

Critical Commentary

Advancing the Science of Social Work: The Case for Biosocial Research

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Abstract

Social workers have long advocated for using a biopsychosocial model for social work practice. Although the biopsychosocial framework to understanding and treating problems is ubiquitous to social work practice, the biological domain has historically been neglected. In recent years, however, social work practitioners and scholars have begun to embrace findings from biosocial research to inform theory and practice. Despite the emerging use of findings from biosocial research studies in social work, the discipline of social work seems slow to employ biosocial research designs to contribute new knowledge. This critical commentary discusses the importance of biosocial research to social work, explores the reluctance and barriers to more fully incorporating biosocial research designs, and argues for the social work research community to set an active biosocial research agenda so that we may contribute in a scientific way to testing and refining all aspects of the biopsychosocial framework.

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Introduction

Since the inception of the social work profession, social workers have advocated using a holistic perspective to assessing and treating individual and social problems. To this day, ‘biopsychosocial’ and ‘person-in-environment’ perspectives are ubiquitous in social work practice and research. For example, the bioecological model (Bronfenbrenner and Cici, 1994), which accounts for biological and ecological factors to understand complex processes and contexts, is one of the most prevalent models taught and used in social work (Wakefield, 1996a, 1996b). However, despite the apparent emphasis on using a biopsychosocial theoretical approach, the *psycho-social* domains have traditionally received the lion’s share of the attention, while biological factors—genetic, physiological or neurological—have received cursory or superficial attention (McCutcheon, 2006; Saleebey, 1992; Vaughn et al., 2013).

The evolution of new intersecting fields of scientific study (e.g. social neuroscience), aimed at integrating biological and social research to improve our understanding of human behaviour, has advanced dramatically in recent years. A robust evidence base has firmly established the importance of both the environment and biology in almost every realm of human behaviour (Polderman et al., 2015). To some degree, social work practitioners and scholars have incorporated the results from biosocial scholarship into theory and practice in order to push the field forward, yet this remains the general exception rather than the rule (e.g. Applegate and Shapiro, 2005; Combs-Orme, 2013; Garland and Howard, 2009; Hesselbrock et al., 2013; Johnson, 2001; Kingsberry, 2011; Montgomery, 2013; Sayre and Walker, 2014; Vaughn et al., 2013).

Despite some acceptance of biosocial thinking to inform theory and practice, the discipline of social work has been relatively slow to employ biosocial research designs (Maynard et al., 2015). Of the social science disciplines, psychology has arguably moved most quickly to incorporate biosocial research designs (Pinker, 2002). Other fields, such as criminology and sociology, have slowly begun emphasising a biosocial approach despite long histories of resistance to biology (Barnes et al., 2014a; Barnes and Boutwell, 2015). Some social work scholars have called for the integration of social and biological research, advocating for a transdisciplinary approach to understanding human behaviour (Brekke, 2014; Matto and Strolin-Goltzman, 2010; McCutcheon, 2006; Vaughn et al., 2013) and integrating knowledge and methods across disciplines to propose, test and refine the bioecological and person-in-environment models used by social workers.

Our recent examination of the publication of biosocial research in social work disciplinary journals, however, found few examples of studies in which authors used a biosocial research design (Maynard et al., 2015).

We systematically searched seventy-five social work journals, using the comprehensive list of journals ranked by Hodge and Lacasse (2011), for empirical articles published between 1 January 2000 and 31 January 2015 that included at least one biological factor as a variable in the study (Maynard *et al.*, 2015 for full study details). We found only eleven studies that met study inclusion criteria, revealing a paucity of studies published in social work journals that used biological variables in the research design. Given that research housed in a discipline's journals reflects the knowledge central to the field, our findings indicate serious neglect of a relevant area of research, which could result in important implications for the field of social work.

This critical commentary argues for the need to more fully incorporate and actively engage in biosocial research by social work researchers. We provide an overview of biosocial research, discuss the potential benefits of employing biosocial research designs, and explore barriers and opposition to biosocial research in social work.

The nature of biosocial science

Biosocial research is a broad term referring to a multidisciplinary enterprise integrating the biological and social sciences (Barnes and Boutwell, 2015). Though a full discussion of biosocial research is beyond the scope of this commentary, we will focus on behaviour and molecular genetics, physiological processes and neurobiology. Behaviour genetics is an interdisciplinary field of study that examines the relative contribution of genetics and environment to human differences across a range of phenotypes (i.e. behaviours, diseases, etc.; Barnes, *et al.*, 2014a). The basic twin design, which serves as the workhorse of quantitative geneticists, allows researchers to partition the variance of phenotypes (e.g. personality traits, psychopathologies) into two primary components: heritable (capturing the role that genetic differences play in explaining human differences) and environmental variance (Plomin *et al.*, 2013; Polderman *et al.*, 2015). Environmental variance is subdivided into that which is accounted for by the shared environment (environmental effects that increase the similarity of siblings raised together) versus that which is explained by the non-shared environment (which constitutes all of the unique experiences that siblings experience over their lives, thus making them different from one another, as well as measurement error and random chance). Owing to decades of twin research, the idea that genetic variation plays an important role in creating individual differences on physiological, psychological and sociological outcomes is beyond dispute (Barnes *et al.*, 2014b; Plomin and Asbury, 2005; Polderman *et al.*, 2015; Turkheimer and Waldron, 2000). Moving beyond the broad partitioning of trait variance, molecular genetics directly measures variation in segments of DNA in order to test

whether they are associated with certain behaviours. The conclusions emerging from molecular genetics is that the traits which occupy the interest of social scientists are the product of numerous genetic variants, all contributing minute (generally additive) effects (Chabris *et al.*, 2015; Plomin *et al.*, 1994; Polderman *et al.*, 2015).

Beyond genetics, biosocial scholars explore the physiological and neural substrates that are associated with social and behavioural outcomes. Studies examining physiological states have consistently produced important findings that contribute to our understanding of social and behavioural outcomes. Low resting heart rate, for instance, represents a consistent correlate of delinquent and criminal behaviour (Armstrong and Boutwell, 2012; Ortiz and Raine, 2004). Lower cortisol responses to stress have been linked to childhood adversity and emotional and social problems in children (Ouellet-Morin *et al.*, 2011).

Neuroscience, the study of the nervous system focusing on the brain and its impact on behaviour and cognitive functions, has exploded in the past twenty years. Several branches of neuroscience have been formed to focus on different research areas and subjects of study, including those focused on behaviour and cognition such as social neuroscience, cognitive neuroscience, neuropsychology, behavioural neuroscience and cultural neuroscience (Pinker, 2002). The neurosciences have examined specific regions of the brain—examining both structure and function—in order to discern how behaviour emerges at the level of neuronal functioning (Aron *et al.*, 2005; Etkin and Wager, 2007; Lanius *et al.*, 2004). Emergent findings from various branches within the neurosciences have provided a wealth of insight into biological correlates and causes of behaviour.

In short, biosocial scholarship is a rich and diverse paradigm that employs a large methodological toolkit (quantitative genetics, behavioural endocrinology and psycho-physiology, and neuroscience-based performance measures and brain imaging) to understand social processes and outcomes. Advances in technology have provided the means to explore factors, such as genes and neural pathways, which were not possible to explore in the not-too-distant past. This rapidly expanding body of biosocial research has advanced our understanding of the aetiology and development of mental and behavioural health problems and social outcomes considerably, while also highlighting the complex interplay of biological factors and environmental influences. Indeed, evidence from biosocial research has elucidated the importance of socio-environmental factors, rather than negated them (Danese and McEwen, 2012; Mitchell *et al.*, 2014). Given the relevance of both biological and environmental factors to human development, focusing only on socio-environmental factors carries with it the possibility of confusing which socio-environmental factors are important because the biological sources of variance were not included in the models (Barnes *et al.*, 2014a). As such, the inclusion of the

biological strengthens insight about the socio-environmental factors that are relevant to behaviour.

Integrating biological factors into social work research

Knowledge regarding the causes and correlates of typical and atypical development derived from biosocial research designs can lead to more efficient and effective identification of those at greatest risk for various disorders or poor outcomes and, as such, facilitate targeted prevention and intervention efforts (Beauchaine *et al.*, 2008; Garland and Howard, 2009; Matto and Strolin-Goltzman, 2010; Maynard and Larson, 2014; McCutcheon, 2006). For example, once thought to stem from one's early life experiences (e.g. family dysfunction), schizophrenia is now understood to result from a complex array of polygenic influences (Pinker, 2002). From extensive research on the biological substrates of schizophrenia, researchers are beginning to elucidate various endophenotypes that mark liability for the disorder. This knowledge could be used to facilitate the identification of children and adolescents at the greatest risk and provide targeted prevention services to reduce the likelihood of developing schizophrenia (Beauchaine *et al.*, 2008). While schizophrenia is now understood as a disorder of brain function, biosocial research examining the contributions of biological and social factors has also led to a better understanding of the role and interaction of socio-environmental factors in the course of schizophrenia. This has in turn led to the widespread use of psycho-social interventions in treating schizophrenia, such as psycho-educational multi-family groups (McFarlane, 2002). Thus, while understanding the biological factors is important, turning our attention to include biological factors in social work research does not presume a biological intervention. Indeed, it can lead to the identification and refinement of psycho-social interventions that affect or mitigate biological factors.

In addition to better understanding causes, correlates and moderators to improve our basic knowledge of human development and behavioural and mental health disorders, the knowledge derived from biosocial research has contributed to a reduction of the stigma once associated with many disorders. Several disorders were once thought to stem from failures of individual morality or dysfunctional mother-child relationships, often resulting in blame and stigma on individuals, mothers and families, as well as misplaced targets of intervention efforts. The evolution of the conceptualisations and treatment of schizophrenia and autism are but two examples of the ways in which biosocial research has contributed to the de-stigmatisation and improved treatment of behavioural and mental health disorders. Even sexual orientation, which was until more recently viewed as an individual choice with social learning origins and listed as a mental disorder in the *Diagnostic and Statistical Manual* of the American

Psychiatric Association (APA, 1968), is now understood to have more complex underpinnings that span beyond simplistic notions of choice (Littrell, 2008). This knowledge, derived from biosocial research, has allowed a reconceptualisation of sexuality and discontinuation of ineffective and dangerous approaches to ‘treatment’, such as conversion therapy.

Despite advances in knowledge of the salience of biological and environmental factors, inclusion of biological variables in prevention and intervention theory and science is lagging (Beauchaine *et al.*, 2008) and biosocial principles are largely absent from social work intervention programmes. Indeed, the results of our systematic review (Maynard *et al.*, 2015) suggest that social work is lagging behind other disciplines in contributing new knowledge to advance the ‘bio’ component of the biopsychosocial framework. This is unfortunate, as social work has much to gain from, and contribute to, biosocial research. Given the inter-disciplinary nature of social work, social workers are particularly well positioned to contribute to the integration of biological and social research and translate these research findings into practice (McCutcheon, 2006; National Association of Social Workers (NASW), 2003). Moreover, embracing biosocial research methods will allow us to not only gain a deeper understanding of the nature of problems social workers face, but it can also directly inform assessment, prevention and treatment strategies. For example, fMRI studies used in psycho-social treatment investigations can identify key areas of the brain that are impacted by psycho-social treatment and thus enhance the specification of treatment along with its scientific credibility.

Given more recent developments and advances in our understanding of the interplay of biological and social factors, we argue that integrating biological measures into social work research programmes is an important next step in the development and advancement of social work research. Incorporating biological variables can help to provide a more nuanced and more accurate understanding of individual and social problems. Moreover, by embracing a truly biosocial framework, we can enhance social work intervention programmes by more effectively and efficiently targeting environment and biosocial variables and interactions that predict and moderate treatment response, and advance identification and matching of interventions to those most at risk and most likely to benefit (see also Beauchaine *et al.*, 2008; Matto and Strolin-Goltzman, 2010; McCutcheon, 2006; Rocque *et al.*, 2012; Van Goozen and Fairchild, 2008)

Resistance to biosocial research in social work

If biosocial research methods are so critical to advancing the field of social work, then why is social work lagging behind other social science

disciplines in adopting biosocial research methods? While there are likely several reasons, we will discuss three of the most salient. First, social work knowledge and research methods are primarily derived from the social sciences. Social scientists have traditionally received very little training in the biological and natural sciences, which in large part stems from the traditional scope and ontological and epistemological assumptions underpinning social science research. Consequently, doctoral students do not receive training to conduct biosocial research. Moreover, undergraduate and master's-level social work education programmes, which most often form the basis of education for doctoral-trained social work researchers, are deficient in training in biology, genetics or the neurosciences. Simply, social work scholars lack the requisite training to pose biosocial research questions and to implement biosocial research methods. As a result, the overarching ideology for much of the past century has focused the attention of social workers on the non-biological sources of individual and social problems. Over the past decade, however, there has been increased interest in integrating training in neurology and genetics into social work education programmes (Johnson, 2001; Kingsberry *et al.*, 2011; NASW, 2003), but it is unclear whether and to what extent social work programmes have added this content to their curriculum. This lack of expertise and training for biosocial research is not unique to social work scholars. Researchers and scholars in the biological and natural sciences who are undertaking biosocial research are often doing so without the requisite training and expertise in the social sciences, thus they might not fully understand or appreciate the socio-environmental factors and implications. While making curricular changes can surely help, it is more necessary than ever for social work scholars to work on inter-disciplinary teams with those who have specialised knowledge, expertise and equipment to not only learn from them, but to also share our knowledge and expertise. By working together, the social and natural scientists can benefit from each other's knowledge and methods to better understand and mitigate individual and social problems.

Another barrier, fuelled in part by a lack of knowledge and understanding, is the opposition to biosocial research methods based in fear or on ideological grounds (Pinker, 2002). Given our historical focus on the environment and human agency, social workers express concerns that biosocial research will lead down a dangerous path of unethical and harmful research that could take advantage of and harm marginalised and disadvantaged groups, and perpetuate social and economic injustice (Hall *et al.*, 2008). These fears are particularly heightened for behaviour and molecular genetics research, primarily as a result of the eugenics movement in the early twentieth century. While there are certainly instances of biosocial research being abused and causing harm, the same is the case for social science research (Pinker, 2002). One has to look no further

than some famous examples, such as the Stanford Prison Experiment, the Milgram study and homosexual aversion therapy experiments (Milgram, 1963; Zimbardo *et al.*, 1971). In the days of eugenics and other failures of social science experiments mentioned above, biological and social sciences were less developed, and some fields, such as human genetics, were in their infancy, resulting in both sides committing serious mistakes and abuses (Massey, 2015). However, we have made substantial progress, and there has since been much growth and development across all scientific fields in terms of our knowledge, methods and ethical protections for human subjects. There are thousands of medical and other studies using biospecimens that are done in ethically sound ways, and the results from those studies have resulted in much benefit to the world.

Despite greater awareness of abuses that can occur in research from prior cases, the advances in regulations and safeguards designed to protect human participants, and evidence of biosocial research being conducted in ethical ways that have benefitted humanity, misuse and abuse of biosocial research can still occur. With the emergence of biosocial research and novel techniques and technology, new and complex ethical issues are arising and we need to be attentive and mindful of the ethical implications and be prepared to advocate on behalf of vulnerable populations. While it is beyond the scope of this commentary to discuss ethical issues and implications in depth, there are ethical considerations that should be considered by social workers. Durfy (2000), in a compendium of articles published by the National Research Council (2000) on whether biological measures should be used in social science research, discussed four general categories of ethical and social issues of genetic research studies that are also relevant to other biosocial designs and continue to apply today. These include 'privacy [of genetic information], access and ownership of genetic information and materials, psychosocial risks of participating in genetic research studies, and potential group harms' (National Research Council, 2000, p. 304). A number of recent articles have been written to discuss and debate some of the more nuanced issues arising, particularly as it relates to the collection, management and storage of biospecimens and genetic material, informed consent and disclosing individual research results to participants (McEwen *et al.*, 2013; Simon *et al.*, 2012; Woods and McCormack, 2013). While the intensity of the discussion of biosocial research ethics have intensified over the past ten to fifteen years, consideration of ethical issues of biosocial research are not new—there are a number of reports by the Federal government and working groups that have been published over the past thirty years addressing ethical, social and policy issues of biosocial research, including a publication from the NASW (2003), from which social work researchers can draw when considering incorporating biosocial research methods.

Many of the aforementioned issues are not resolved and continue to be debated, and ethical concerns related to biosocial research should not

be taken lightly. Indeed, we would argue that social work researchers need to be at the table in these discussions to advocate for vulnerable populations in particular, and help in establishing rules and regulations. Indeed, revisions to the Common Rule, the Federal policy for the protection of human subjects (45 C.F.R. Part 46), are currently being proposed and the treatment of biospecimens is one of the more controversial changes being proposed (US Department of Health and Human Services (HHS), n.d.). While we do not necessarily have all the answers to these complex ethical issues, we would advocate that social work researchers be guided by the Code of Ethics set forth by the NASW (2008) and also be aware of the code of ethics of research collaborators from other disciplines with whom they are working. We also recommend that social work researchers, guided by the NASW Code of Ethics, contribute more directly in their universities and organisations to help form guidance within their own Institutional Review Boards.

While ethical issues related to biosocial research can be complex and nuanced, many of the ethical issues present in biosocial research are not necessarily distinct from other types of research with human participants. Notwithstanding the potential complexities and nuances of biosocial research, it is important to consider that ignoring biological factors when they are clearly relevant to the topic, and examining only socio-environmental factors, can result in biased research and incorrect conclusions (Barnes *et al.*, 2014a), which also has ethical implications. The idea of rejecting biosocial research or not including marginalised populations in such studies aimed ultimately at benefitting humanity is arguably unethical. Alternatively, we can embrace biosocial research methods, follow and continue to develop and advocate for ethical conduct and use of biosocial research, and use that research to the benefit of all people, including those who are marginalised and disadvantaged. As Jones and Harris (2011) cogently argued when reflecting on the dilemma of the risks versus benefits of genetic research in social work, 'It is precisely because of this dilemma that social workers, and especially social workers of colour, must be encouraged to become active participants in all aspects of genetics, including research, policy formation, administration, as well as counselling' (p. 390).

In addition to fears of abuses and harm, some have expressed concern that embracing the biosocial research paradigm would lead to biological determinism, reinforce the medical model and lead to the prioritisation of medical interventions (Beauchaine *et al.*, 2008). This, however, represents a misunderstanding of how biological factors influence behavioural and psychological outcomes. As was discussed earlier, it is due to biosocial research (behaviour genetics, in particular) that relevant environmental factors have been most effectively elucidated. Further, reductionism and determinism work both ways—strict attention to the social is itself a form of reductionism and can be equally deterministic

(Pinker, 2002). While medical interventions could certainly be proposed in response to biosocial research evidence, the concerns that the medical model would be the sole focus ignores the overwhelming evidence from biosocial research that well-being and maladjustment have both environmental and biological influences. Moreover, it also ignores the myriad of socio-environmental factors and interventions that have been found to mitigate or affect biological processes (Beauchaine *et al.*, 2008; Garland and Howard, 2009; Maynard and Larson, 2014; Van Goozen and Fairchild, 2008). Social workers can play a critical role in advancing biosocial research by providing the knowledge and understanding of the social situations and factors that may contribute to and interact with the biological structures and processes (Massey, 2015). Indeed, if social workers remain on the periphery of biosocial research, the issues we are concerned about and the values for which we stand may not be addressed (Jones and Harris, 2011).

Like all other research approaches, the opportunity for abuse and misuse is certainly present. We must be aware of the history and risks, and the basic ethical canons of science must guide the way; but this is nothing new or unique, and it applies to every research agenda, biosocial or otherwise. We must not, however, continue to ignore or discount potential benefits of biosocial methods or their implications for research and social work practice based on fear or ideology. If we continue to neglect biosocial research methods, then we may do more harm than good by perpetuating out-dated theories and basing our profession on incomplete evidence.

Conclusions

Biosocial research has not only expanded our understanding of the aetiology and development of social problems, but it has also effectively highlighted the complex interplay of biological and environmental factors. The advances being made in biosocial research can strengthen and advance our understanding of the 'bio' component of the biopsychosocial model and allow us to test more robust theoretical models and create more holistic and effective assessment methods and interventions. Moreover, results from biosocial research can provide evidence needed to reduce stigma, empower people, and inform and improve assessment, prevention and intervention efforts. It is clear that biosocial research methods will continue to advance whether or not social workers are involved. Fortunately, social work researchers are already engaging in biosocial research, including Eric Garland and Matthew Howard (Garland *et al.*, 2012, 2010), Michael Vaughn (Dong *et al.*, 2014; Maynard *et al.*, 2014; Vaughn *et al.*, 2009a, 2009b), Shaun Eack (Eack *et al.*, 2010) and Greenberg and Mailick (Smith *et al.*, 2012; Song *et al.*, 2014).

Unfortunately, there remains a paucity of social work researchers who are using biosocial research methods, and few social work students being trained in biosocial methods.

The question is whether the discipline of social work should remain outside looking in, or at best on the periphery of such a substantial paradigm shift. Do we want other disciplines driving and shaping biosocial research questions, priorities and methods? Do we want to rely on other disciplines to translate biosocial research into practice? There are undoubtedly real barriers, such as substantive and methodological training and funding challenges, to fully engage in biosocial research, and there are unresolved ethical implications that need to be considered and addressed. Social work, however, has much to contribute to the biosocial research paradigm and thus we must pursue an active biosocial research agenda and build capacity within social work to make a more substantial impact. In short, social workers must be at the table to drive the questions that are asked, and influence how problems are framed and how biosocial research is generated, interpreted and disseminated, including the ethical implications and protection of vulnerable populations. If we want our discipline to remain relevant and to truly advance a 'science of social work' (Brekke, 2012), we must engage in testing and refining all aspects of the biosychosocial framework.

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