analysis. I took an inductive approach in that I approached the "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. 83). The reason for this approach is that I wanted to remain open to any themes that 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 and Clarke (2006), with coding geared toward the semantic level. QSR International's NVivo 10 software was used to carry out the thematic analysis.

Ethical Considerations

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

Results

Figure 1 presents the literature search process. It is based on the "preferred reporting items for systematic reviews and meta-analyses" (PRISMA) flow

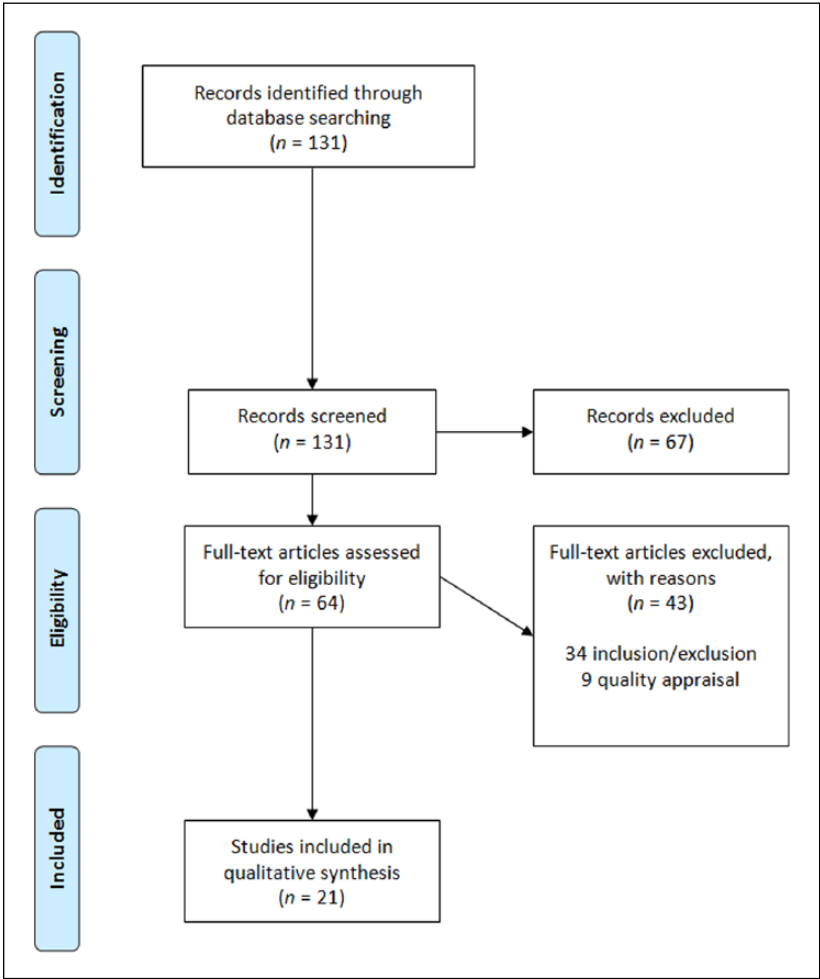


Figure 1. PRISMA data flow chart of literature search and review, highlighting the process of inclusion and exclusion of articles. Adapted from “Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement,” by D. Moher, A. Liberati, J. Tetzlaff, D. G. Altman, and PRISMA Group, 2009, *PLOS Medicine*, 6(7), Figure 1. Copyright 2009 by Moher et al.

chart, an evidence-based approach to determining minimum reporting requirements for systematic reviews and meta-analyses proposed in Moher et al. (2009). Table 2 shows a list of publications included in the analysis.

Table 2. Literature Carried Through to Synthesis

Author (year)	Title	Article type
Agresti (1992)	Integrating neuropsychological training into a counseling psychology curriculum	Theoretical
Corazzini (1992)	To be a counseling psychologist or a counseling neuropsychologist	Theoretical/comment
Kemp (1992)	Counseling center psychologists in neuropsychology: Counseling neuropsychology	Theoretical
Larson (1992)	Neuropsychological counseling in hospital settings	Theoretical/comment
Larson & Agresti (1992)	Counseling psychology and neuropsychology: An overview	Theoretical
Malec (1992)	Consumer protection in the expansion of clinical neuropsychology	Theoretical/comment
Paulsen (1992)	Counseling psychology and neuropsychology: A true integration	Theoretical/comment
Woody (1992)	Malpractice in counseling neuropsychology	Theoretical/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	Theoretical
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	Theoretical
Rizq (2007)	Tread softly: Counselling psychology and neuroscience	Theoretical
Rumble (2008)	Knowing the brain, unknowing the body: A response to Rizq, R. (2007). "Tread softly: Counselling psychology and neuroscience."	Theoretical/comment

(continued)

Table 2. (continued)

Author (year)	Title	Article type
Coutinho, Silva, & Decety (2014)	Neurosciences, empathy, and healthy interpersonal relationships: Recent findings and implications for counseling psychology	Theoretical
Fine & Sung (2014)	Neuroscience of child and adolescent health development	Theoretical
Gonçalves & Perrone-McGovern (2014)	A neuroscience agenda for counseling psychology research	Theoretical
Sampaio & Lifter (2014)	Neurosciences of infant mental health development: Recent findings and implications for counseling psychology	Theoretical
Simon-Dack & Marmarosh (2014)	Neurosciences and adult health behaviors: Recent findings and implications for counseling psychology	Theoretical
Wright & Díaz (2014)	Neuroscience research on aging and implications for counseling psychology	Theoretical
Goss (2015)	The importance of incorporating neuroscientific knowledge into counselling psychology: An introduction to affective neuroscience	Theoretical

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 articles (e.g., dissertation abstracts). In addition, many studies did not meet the title or abstract criteria, including a number of articles with *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 9 more were removed. These articles were removed either because they did not meet the requirements of being an academic article (e.g., 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., Viccili, MacMullin, Weiss, & Lunskey, 2010). There were 21 studies remaining. A thematic analysis was carried out on the articles to obtain the key themes presented.

Themes

Following a period of familiarizing myself with the material, initial coding was carried out across the literature, geared toward obtaining a rich description of the dataset. Because the aim of the study was to elicit headline themes of discussion, coding was conducted at a high semantic level; that is, 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 section headings and paragraphs, and to specific phrases and words, as well as 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. 92).

The four main themes found were Biopsychosocial Topics of Discussion, Neuroscience Education, Integrating Neuropsychology, and Implications of Integration.

Theme 1—Biopsychosocial Topics of Discussion. This theme provides 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.

Subtheme 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 from the neuroscience of empathy is included below:

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)

Subtheme 1.2—General psychosocial topics. A number of codes highlighted general discussions about psychosocial concepts. 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 [*sic*] behaviors such as unconditional acceptance of the client's experience, active listening, and nonjudgmental communication. (Coutinho et al., 2014, p. 542)

Subtheme 1.3—Specific topics. Whereas the items coded in the previous subtheme focused on general concepts of psychosocial theories, this subtheme highlights more specific topics 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, such as how empathy or attachment (Subtheme 1.2) affects the adolescent brain (Subtheme 1.3).

Theme 2—Neuroscience Education. The literature often provided the reader with information and education on neuroscience.

Subtheme 2.1—Neuroscience research techniques. Several 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 & Díaz, 2014, p. 535)

Within this theme, there were also descriptions of both 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 & Sung, 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). (Sampaio & Lifter, 2014, p. 515)

The theme also included discussions about the use of animal models and research to inform neuroscience.

Subtheme 2.2—Neuroscience concepts. Just like the general (counseling) psychology themes (e.g., empathy, attachment, memory) were identified in the subtheme on general psychosocial topics, there were consistent neuroscience concepts identified throughout the literature. These concepts, namely biomarkers, epigenetics, mirror neurons, neurogenesis and synaptogenesis, and neuroplasticity, 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)

Subtheme 2.3—General neuroscience education. Similar to Subtheme 1.1, many articles 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 programming deficits (e.g., schizophrenia, attention-deficit/hyperactivity disorder, major depressive disorder). (Gonçalves & Perrone-McGovern, 2014, p. 509)

Theme 3—Integrating Neuropsychology. Although the focus of this analysis was on the more broadly applicable field of neuroscience, a number of articles focused solely on the integration of counseling psychology and neuropsychology. As such, an entire theme emerged on this subject.

Subtheme 3.1—The benefits of integrating neuropsychology. Coding within this theme highlighted the benefits 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, and 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)

Subtheme 3.2—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 claiming 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)

The 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 judgments about and absolute adherence to professional standards. (Woody, 1992, p. 639)

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

Subtheme 3.3—Implementing neuropsychology into counseling psychology training. Generally, authors agreed that neuropsychology training should be implemented within counseling psychology:

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 about 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:

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)

Ethical considerations were highlighted as well:

[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)

Subtheme 3.4—What does it mean to our identity? A number of discussions centered around the traditional view of a counseling psychologist's identity, as well as around the focus that counseling psychology has often given to discussing its identity. Suggestions were made that there should be less focus on, and less 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)

Subtheme 3.5—Neuropsychology education. Similar to Subtheme 2.3, which discussed how the literature provided a general education on neuroscience, this subtheme highlights that a number of articles provided a general education on neuropsychology, including specific case examples of how a counseling psychologist can use neuropsychology as well as education on neuropsychological assessment and the role of a neuropsychologist:

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)

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)

Theme 4—Implications of Integration. A prominent discussion throughout the articles related to the subject of integrating neuroscience into counseling psychology, highlighting the implications of integrating the two disciplines, including discussions on the challenges and benefits of integration.

Subtheme 4.1—Implications for counseling psychology. A consistent focus was 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. In this subtheme, authors addressed collaborations 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 [Alzheimer's Disease]. (Wright & Díaz, 2014, p. 537)

Two other main subsections of this theme related to the implication of neuroscience for counseling psychologists' clinical practice as well as research:

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, 2014, p. 530)

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)

Subtheme 4.2—Challenges. Challenges noted 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), a reductionist view of neuroscience and the danger of neuroscience being used to try to complete knowledge about a client.

Subtheme 4.3—Benefits. Somewhat opposing the items in Subtheme 4.2, a number of codes related to the benefits 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 multidisciplinary 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)

Discussion

The aim of this research was to undertake a systematic review 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, Neuroscience Education, Integrating Neuropsychology, and Implications of Integration. These headline themes provide a somewhat general flavor of the types of topics discussed within the literature; however, it is the subthemes that 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 order to capture a general understanding of the literature in relation to the paradigm. The literature search returned 21 articles that were deemed eligible for synthesis, suggesting that it is a fairly young paradigm. One prominent finding was that there were two distinct periods of publications. The first period consisted of eight articles from a special edition of the SAGE journal *The Counseling Psychologist* in 1992, which 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 articles greatly influenced the third theme, Integrating Neuropsychology. There were also two other articles published later in the 1990s that focused on this integration (Lopez, Ryan, & Sumerall, 1998; Ryan, Lopez, & Lichtenberg, 1999). The second distinct period consisted of six articles that were published in 2014, all in a special section of the *Journal of Counseling Psychology*, focusing on the integration of counseling psychology and neuroscience (Coutinho et al., 2014; Fine & Sung, 2014; Gonçalves & Perrone-McGovern, 2014; Sampaio & Lifter, 2014; Simon-Dack & Marmarosh, 2014; Wright & Díaz, 2014). Only two articles (Goss, 2015; Rizq, 2007) provided a similar level of discussion to the previous publications released in 1992 and 2014. Judd and Wilson (1999), on the other hand, discussed the experience of clients with acquired brain injury (ABI); Rumble (2008) provided 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. First, given the source location of the articles, the United States 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 U.K.-based publication that, along with Fairfax (2007) and Rizq (2007), suggests that there is some attention to the issue in the United Kingdom. The second is that perhaps the *Journal of Counseling Psychology* special section in 2014 signals that an earlier flame of integrating counseling psychology and neuroscience, sparked in the 1992 special issue 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. Neuroscience can provide an evidence base for the work of scientist-practitioner-oriented counseling psychologists, which can, in turn, promote communication with medically oriented multidisciplinary colleagues. Larson (1992) proposed various roles for counseling psychologists to undertake in neuropsychological settings, including providing psychoeducation to clients and their families by interpreting neurological data, discussing how assessed deficits may affect their subjective experience, as well as acting as a mediator in conflicts that 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). An understanding of neuroscience may improve counseling psychologists' work within a range of client populations, including people with learning disabilities and with 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 oriented ecological evidence to help illuminate neuroscience research further (Coutinho et al., 2014; Fine & Sung, 2014; Goss, 2015; Rizq, 2007; Wright & Díaz, 2014).

The literature also discusses a number of challenges to integrating neuroscience into counseling psychology. One such discussion is related to the danger of false expertise, meaning that there is a potential danger of counseling psychologists thinking they know more than they actually do on the subject of neuroscience (and neuropsychology) and working outside of their area of 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, the data suggest integrating neuroscience into doctoral and postdoctoral training courses to help counseling psychologists familiarize themselves with the area and reach a level of knowledge that is consistent with ethical practice (Goss, 2015; Paulsen, 1992).

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 adopts a medically oriented 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). Counseling psychologists can maintain their core professional identity when diversifying into other areas, including neuroscience (Agresti, 1992; Corazzini, 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 that may have been missed. A key limitation to this work is that I included only articles that have a truncation of "counseling psycholog*" and "neuro*" in their title or abstract. It is possible that there are articles discussing the integration of neuroscience with clinical or educational psychology, vocational decision making, counseling, or psychotherapy that may have high relevance and links to counseling psychology. However, given that I was interested in investigating the potentially unique integration that 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 multidisciplinary readers are aware of the wide-ranging and unique contributions that we can bring to developing the well-being and mental health of our clients. It is important to note, however, that a number of key vocational, clinical, and educational journals were included within the PsycINFO search.

The exclusion of pre-1990 material could be seen as a limitation to this research. There were two primary reasons, however, that I maintained a 25-year inclusion criteria on publications. First, it is only within the past 20 years or so that neuroimaging techniques have allowed us to develop greater depth of understanding of the brain (Damasio, 2011); publications pre-1991 could be seen as somewhat skeptical in their body of neuroscience evidence. Second, the discussions of any articles published more than 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 24 years old, making it difficult to determine whether their discussions are truly relevant to the current landscape of counseling psychology. I felt that their inclusion was required to

demonstrate an element of the historical discussions that have occurred, as well as to highlight a previous special issue of a journal focused on the topic 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 seemed important to highlight all forms of discussions that 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, while acknowledging that both have a place in the overall review of literature presented.

Although articles had to be published in a peer-reviewed journal, there is a possibility that Rumble's (2008) publication was reviewed only 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 areas within which integration is currently being discussed, such as empathy and aging. Several themes and subthemes suggest that counseling psychologists can use the available publications to further educate themselves in neuroscience, particularly in relation to counseling psychology. One particularly useful direction for future work would be to conduct the same research methodology but to focus the research question on exploring 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. For example, in Coutinho et al. (2014), there was a discussion on the neuroscience of empathy. The next stage for a review would be to extrapolate what specific brain areas, neurotransmitters, and so on 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 entire dataset is that it may provide insight into what the common brain regions and processes are relevant to the work of counseling psychologists. In turn these topics could be integrated into personal, doctoral, and continual professional development training. Learning about concepts such as neuroplasticity and

neurogenesis can be of benefit to counseling psychologists (Coutinho et al., 2014; Fine & Sung, 2014; Gonçalves & 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 identified discussions on the benefits and challenges of integrating neuroscience into counseling psychology. Although I began to discuss these points, additional research is needed to analyze the specific details, potentially helping to improve the integration of the two disciplines.

In relation to the third theme on neuropsychology, given that the majority of publications contributing to this theme were published in 1992, it would be useful to investigate whether the landscape for integrating neuropsychology into counseling psychology training and practice has changed over the past 24 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 2014-2015 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 articles were theoretical discussion articles. There were only two quantitative research articles, 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 that integrates 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 the case, perhaps this is a consideration for editorial teams when selecting peer reviewers, or perhaps it is merely a case of being patient while more of our colleagues become further familiarized with neuroscience research; however, this is something that would perhaps benefit from further research inquiry 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.

Author's Note

David Goss was at the University of Manchester when he completed this study.

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