Translating the theory of intersectionality into quantitative and mixed methods for empirical gender transformative research on health

Anne E. Fehrenbacher and Dhara Patel

ABSTRACT
Intersectionality theory has been used primarily in legal research to provide a framework for understanding the experiences of populations situated within multiple systems of oppression, particularly in relation to anti-discrimination law and gender-based violence. Gender transformative approaches to health seek to move beyond individual-level change and instead centre on restructuring the power relationships that create and maintain gender inequalities. Intersectionality theory is well-suited for the study of gender transformation on health, but there is a lack of consensus on clearly defined intersectional methodology in the field of public health, particularly for quantitative studies. Because qualitative methodologies are well-developed and employed with regularity for intersectional health research, the objective of this paper is to describe innovative quantitative and mixed methods approaches underutilised in public health and provide researchers examples of how to design a study’s methodology to adequately address intersectional research questions. The proposed methods provide a toolkit for the investigation of complex interactions across multiple levels, which may offer insight into effective points of intervention to reduce disparities, strengthen larger social movements, and ultimately alter structural and policy contexts. Despite challenges posed by the theory, intersectional approaches may be the key to addressing persistent inequalities that limit gender transformation.

ARTICLE HISTORY
Received 1 February 2019
Accepted 19 September 2019

KEYWORDS
Intersectionality; gender; theory; methods; transformative research

Introduction

Gender transformation in health moves beyond individual-level change and is instead centred on restructuring the power relationships that create and maintain gender inequalities (Hillenbrand et al. 2015). Intersectionality theory is well-suited for the
study of gender transformation because it challenges models that operationalise social determinants of health as distinct categories and is designed to change structures, institutions, and policies (Iyer, Sen, and Ostlin 2008). Intersectionality refers to the fluid process of holding multiple identities situated within a historical context (Crenshaw 1989). Introduced by feminist legal theorist Kimberlé Crenshaw in 1989, the theory of intersectionality highlights how oppressed social groups live in the margins of society with unequal access to resources and opportunities. Black feminist legal scholars have used intersectionality theory to demonstrate the ways in which systems of power and resilience based on gender, race, and class, among other axes, overlap with one another rather than exert independent effects on individuals or groups (Crenshaw 1989).

The theory of intersectionality provides a framework for understanding the interlocking, cumulative effects of different social structures on health (Wickrama et al. 1999, Institute of Medicine 2003). Although intersectionality theory has grown rapidly in popularity among academics across disciplines, it is still used primarily in theoretical or conceptual work rather than applied research within public health (Bowleg 2012). In addition, public health researchers have often oversimplified intersectionality theory by focusing primarily on identity categories as distinct variables rather than interactive processes, as well as relying on deficit models of identity which fail to recognise how delineating difference can be a source of solidarity, empowerment, and resistance (Rosenthal 2016). Further empirical research on the interrelationships between different axes of social power and their impact on health is needed to create gender transformative interventions and policies.

**Intersectionality theory and gender transformation**

Pederson, Greaves, and Poole (2015) have proposed an intersectional approach for gender transformative research, that is, an approach that challenges existing gender norms and power structures to reduce gender inequities while also accounting for how other embodied and ascribed identities influence these norms (Pederson, Greaves, and Poole 2015). Their gender transformative framework for health promotion grew from the recognition that many health interventions directed at women are based on inadequate evidence, promote the use of gendered stereotypes, and conflate sex with gender (Pederson, Greaves, and Poole 2015). The gender transformative framework attempts to address these issues by incorporating ‘gendered health determinants’ – biological, environmental, social, political, cultural, and economic factors – which interact to create gendered social structures and systems, which in turn, influence policy and services through discriminatory practices (Pederson, Greaves, and Poole 2015).

Although gender is understood in public health as a fluid concept that incorporates behaviours, expressions, norms, identities, and institutions which can be operationalised many different ways, the measurement of gender is commonly conflated with sex assigned at birth (Westbrook and Saperstein 2015). The gender transformative model for health promotion draws attention to the need for composite and process measures of gender, such as the Gender Role Conflict Index or Self-Perceived and Self-Reported Gender Equality Scale (Tannenbaum, Greaves, and Graham 2016). Because gender is experienced not just individually but socially, it may be better explained through relational gender theory rather than categories (Connell 2012). Connell describes relational
gender theory as a way of understanding gender as a multidimensional process operating and embodied within a complex network of institutions (Connell 2012).

Although the gender transformative framework for health promotion acknowledges the importance of intersectionality in addressing gendered health disparities, early iterations of the framework focused heavily on gendered institutions at the expense of other dimensions of identity or social stratification, such as race, class, and geography (Van den Berg et al. 2013; Doyle et al. 2018). Such approaches can fail to capture the root causes of a problem, produce difficulties in maintaining long-term positive intervention effects, or lead to unintended consequences (Dworkin, Fleming, and Colvin 2015). Furthermore, gender transformative interventions often rely on reductive binary and heteronormative conceptions of gender and family relationships, which are not inclusive of sexual and gender minority individuals and families (Dworkin, Fleming, and Colvin 2015).

For example, in a study which evaluated the use of a gender transformative intervention to promote gender equitable parenting activities, such as sharing chores in the household, researchers found that when men shared their new knowledge with other men, they were often harassed and demeaned by their peers for promoting these ‘feminine’ activities (Dworkin, Fleming, and Colvin 2015). In this instance, the gender transformative intervention attempted to create egalitarian relationships between men and women but neglected to address relationships within same-gender social networks and the influences of other social structures on perceptions of masculinity, such as hierarchies of race, class, and family structure within different cultural settings (Dworkin, Fleming, and Colvin 2015).

Below, we outline the historical roots of intersectionality theory, its application to existing public health theories related to gender transformation, and blind spots which have traditionally limited the field’s ability to answer intersectional research questions. Next, we highlight an array of research methods ideally-suited for intersectional health research and the development of gender transformative interventions. We acknowledge that the methods highlighted here are not the only approaches that can be used to address intersectional research questions but are useful as a toolkit for designing rigorous intersectional health research that can be used to promote gender justice and equity, in line with the intent of intersectionality theory as a framework for legal reform (Crenshaw 1989). Furthermore, gender transformation provides a useful entry point for intersectional health research and should always be assessed, but gender need not be the focal stratifier of every study depending on the research question or goal of an intervention. Since qualitative methods for intersectional health research are well-established and used with regularity, we have chosen to focus on quantitative and mixed methods approaches.

The emergence of intersectionality theory

The foundations of intersectionality theory are rooted in decades of Black feminist organising that led to the drafting of the *Combahee River Collective Statement* in 1977 (Combahee River Collective 1977). The Combahee River Collective was formed in response to racism faced by Black women within feminist movements, as well as
sexism within movements for Black liberation and civil rights (Smith 1983). Intersectional theorising was a prominent feature of the CRC Statement which asserts that it is impossible to separate racial, sexual, and class-based oppression because these systems are experienced simultaneously (Combahee River Collective 1977). Although the term ‘intersectionality’ was not used in the CRC Statement, the collective introduced formative language that laid the groundwork for Crenshaw’s articulation of the theory of intersectionality in 1989. The CRC described how a synthesis of interlocking systems of oppression conditioned their lives, and they called for the recognition of “simultaneous oppressions” faced by women of colour (Smith 1983). The concept of simultaneity bears much in common with Crenshaw’s theory of intersectionality, which would later be heralded as one of the most important theoretical contributions to feminist scholarship of the twentieth century (Combahee River Collective 1977; Crenshaw 1989).

Crenshaw (1989) proposed the theory of intersectionality to explain how the definition of discrimination from which anti-discrimination law proceeds necessitates that an offender intentionally identifies a specific class or category as the basis for the discrimination and that all individuals within this category are treated the same. Any statistical variation within the group can be used to argue that discrimination has not occurred, and as a result, those with intersectional experiences of oppression may actually be a threat to the claims of individuals within the larger category (Crenshaw 1989). Crenshaw highlighted how reframing the discourse to centre the experiences of marginalised groups and the most marginalised individuals within these groups would benefit those at all levels rather than only those near the top of the social hierarchy (Crenshaw 1989). She also emphasised that identities need not be regarded solely as categories of marginalisation but as sources of resilience and social power.

In 1991, Crenshaw expanded her analysis of intersectionality to assess the ways in which race and gender intersect in shaping structural, political, and representational aspects of violence against women of colour (Crenshaw 1991). During the same era, Crenshaw’s theory gained wide attention as the centrepiece to sociologist Patricia Hill Collins’s Matrix of Domination, which explained the marginalising as well as privileging powers of overlapping social structures that cannot be disaggregated or assessed independent from one another (Collins 1998).

In 2000, Crenshaw further elaborated the theory to discuss how intersectional perspectives could be operationalised in a transnational human rights context. She highlighted the need to develop methodologies to make the invisible structures of oppression visible and better address the intersections where different forms of subordination converge on a global scale. Crenshaw drew on Mari Matsuda’s (1991) policy of ‘asking the other questions’ as a call to broaden inquiry into the causes of oppression and account for the often tacit factors that structure different forms of power beyond gender and race (Matsuda 1991).

Applications of intersectionality theory to gender transformative research on health

There is a large body of literature on social determinants of health such as race, gender and class, which have been linked to a range of health disparities within diverse
populations (Glanz, Rimer, and Lewis 2002; McGibbon and McPherson 2011). However, most public health studies treat these categories as distinct variables with independent effects on health (Bauer 2014). Proponents of intersectionality theory have highlighted that the most oppressed populations tend to be those that are negatively affected by multiple social hierarchies (Anderson 2000; Bowleg 2012), which in turn, limit their access to legal recognition and protection, social mobility, and material resources, all of which cumulatively create and sustain health disparities (D’Andrea 2002). The theory also elucidates how different identities can be sources of both resilience and oppression, an important consideration for developing gender transformative interventions (Rosenthal 2016).

Theories and models akin to intersectionality theory that have been applied to public health research on gender transformation include Connell’s (1987) theory of gender and power as applied by Wingood and DiClemente (2000), Sen and Iyer’s (2012) “middle groups” framework, and Guruge and Khanlou’s (2004) relational model on intersecting health issues within familial, community, and social realms (Guruge and Khanlou 2004), which was further elaborated by O’Mahony and Donnelly (2010). Below we will review each of these in turn.

Connell’s theory of gender and power has gained traction within the field of public health, particularly in the study of HIV-related disparities and gender-based violence (Wingood and DiClemente 2000). According to the theory of gender and power, three distinct but overlapping structures embedded in societal and institutional levels work simultaneously to create gender roles that influence inequities: the sexual division of labour, the sexual division of power, and the structure of cathectis or social norms (Wingood and DiClemente 2000; Connell 1987). The structures are maintained by institutions which create gender-based disparities, such as lower pay, lack of control of resources, and lower expectations for women’s roles in society (Connell 2006).

Wingood and DiClemente (2000) further developed aspects of the theory to create a public health model that explains how gender imbalances create exposures, risk factors, and biological vulnerabilities that increase women’s susceptibility to disease and violence. Wingood and DiClemente’s (2000) model has been used to examine women’s health in the context of abusive relationships, allowing for the construction of scales to measure decision-making dominance, relationship control, emotional resources, and dependence (Pulerwitz, Gortmaker, and Dejong 2000; Wingood and DiClemente 2000). The major limitation of the theory of gender and power is its singular focus on gender as a primary determinant of health, which overlooks the impact of factors such as age or class standing; and leads to a focus on differences between rather than within gender groups (Hankivsky 2012). As a result, it is necessary to explain the ways in which other social categories interact with gender to create systemic inequalities (Van Herk, Smith, and Andrew 2011).

Sen and Iyer (2012) used intersectionality theory to create a framework for analysing “middle groups” that assessed the relationship between gender and class in access to long-term health treatments (Sen and Iyer 2012). This framework helped identify a result contradicting their initial logic: the outcomes between low-income men and high-income women were similar because women would use their class advantage to reduce the impacts from their gender disadvantage, and men would do
the opposite (Sen and Iyer 2012). Different identities could be a source of both empowerment and oppression for these individuals depending on the context and reference group.

O’Mahony and Donnelly (2010) built on a conceptual model based on feminist and post-colonial scholarship from Guruge and Khanlou (2004) by highlighting the ways in which intersectional research can transform knowledge about immigrant and refugee health to meet their needs in ways that are compatible with their social, cultural, economic, historical and political identities. Intersectional approaches were effective at improving health care delivery for immigrant and refugee women by situating their health needs within their local socio-cultural context as well as the historical context of gender in relation to colonialism and globalisation (O’Mahony and Donnelly 2010). Although intersectionality theory bears a number of challenges for implementation as a result of the complicated interactions it seeks to uncover, it is a crucial perspective for understanding how gendered health inequities are reproduced and sustained (Rouhani 2014; Harawa and Ford 2009).

**Toward intersectional theory-based methodology in public health**

Many scholars have noted a lack of consensus on clearly defined intersectional methodology in public health, particularly for quantitative studies, due to a disconnect between theory and the development of intersectional research designs and questions (Bowleg 2012). Iyer, Sen, and Ostlin (2008) have contended that the absence of conceptual clarity on how to operationalise intersectional constructs has contributed to significant human costs in the form of excess morbidity and mortality associated with health disparities (Iyer, Sen, and Ostlin 2008). Translating intersectionality theory into methodological practice poses a number of challenges for health researchers. First, health researchers often lack self-reflexivity and have difficulty interrogating their blind spots to determine how to reconsider the conceptualisation of their research designs and questions in light of multiple intersecting forms of oppression and resilience (Lorber 2006). The intersectional researcher must begin by examining their positionality within the hierarchies of focus and avoid identifying as an objective observer outside the frame of investigation.

Second, the researcher must determine how to ask questions about interdependent, mutually-constitutive experiences without falling back on an additive approach (McCall 2005). One of the few points of consensus regarding intersectional methodology lies in the rejection of additive models that rely on the assumption of orthogonal relationships between variables – statistically meaning that the vectors of each identity category are perpendicular to one another denoting independence (Kruskal 1988). The additive approach posits that identities can be ranked and summed which can lead to “intersectional invisibilities,” in contrast to the more widely-accepted multiplicative approach which sees the influence of demographic categories on health as conditional on the intersections of other identities. Furthermore, as Bowleg (2008) argues, it is essential to focus on how certain identities or circumstances impact dimensions of experience such as access to healthcare and interpret findings within a sociohistorical and social inequity perspective. Bowleg and Bauer (2016) demonstrate
this with their critiques of multiple main effects analysis in comparison to interaction analysis, and Bauer (2014) further elaborates on categorisation in intersectional data analysis and interpretation, describing the importance of distinguishing social positions from social processes (Bowleg and Bauer 2016).

Nonetheless, multiplicative approaches to intersectional research have their own limitations, chiefly that interactions between variables must be interpreted along with the main effects in regression models (the variables must be included separately and jointly as an interaction term) in order to avoid statistical misspecification (Dubrow 2008; Bowleg 2012). However, conceptually, the constructs in intersectionality theory may not be meaningful in isolation thus calling into question the validity of including the individual terms along with the interaction term in a model. Further still, some strict adherents to intersectionality theory believe that the use of any categorisation scheme is inherently problematic since it reduces complex, historically- and politically-loaded concepts to one-dimensional measures void of context. Many of the categories used in quantitative and mixed methods research are based on power inequities, and categories such as race and income are often conflated with racism or classism which may not be accurate for certain cases (Else-Quest and Hyde 2016; Bauer 2014). As a result, some researchers endorse an anti-categorical approach to intersectionality (Knudsen 2006). This interpretation of intersectionality theory is difficult to reconcile with quantitative methods, particularly regression analyses which rely on clean distinctions between variables. However, abandoning quantitative methods severely limits the breadth of tools available to a researcher, though some would argue that this is a necessary price to pay in order to maintain theoretical integrity when addressing intersectional questions (McCall 2005).

Finally, most researchers tend to share a dominant methodological alignment – usually either quantitative or qualitative – and may lack the training or experience to conduct mixed methods research which aims at gathering data at the macro, meso, and micro levels to allow for both generalisability and local meaning making (Johnson and Onwuegbuzie 2004). The process of triangulation, or employing multiple methodological approaches to understand a phenomenon, allows the researcher to interrogate complex, compound influences on health. We will revisit the importance of mixed methods after first discussing intersectional approaches to quantitative research.

Given the characteristics of intersectionality theory, qualitative methodology has been well-developed because it is often necessary to describe multidimensional aspects of identity and social phenomena (Shields 2008). In-depth interviews, focus groups and ethnography remain important methods for eliciting respondents’ own conceptions of the social order and the interplay of various axes of identity in their lives. The following sections aim to describe innovative quantitative and mixed methods approaches underutilised in public health and provide researchers examples of how to design or tailor a study’s methodology to adequately address intersectional research questions related to gender transformation. This is not a comprehensive review of intersectional methods suited for all types of intersectional or gender transformative research, nor are these methods necessarily fully distinct from one another. Many researchers utilise multiple different tools to thoroughly examine an
intersectional question, so we do not seek to prescribe an “ideal” methodological approach to intersectional health research. We also call on researchers to attend to the central tenets of intersectionality theory, which include applying intersectional work to social action for legal reform to affect larger structures.

**Intersectional quantitative methods**

In the quantitative realm, the most basic and common approach to intersectional research comes in the form of testing statistical interactions between two or more variables, but few studies utilise higher-level interactions due to lack of theory or sample size barriers (Hankivsky and Grace 2015). To further explore interactions through an intersectional lens, researchers have proposed combining variables that are highly correlated such as income and geography while others have proposed only using dichotomous variables (Hankivsky and Grace 2015). Nonetheless, interactions are still limiting for intersectional analysis, since they are often based on predetermined relationships and typically rely on assumptions of categories as fixed (Hancock 2019).

A more sophisticated approach is the use of hierarchical linear models (HLM), or multilevel models, which are becoming increasingly common in public health research, though still often overlooked (Else-Quest and Hyde 2016). HLM provides many advantages over ordinary least squares regression, due to its ability to address complexity and variation within groups as well as between levels of analysis (e.g. for women of colour situated within a neighbourhood situated within a city) (Choo and Ferree 2010; Evans et al. 2018). The use of fixed and random effects in clustered data allows for limited aggregation bias and estimation of cross-level interactions, which provides data to determine how identity categories vary by social context (Evans et al. 2018).

For instance, in their study on variation in suicide among youth, Bostwick et al. (2014) utilised HLM to understand the differences between and within heterosexual and LGBTQ youth. Through the HLM approach, they discovered that Asian and Black sexual minority women had better outcomes than White sexual minority women, illustrating how cultures and norms associated with certain racial identities could act as protective factors or promote resilience against suicide risk (Bostwick et al. 2014). As a result, interventions targeting suicide need to be tailored to specific groups rather than targeted generally to sexuality minority youth or youth of colour (Bostwick et al. 2014). They must also attend to within gender variation.

However, in order to harness the power of HLM to elucidate intersectional relationships, a researcher must resist the ingrained tendency to achieve parsimony in a regression model. Seeking complexity is counter to the usual reductionist approach, which focuses on ruling out non-significant variables and weak associations to determine the principle predictors of the dependent variable. An intersectional researcher instead assesses a more comprehensive range of factors, while acknowledging that intersectionality is a dynamic process rather than a collection of discrete categories (Choo and Ferree 2010).

A second quantitative approach which is less commonly-used in public health research is the use of propensity score matching to model heterogeneous treatment effects (HTE) (Xie, Brand, and Jann 2012). HTE models rely on the assumption that
social and behavioural phenomena vary across units of analysis at different levels not only in their background characteristics but also in how individuals respond to a treatment, intervention or event. Heterogeneous treatment effects are widely recognised but seldom studied empirically using quantitative methods in public health (Brand and Xie 2010). The strength of the HTE method lies in its ability to account for intragroup variation both at baseline and following a treatment. Note, however, that the term “treatment” here does not refer to a treatment in the clinical sense such as in a randomised controlled trial. Instead treatment can refer to any non-random event that may occur in an observational study such as being laid off from a job, experiencing a divorce, or being exposed to a traumatic event, such as an overdose (Xie, Brand, and Jann 2012).

The HTE method can assess the effects of an event on both those that experienced the event and those that did not through the use of propensity score matching (PSM), which is a statistical technique to reduce bias due to confounding or selection bias (Pearl 2003). PSM is a useful tool for studies in which the units of analysis cannot be randomised into treatment and control groups, particularly in the study of dangerous or unhealthy behaviours or events. A researcher cannot assign a certain group of people to experience a job displacement or to develop an addiction because such a practice would be unethical. Instead, researchers can use PSM to assess these behaviours or events in non-experimental settings (i.e., “in real life”) to determine how certain individuals are predisposed to experience an event and also to investigate whether those that are likely to experience the event would experience a stronger or weaker treatment effect than those that are not likely to experience the event.

For example, Robinson and Espelage (2013) assessed impacts of peer victimisation on middle and high-school adolescents’ sexual attitudes and behaviours through PSM (Robinson and Espelage 2013). LGBTQ youth were more likely to experience peer victimisation and they also had a higher risk of engaging in sexual risk-taking and suicidal ideation than heterosexual youth matched on peer victimisation levels (Robinson and Espelage 2013). However, peer victimisation did not account for the entire difference in health disparities and risk-taking behaviours between LGBTQ and heterosexual youth due to heterogeneity within LGBTQ communities. As a result, addressing peer victimisation may be necessary but not sufficient for reducing mental and sexual health disparities between LGBTQ and heterosexual youth (Robinson and Espelage 2013).

An HTE model allows a researcher to investigate whether the event would have a larger impact on those that are more or less likely to experience the event as a result of overlapping factors affecting that individual’s identity and access to material, emotional, and community support (Heckman 2005). The HTE method can provide important insights about how to distribute scarce resources in an unequal society by identifying the mechanisms through which treatments affect opportunity structures and enable policy makers to maximise benefits for the populations with the greatest needs (Brand and Xie 2010).

**Intersectional mixed methods**

Since intersectionality is conceptualised as a multilevel and multidimensional framework, distinct methodologies may be advantageous at different levels and for
the study of particular features of intersectionality. McCall (2005) describes the distinction between quantitative and qualitative methods presented in much feminist writing as ‘severely underdeterminitive of the philosophical and substantive issues involved in any study of intersectionality’ (McCall 2005). Although some post-structuralists argue that qualitative and quantitative methods are incomparable and should not be combined, the field of public health encourages the use of multiple diverse methodological approaches within the same study as a means of enriching the analysis and triangulating findings (Gottdiener 1993). One of the most commonly-used forms of mixed methods research that is particularly beneficial for intersectional research questions is the use of a nested qualitative sub-sample for in-depth interviews within a larger population-based survey. The practice of conducting intensive qualitative research on a sub-group within a larger population allows for an understanding of the mechanisms between various associations and processes as well as the meanings of constructs under investigation to maximise both generalisability and localisation (Lieberman 2005).

Mixed methods approaches such as cultural consensus modelling (CCM) have improved our understanding of gender’s impact on health outcomes and how gendered norms interact with other social forces to produce disparities. CCM uses modified factor analysis to determine to what degree particular beliefs within given cultural domain are shared between and within groups (Ulijaszek 2013). It has three major components: 1) identifying relevant cultural domains or models for a research question, 2) operationalising values associated with the domains or models, and 3) measuring cultural consensus (CC) (Ulijaszek 2013).

In a study investigating the intersection of religious and gendered norms on stress among youth in Utah, researchers used CCM to analyse to what degree female students subscribed to Mormon and/or secular beliefs around gender roles and responsibilities (Dengah et al. 2019). Using semi-structured interviews, they identified values that were central characteristics of Mormon gendered models and secular gendered models, then used cultural consensus to verify that there was sufficiently high agreement among the respondents to consider these cohesive cultural models (Dengah et al. 2019). Next, they surveyed the young women about their own personal beliefs in each of those models and conducted a regression analysis, which illustrated that those who adhered to both Mormon and American secular gender models tended to experience the greatest levels of stress because the expectations for each model were so divergent, creating conflict in their lives. This finding was then validated by qualitative interviews (Dengah et al. 2019). These mixed methods helped elucidate why there are such high rates of mental illness among Utah youth, and suggested ways forward for gender transformative interventions (Dengah et al. 2019).

Beyond the integration of traditional qualitative and quantitative methods, hybrid mixed methods using geospatial analysis hold great potential to enhance gender transformative interventions. To assess how the intersections of geography, gender, religion, and socioeconomics impact care-seeking behaviours for boys and girls among Ethiopian families, researchers used geospatial hierarchical cluster analysis identifying areas with high rates of care seeking (“hot spots”) and those with low rates of care seeking (“cold spots”) separately for boys and girls and the differential between them
Next, they compared these areas in relation to the distribution of wealth and different religious affiliations among households overlaying them onto the hot spot maps (Weber et al. 2019). Overall, they discovered that poverty was not a significant factor in care-seeking behaviour; rather, religion and cultural gender norms intersected such that Muslim-majority regions gave preferential treatment to boys compared to girls (Weber et al. 2019). This example highlights the limits of simply increasing access to care without attending to local variation in institutions and norms to increase gender equity (Weber et al. 2019).

Although mixed methods can be costly and time-intensive, funders and policy makers are beginning to notice that the return on investment can be substantial in terms of improving effectiveness of interventions, as well as promoting strong relationships between researchers and communities of study (Creswell et al. 2011). Additionally, using mixed methods like CCM or the “ethnographic sandwich” approach – in which researchers conduct first- and third-stage ethnographic work with a quantitative phase in between – facilitates the cyclical process of inductive and deductive research, producing new questions for empirical evaluation, operationalising and validating constructs, and returning to and refining the guiding theories (Dressler, Oths, and Gravlee 2005). Mixed methods allow for the assessment of complex interactions between gender, race, class and social processes and expectations that emerge from each acknowledging dynamic interconnections that singular research methods often do not adequately address.

**Ethics and intersectional health research**

Conducting intersectional health research for gender transformation does not require a rejection of existing qualitative and quantitative methods. Many of the key concerns and challenges to overcome in intersectional research are not inherent to the methods themselves, but rather are problems with the modes in which they are applied. The theory of intersectionality was developed to undo discriminatory laws (Crenshaw 1989); so too should intersectional health research for gender transformation be designed with reparative intent to counter the legacy of eugenics and the exploitation of vulnerable populations in public health (Rosenthal 2016). No methodological approach will be effective in the absence of trust and community buy-in.

Intersectional researchers must reckon with the history of ethical violations committed in the name of public health, including the US Public Health Service (PHS) Tuskegee syphilis study in which African American men were denied treatment; the Guatemalan STD Experiments, in which PHS scientists intentionally infected prisoners, sex workers, orphans, soldiers and mental hospital patients with gonorrhoea, syphilis and chancroid; and state laws and public health programmes, most notably in California, allowing the forced sterilisation of people of colour, prisoners, and people with disabilities (Resnik 2012). Researchers must approach their work with cultural humility and acknowledge the ugly and unethical pasts of their scientific disciplines and the lingering distrust of researchers that rightfully remains in many marginalised communities due to unethical research practices (Freimuth et al. 2001).

Public health researchers attuned to the intersectional forces shaping oppression can take steps to remedy the ills of their scientific ancestors and contemporaries by
adhering to ethical standards beyond simply a commitment to not doing harm. Gender transformative research for health must be guided by principles of justice, beneficence, and community engagement and reciprocity (Cassell 2000). If a researcher is committed to an intersectional project, they must support long-term collaborations and share the fruits of their research with the study population, at a minimum, and preferably with the larger community to mobilise collective action for policy and structural change, for which the theory of intersectionality was intended (Crenshaw 1989). Health research on gender transformation should focus on structural and policy recommendations to alter harmful environments rather than parroting the same tired refrains about micro-level behaviour change putting the onus on individuals (Trickett et al. 2011).

Conclusion

The theory of intersectionality has transformed the fields of law and feminist studies by highlighting how overlapping systems of oppression and resilience structure the attributes and experiences of populations (Davis 2008). The theory has tremendous potential to improve gender transformative health research and interventions for a range of disparities across multiple dimensions of identity and social status. Many of the core principles of public health, such as a commitment to social justice, an emphasis on structural interventions, and a focus on community-based participatory action research, make the field a welcome home for intersectional research on gender transformation (Thomas et al. 2002). However, public health researchers must move beyond paying lip service to the theory of intersectionality and develop concrete strategies to incorporate intersectionality into research designs and methods, as well as dissemination and action plans to make research findings available and applicable to larger social movements.

Many current and emerging methods may be well-suited to integrate an intersectional lens (Else-Quest and Hyde 2016). Multilevel modelling, studies of heterogeneous treatment effects and mixed methods approaches such as cultural consensus modelling and geospatial cluster analysis allow for investigation of complex interactions across levels and offer insight into effective points of intervention to reduce disparities and promote gender transformation. Public health researchers must remain reflexive about their positions within the social hierarchies in which their studies are embedded and aware of the potential for their actions and the instruments of research to reify structures of gender inequality. Bridging intersectionality theory and methods will require political will and a critical eye to the blind spots which have historically plagued the field of public health. Despite the challenges posed by the theory, intersectionality may be the key to addressing persistent health inequalities and promoting gender transformation (Adler and Newman 2002).

Acknowledgements

We thank Whitney Akabike for her support in manuscript preparation. We also acknowledge the University of California Global Health Institute’s Center of Expertise in Women’s Health, Gender, and Empowerment for supporting the intellectual environment related to this work. We are grateful to the intersectional theorists and methodologists who made this research possible, especially Kimberlé Crenshaw for her constructive feedback on the first draft of this manuscript.
Disclosure statement

Authors declares no conflicts of interest.

Ethical approval

No ethical approvals were required for this manuscript because it did not involve any procedures performed involving human subjects.

Funding

Support for the first author was provided by a centre grant at the UCLA Center for HIV Identification, Prevention, and Treatment Services (NIMH P30MH058107), a training grant at the UCLA Semel Institute for Neuroscience and Human Behavior (NIMH T32MH109205), and a training grant at the University of California Global Health Institute (UCGHI) from the NIH Fogarty International Center (FIC D43TW009343). Additional support was provided by NIH Grants P30AI028697 and UL1TR000124. Support for the second author was provided by the Bixby Program in Population and Reproductive Health Research Mentorship. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health or other funders.

References

Adler, N. E., and K. Newman. 2002. “Socioeconomic Disparities in Health: Pathways and Policies.” Health Affairs (Project Hope) 21 (2): 60–76. doi:10.1377/hlthaff.21.2.60

Anderson, J. M. 2000. “Gender, ‘Race’, Poverty, Health and Discourses of Health Reform in the Context of Globalization: A Postcolonial Feminist Perspective in Policy Research.” Nursing Inquiry 7 (4): 220–229. doi:10.1046/j.1440-1800.2000.00074.x

Bauer, G. R. 2014. “Incorporating Intersectionality Theory into Population Health Research Methodology: Challenges and the Potential to Advance Health Equity.” Social Science & Medicine 110: 10–17. doi:10.1016/j.socscimed.2014.03.022

Bowleg, L. 2008. ”When Black+ Lesbian+ Woman≠ Black Lesbian Woman: The Methodological Challenges of Qualitative and Quantitative Intersectionality Research.” Sex Roles 59 (5-6): 312–325.

Bostwick, W. B., I. Meyer, F. Aranda, S. Russell, T. Hughes, M. Birkett, and B. Mustanski. 2014. “Mental Health and Suicidality among Racially/Ethnically Diverse Sexual Minority Youths.” American Journal of Public Health 104 (6): 1129–1136. doi:10.2105/AJPH.2013.301749

Bowleg, L. 2012. “The Problem with the Phrase Women and Minorities: intersectionality—an important theoretical framework for public health.” American Journal of Public Health 102 (7): 1267–1273. doi:10.2105/AJPH.2012.300750

Bowleg, L., and G. Bauer. 2016. “Invited Reflection: Quantifying Intersectionality.” Psychology of Women Quarterly 40 (3): 337–341. doi:10.1177/0361684316654282

Brand, J. E., and Y. Xie. 2010. “Who Benefits Most from College? Evidence for Negative Selection in Heterogeneous Economic Returns to Higher Education.” American Sociological Review 75 (2): 273–302. doi:10.1177/0003122410363567

Cassell, E. J. 2000. “The Principles of the Belmont Report Revisited: How Have respect for Persons, Beneficence, and Justice Been Applied to Clinical Medicine?” The Hastings Center Report 30 (4): 12–21. doi:10.2307/3527640

Choo, H. Y., and M. M. Ferree. 2010. “Practicing Intersectionality in Sociological Research: A Critical Analysis of Inclusions, Interactions, and Institutions in the Study of Inequalities.” Sociological Theory 28 (2): 129–149. doi:10.1111/j.1467-9558.2010.01370.x
Collins, P. H. 1998. “It’s All in the Family: Intersections of Gender, Race, and Nation.” *Hypatia* 13 (3): 62–82. doi:10.1111/j.1527-2001.1998.tb01370.x

Connell, R. 2006. “Glass Ceilings or Gendered Institutions? Mapping the Gender Regimes of Public Sector Worksites.” *Public Administration Review* 66 (6): 837–849. doi:10.1111/j.1540-6210.2006.00652.x

Connell, R. 2012. “Gender, Health and Theory: Conceptualizing the Issue, in Local and World Perspective.” *Social Science & Medicine* 74 (11): 1675–1683. doi:10.1016/j.socscimed.2011.06.006

Connell, R. W. 1987. *Gender and Power: Society, the Person, and Sexual Politics*. 1st ed. Stanford, CA: Stanford University Press.

Crenshaw, K. 1989. “Demarginalizing the Intersection of Race and Sex: A Black Feminist Critique of Antidiscrimination Doctrine, Feminist Theory and Antiracist Politics.” *University of Chicago Legal Forum* 1989: 139–168.

Crenshaw, K. 1991. “Mapping the Margins: Identity Politics, Intersectionality, and Violence against Women.” *Stanford Law Review* 43 (6): 1241–1299. doi:10.2307/1229039

Creswell, J. W., A. C. Klassen, V. L. P. Clark, and K. C. Smith. 2011. “Best Practices for Mixed Methods Research in the Health Sciences.” Bethesda (Maryland): National Institutes of Health, Office of behavioral and Social Sciences Research. Available at [https://mafiadoc.com/best-practices-for-mixed-methods-research-in-the-health-sciences_5977bb0d1723dde28b57d5ee.html](https://mafiadoc.com/best-practices-for-mixed-methods-research-in-the-health-sciences_5977bb0d1723dde28b57d5ee.html)

D’Andrea, L. A. 2002. “The (Crying) Need for Different Kinds of Research.” *Research for Sex Work* 5: Health, HIV and Sex Work - the Influence of Migration and Mobility 5: 30–32.

Davis, K. 2008. “Intersectionality as Buzzword: A Sociology of Science Perspective on What Makes a Feminist Theory Successful.” *Feminist Theory* 9 (1): 67–85. doi:10.1177/1464700108086364

Dengah, H. F., E. Thomas, E. Hawvermale, and E. Temple. 2019. “Find That Balance: the Impact of Cultural Consonance and Dissonance on Mental Health among Utah and Mormon Women.” *Medical Anthropology Quarterly* 33 (3): 439–458. doi:10.1111/maq.12527

Doyle, K., R. G. Levitt, G. Barker, G. G. Bastian, J. B. Bingenheimer, S. Kazimbaya, A. Nzabonimpa, J. Pulerwitz, F. Sayinzoga, V. Sharma, et al. 2018. “Gender-Transformative Bandebereho Couples’ Intervention to Promote Male Engagement in Reproductive and Maternal Health and Violence Prevention in Rwanda: Findings from a Randomized Controlled Trial.” *PloS One* 13 (4): e0192756. doi:10.1371/journal.pone.0192756

Dubrow, J. K. 2008. “How Can We account for Intersectionality in Quantitative Analysis of Survey Data? Empirical Illustration for Central and Eastern Europe.” *ASK Research and Methods* 17 (1): 85–100.

Dworkin, S. L., P. J. Fleming, and C. J. Colvin. 2015. “The Promises and Limitations of Gender-Transformative Health Programming with Men: Critical Reflections from the Field.” *Culture, Health & Sexuality* 17 (sup2): 128–143. doi:10.1080/13691058.2015.1035751

Else-Quest, N. M., and J. S. Hyde. 2016. “Intersectionality in Quantitative Psychological Research: ii. Methods and Techniques.” *Psychology of Women Quarterly* 40 (3): 319–336. doi:10.1177/0361684316647953

Evans, C. R., D. R. Williams, J.-P. Onnela, and S. V. Subramanian. 2018. “A Multilevel Approach to Modeling Health Inequalities at the Intersection of Multiple Social Identities.” *Social Science & Medicine* 203: 64–73. doi:10.1016/j.socscimed.2017.11.011

Freimuth, V. S., S. C. Quinn, S. B. Thomas, G. Cole, E. Zook, and T. Duncan. 2001. “African Americans’ Views on Research and the Tuskegee Syphilis Study.” *Social Science & Medicine* 52 (5): 797–808. doi:10.1016/S0277-9536(00)00178-7

Glanz, K., B. K. Rimer, and F. M. Lewis. 2002. *Health Behavior and Health Education: Theory, Research, and Practice*. 3rd ed. San Francisco, CA: Jossey-Bass.

Gottdiener, M. 1993. “Ideology, Foundationalism, and Sociological Theory.” *The Sociological Quarterly* 34 (4): 653–671. doi:10.1111/j.1533-8525.1993.tb00111.x
Guruge, S., and N. Khanlou. 2004. “Intersectionalities of Influence: Researching the Health of Immigrant and Refugee Women.” Canadian Journal of Nursing Research 36 (3): 32–47.

Hancock, A.-M. 2019. “Empirical Intersectionality: A Tale of Two Approaches.” In The Palgrave Handbook of Intersectionality in Public Policy. The Politics of Intersectionality, edited by O. Hankivsky and J. S. Jordan-Zachery, 95–132. London: Palgrave Macmillan.

Hankivsky, O. 2012. “Women’s Health, Men’s Health, and Gender and Health: Implications of Intersectionality.” Social Science & Medicine 74 (11): 1712–1720. doi:10.1016/j.socscimed.2011.11.029

Hankivsky, O., and D. Grace. 2015. “Understanding and Emphasizing Difference and Intersectionality in Multimethod and Mixed Methods Research.” In The Oxford Handbook of Multimethod and Mixed Methods Research Inquiry, edited by S. Nagy Hesse-Biber and R. B. Johnson, Oxford: Oxford University Press.

Harawa, N. T., and C. L. Ford. 2009. “The Foundation of Modern Racial Categories and Implications for Research on Black/White Disparities in Health.” Ethnicity and Disease 19 (2): 209–217.

Heckman, J. J. 2005. “The Scientific Model of Causality.” Sociological Methodology 35 (1): 1–97. doi:10.1111/j.0081-1750.2006.00164.x

Hillenbrand, E., N. Karim, P. Mohanraj, and D. Wu. 2015. “Measuring Gender-Transformative Change: A Review of Literature and Promising Practices.” Care USA Working Paper.

Institute of Medicine. 2003. Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care (with Cd), edited by B. D. Smedley, A. Y. Stith and A. R. Nelson. Washington, DC: The National Academies Press.

Iyer, A., G. Sen, and P. Ostlin. 2008. “The Intersections of Gender and Class in Health Status and Health Care.” Global Public Health 3 (Suppl 1): 13–24. doi:10.1080/17441690801892174

Johnson, R. B., and A. J. Onwuegbuzie. 2004. “Mixed Methods Research: A Research Paradigm Whose Time Has Come.” Educational Researcher 33 (7): 14–26. doi:10.3102/0013189X033007014

Knudsen, S. V. 2006. “Intersectionality—A Theoretical Inspiration in the Analysis of Minority Cultures and Identities in Textbooks.” In Caught in the Web or Lost in the Textbook, edited by É. Bruillard, B. Aamotsbakken, S. V. Knudsen, and M. Horsley, vol. 53, 61–76. Paris: Caen. Kruskal, W. 1988. “Miracles and Statistics: The Casual Assumption of Independence.” Journal of the American Statistical Association 83 (404): 929–940. doi:10.1080/01621459.1988.10478682

Lieberman, E. S. 2005. “Nested Analysis as a Mixed-Method Strategy for Comparative Research.” American Political Science Review 99 (3): 435–452. doi:10.1017/S0003055405051762

Lorber, J. 2006. “Shifting Paradigms and Challenging Categories.” Social Problems 53 (4): 448. doi:10.1525/sp.2006.53.4.448

Matsuda, M. J. 1991. “Beside My Sister, Facing the Enemy: Legal Theory out of Coalition.” Stanford Law Review 43 (6): 1183–1192. doi:10.2307/1229035

Maureen O’Mahony, J., and T. T. Donnelly. 2010. “A Postcolonial Feminist Perspective Inquiry into Immigrant Women’s Mental Health Care Experiences.” Issues in Mental Health Nursing 31 (7): 440–449. doi:10.3109/01612840903521971

McCall, L. 2005. “The Complexity of Intersectionality.” Signs: Journal of Women in Culture and Society 30 (3): 1771–1800. doi:10.1086/426800

McGibbon, E., and C. McPherson. 2011. “Applying Intersectionality & Complexity Theory to Address the Social Determinants of Women’s Health.” Women’s Health and Urban Life 10 (1): 59–86.

Pearl, J. 2003. “Causality: Models, Reasoning, and Inference.” Econometric Theory 19 (675–685): 46. Pederson, A., L. Greaves, and N. Poole. 2015. “Gender-Transformative Health Promotion for Women: A Framework for Action.” Health Promotion International 30 (1): 140–150. doi:10.1093/heapro/dau083

Pulerwitz, J., S. L. Gortmaker, and W. Dejong. 2000. “Measuring Sexual Relationship Power in HIV/STD Research.” Sex Roles 42 (7/8): 637–660. doi:10.1023/A:1007051506972

Resnik, D. B. 2012. Research Ethics Timeline (1932-Present). Research Triangle Park, NC: National Institute of Environmental Health Science.

Robinson, J. P., and D. L. Espelage. 2013. “Peer Victimization and Sexual Risk Differences between Lesbian, Gay, Bisexual, Transgender, or Questioning and Nontransgender
Heterosexual Youths in Grades 7–12.” *American Journal of Public Health* 103 (10): 1810–1819. doi:10.2105/AJPH.2013.301387

Rosenthal, L. 2016. “Incorporating Intersectionality into Psychology: An Opportunity to Promote Social Justice and Equity.” *The American Psychologist* 71 (6): 474. doi:10.1037/a0040323

Rouhani, S. 2014. “Intersectionality-Informed Quantitative Research: A Primer.” *American Journal of Public Health* 103 (6): 1082–1089.

Sen, G., and A. Iyer. 2012. “Who Gains, Who Loses and How: Leveraging Gender and Class Intersections to Secure Health Entitlements.” *Social Science & Medicine* 74 (11): 1802–1811. doi:10.1016/j.socscimed.2011.05.035

Shields, S. A. 2008. “Gender: An Intersectionality Perspective.” *Sex Roles* 59 (5–6): 301–311. doi:10.1007/s11199-008-9501-8

Smith, B. 1983. *Home Girls: A Black Feminist Anthology*. New York: Kitchen Table–Women of Color Press.

Tannenbaum, C., L. Greaves, and I. D. Graham. 2016. “Why Sex and Gender Matter in Implementation Research.” *BMC Medical Research Methodology* 16 (1): 145. doi:10.1186/s12874-016-0247-7

Thomas, J. C., M. Sage, J. Dillenberg, and V. J. Guillory. 2002. “A Code of Ethics of Public Health.” *American Journal of Public Health* 92, 1057–1059.

Trickett, E. J., S. Beehler, C. Deutsch, L. W. Green, P. Hawe, K. McLeroy, R. L. Miller, B. D. Rapkin, J. J. Schensul, A. J. Schulz, et al. 2011. “Advancing the Science of Community-Level Interventions.” *American Journal of Public Health* 101 (8): 1410–1419. doi:10.2105/AJPH.2010.300113

Ulijaszek, S. 2013. “Cultural Consensus Modeling of Disease.” In *When Culture Impacts Health*, edited by C. Banwell, S. Ulijaszek, and J. Dixon, 269–278. London: Elsevier.

Van den Berg, W., L. Hendricks, A. Hatcher, D. Peacock, P. Godana, and S. Dworkin. 2013. “‘One Man Can’: Shifts in Fatherhood Beliefs and Parenting Practices Following a Gender-Transformative Programme in Eastern Cape, South Africa.” *Gender & Development* 21 (1): 111–125. doi:10.1080/13552074.2013.769775

Van Herk, K. A., D. Smith, and C. Andrew. 2011. “Examining Our Privileges and Oppressions: Incorporating an Intersectionality Paradigm into Nursing.” *Nursing Inquiry* 18 (1): 29–39. doi:10.1111/j.1440-1800.2011.00539.x

Weber, A. M., B. Cislaghi, V. Meausoone, S. Abdalla, I. Mejia-Guevara, P. Loftus, E. Hallgren, I. Seff, L. Stark, C. G. Victora, et al. 2019. “Gender Norms and Health: Insights from Global Survey Data.” *The Lancet* 393 (10189): 2455–2468. doi:10.1016/S0140-6736(19)30765-2

Westbrook, L., and A. Saperstein. 2015. “New Categories Are Not Enough: Rethinking the Measurement of Sex and Gender in Social Surveys.” *Gender & Society* 29 (4): 534–560. doi:10.1177/0891243215584758

Wickrama, K. A., R. D. Conger, L. E. Wallace, and G. H. Elder. 1999. “The Intergenerational Transmission of Health-Risk Behaviors: Adolescent Lifestyles and Gender Moderating Effects.” *Journal of Health and Social Behavior* 40 (3): 258–272. doi:10.2307/2676351

Wingood, G. M., and R. J. DiClemente. 2000. “Application of the Theory of Gender and Power to Examine HIV-Related Exposures, Risk Factors, and Effective Interventions for Women.” *Health Education & Behavior* 27 (5): 539–565. doi:10.1177/109019810002700502

Xie, Y. J. E., Brand, and B. Jann. 2012. “Estimating Heterogeneous Treatment Effects with Observational Data.” *Sociological Methodology* 42 (1): 314–347.