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The effect of agency on women's mental distress: a prospective cohort study from rural Rajasthan, India

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Abstract

Agency, the ability to identify goals and then act upon them, is a core component of women's empowerment and has important implications for the rights and well-being of women and girls. However, inadequate measurement of agency impedes empirical - investigation, and few studies have investigated the relation between agency and health. Using a theory-based measure of women's agency, we investigated the longitudinal association between agency and mental distress among women living in rural Rajasthan, India. Women completed baseline interviews between June and October 2016 and follow-up interviews between June and November 2017 (n = 2859). We measured mental distress with the Hindi version of the 12 item General Health Questionnaire, which asked women 12 questions about symptoms of mental distress (score range: 0 – 12). We measured agency using a measurement model which was composed of 23 indicators tapping into four domains of agency and validated in a prior research study. We modeled the relation between women's agency and mental distress using Poisson regression and an individual-level fixed effects approach to account for time-fixed characteristics of individuals. In models that controlled for time-varying confounding (e.g., household wealth, number of sons), a one standard deviation increase in agency was associated with a reduction of 0.21 distress symptoms (95% CI: -0.32, -0.09), which corresponds to a 7% reduction (95% CI: 3%, 11%) relative to the mean. We found that specific domains of agency varied in their association with mental distress; namely, an increase in women's agency regarding her attitudes about gender norms corresponded to a reduction in mental distress, whereas an increase in women's agency regarding speaking up in public corresponded to an increase in mental distress. Our research demonstrates that agency may be a determinant of mental health and that comprehensive measurement can reveal nuanced relationships.

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Keywords

India; gender; agency; empowerment; mental distress

1. Introduction

Large-scale population-based surveys consistently find that women have a higher prevalence of anxiety and depressive disorders than men (Seedat et al., 2009; Steel et al., 2014). The greater burden of these disorders might be attributable to factors differentially experienced by women, such as intimate partner violence (IPV) (Devries et al., 2013), poverty (Lund et al., 2010), and high unpaid work and caregiving demands (Dinh et al., 2017; Schulz & Sherwood, 2008). These factors might be particularly relevant in patriarchal contexts where gender norms severely constrain women's freedom, including the Middle East, North Africa, and South Asia. For instance, women's status (measured as a composite score of women's economic participation; educational attainment; health and life expectancy; and political empowerment) is lowest in these regions ("The Global Gender Gap Report," 2018), while women's exposure to IPV and sexual violence is highest (Garcia Moreno et al., 2013).

Women's agency may be another determinant of poor mental health, yet there is surprisingly little evidence on this relationship. In this study, we use longitudinal data from approximately 3000 women to investigate the effects of women's agency on mental health in rural Rajasthan, India, a low-income setting where traditional gender norms restrict women's freedom.

1.1 Concepts of women's agency and empowerment

Agency is the ability to identify goals and then act upon them (Kabeer, 1999). Agency includes internal qualities such as critical thinking (Mosedale, 2005) and externally observable factors such as the ability to carry out decisions (Kabeer, 1999). Recent work classifies these internal qualities 'intrinsic agency' and externally observable actions 'instrumental agency' (Miedema et al., 2018). Agency is considered the core component of the broader concept of women's empowerment (Kabeer, 1999; Malhotra & Schuler, 2005), which is the process of women increasing their life choices (Kabeer, 1999). This process is facilitated by women's access to material (e.g., wealth), social (e.g., social status), human (e.g., education), and environmental (e.g., violence-free contexts) resources (Kabeer, 1999; Malhotra & Schuler, 2005).

While Kabeer provides a straightforward definition of agency and its relation to empowerment, there is large variation in the literature surrounding these concepts. Perhaps the most well-known definition of agency is provided by Amartya Sen, who defines it as "what a person is free to do and achieve in pursuit of whatever goals or values he or she regards as important" (1985, p. 203). Whereas the freedom to choose and act upon those choices is core to both Kabeer and Sen's definitions, Sen specifies that these decisions must be regarded as important by people themselves. Sen's definition of agency is also closely aligned with the concept of autonomy, which is people's ability to act upon things they value (Alkire, 2008). While there continues to be considerable debate in the literature around

definitions of agency and autonomy, in practice these terms are commonly used interchangeably, and in our study we drew upon literature from both fields. Relatedly, many studies investigated the broader concept of empowerment using agency (autonomy) indicators, and we included these studies in our discussion of the agency literature.

A large body of work indicates agency encompasses many life domains (e.g., Agarwala & Lynch, 2006; Ibrahim & Alkire, 2007; Mason & Smith, 2003). While domains differ by study, commonly identified domains include household decision-making (i.e., women's involvement in household-related decision and decisions about how household income is spent) and freedom of movement (i.e., women's freedom to travel within and outside of the village). Other less commonly identified domains include attitudes about intimate partner violence (e.g., Gupta & Yesudian, 2006; Sandberg & Rafail, 2013), political and legal awareness (e.g., Schuler et al., 1997), and son preference (e.g., Gupta & Yesudian, 2006). Empirical work demonstrates that women can have high agency in some life domains but not others (Gupta & Yesudian, 2006; Malhotra & Mather, 1997; Mason & Smith, 2000). Gupta and Yesudian (2006), for example, found that only 23% of Indian women had high agency regarding traveling outside their home, but almost twice as many women (43%) had high agency regarding household decisions. In addition, the relationship between these various domains of agency can vary by context; one study compared agency across five countries and found that the strength of the correlation between agency domains varied substantially (Mason & Smith, 2003).

1.2 Challenges to measuring women's agency

Agency is a multi-dimensional latent concept and is inherently difficult to measure. Despite these difficulties, good measurement is essential for understanding the health and social consequences of low agency (Richardson, 2018; Yount et al., 2016), synthesizing research across multiple studies (Carlson et al., 2015; Pratley, 2016), and monitoring development goals related to increasing women's agency (Ibrahim & Alkire, 2007; Richardson, 2018), such as Sustainable Development Goal 5, which is to achieve gender equity and empower all women and girls (UN General Assembly, 2015).

Almost two decades after Kabeer's (1999) seminal paper called for more thoughtful, theoretically grounded measures of women's agency, recent reviews find that many studies measure women's agency inadequately (Carlson et al., 2015; James-Hawkins et al., 2018; Pratley, 2016; Richardson, 2018; Taylor & Pereznieto, 2014). There are four main critiques of current measurement practices. First, most studies are not clear about their conceptualization of agency by, for example, failing to provide conceptual or empirical justification for their delineation of agency domains (Pratley, 2016) or not describing how agency is related to the broader concept of empowerment (Taylor & Pereznieto, 2014). Second, many studies combine domains of agency in ways that may result in biased or inaccurate measurement of the underlying construct (Pratley, 2016; Richardson, 2018), such as using simple summary scores composed of counts of each responses, which may result in bias by implicitly assuming each item carries equal weight (Agarwala & Lynch, 2006; Sandberg & Rafail, 2013). Third, some studies use proxy measures related to the broader concept of empowerment (e.g., access to land; educational attainment) to infer changes in

agency (Kabeer, 1999), despite the fact that proxy measures may not translate into greater agency (Kabeer, 1999) and changes in agency may be a result of not easily observable factors, such as female role models (Alkire, 2008). Fourth, many studies rely on generic agency indicators such as those collected through the Demographic and Health Surveys (Carlson et al., 2015; Pratley, 2016) despite empirical work demonstrating agency indicators vary by context (Agarwala & Lynch, 2006; Schuler et al., 2010).

Thus, recommendations to improve current measurement practices suggest explicitly describing the hypothesized empowerment process and where specific indicators fit into this process (Glennerster et al., 2018; Richardson, 2018), using context-specific indicators (Glennerster et al., 2018; Pratley, 2016; Richardson, 2018), using direct measures of agency instead of using related concepts to infer causality (Kabeer, 1999; Richardson, 2018), and combining agency into consistent and theoretically relevant domains (Pratley, 2016).

1.3 Women's agency and Common Mental Disorders

Anxiety and depressive disorders, which are frequently experienced in both community and clinical settings, are referred to as Common Mental Disorders (CMDs) (Goldberg & Huxley, 1992). Regional differences in the prevalence of CMDs (Seedat et al., 2009; Steel et al., 2014) indicate that societal differences, including the status of women, may be important contributors to the development of CMDs.

A social causation perspective theorizes that an individual's position in society impacts exposure to intermediate factors that affect health (Johnson et al., 1999; Solar & Irwin, 2010). These intermediate factors are unequally distributed in populations (Marmot et al., 1991; Solar & Irwin, 2010), which puts certain demographic groups at higher risk of mental health problems (Johnson et al., 1999; Thoits, 2010). Intermediate factors can be broadly classified as material factors (e.g., physical environment, housing, physical working conditions, income), psychosocial factors (e.g., lack of social support, stressful living or working conditions, negative life events), and behavioural factors (e.g., exercise, diet, and smoking) (Marmot et al., 1991; Solar & Irwin, 2010).

Low agency may impact women's exposure to and control over material and psychosocial factors, which may affect her risk of CMDs. For example, one commonly identified domain of agency is household-decision making. High agency in this domain has direct implications for women's control over household material resources, such as income and assets, which may give women additional resources to cope with adverse conditions and life stressors. High decision-making agency may also increase women's self-efficacy, which is beneficial to mental health (Muris, 2002). Another commonly identified domain of agency is women's freedom to travel to locations both within and outside of her community, which may affect psychosocial factors such as ties with neighbors and organizations within the community. These ties may be an important source of support and camaraderie that can ameliorate difficult or stressful life circumstances. These examples illustrate that agency might affect factors related to mental health and that different domains likely operate through different mechanisms.

Although agency might affect women's risk of CMDs, especially in contexts where traditional gender roles constrain women's freedom, there is surprisingly little research on the relation between women's agency and CMDs, with a few notable exceptions (Hadley et al., 2010; Patel et al., 2006; Yount et al., 2014). These studies have reached inconsistent conclusions, such as finding that high decision-making agency is associated with either higher (Yount et al., 2014) or lower risk of CMDs (Patel et al., 2006). However, comparing these studies is challenging due to the wide variation in measurement approaches; each study measured agency differently, including using different indicators, defining domains differently, and using different approaches to summarize domains.

In addition to measurement challenges, other methodological issues limit our knowledge of the relation between agency and women's mental health. First, many factors that might confound the effect of agency on mental health were likely unmeasured in previous studies; for example, early life experiences and personality characteristics likely contribute to women's agency and later life mental health, yet they were not addressed in extant work. Second, except for one longitudinal study (Yount et al., 2014), the evidence is cross-sectional, and therefore cannot tease out if low agency occurs temporally prior to poor mental health (i.e., social causation) or is a consequence of poor mental health (i.e., social selection). These challenges are mirrored in the broader literature; a recent systematic review found that the majority of research investigating women's agency was cross-sectional (Pratley, 2016), and teasing out the relative etiologic contributions of social selection and social causation for specific mental disorders continues to be a challenge (Muntaner et al., 2013), particularly in low and middle-income countries (Lund & Cois, 2018). Due to this myriad of challenges, few high quality studies exist and the literature is inconclusive regarding the causal relation between low agency and poor mental health.

1.4 Women's empowerment and agency in India

India has a traditional patriarchal social structure that impedes women's freedom. Some traditional practices prohibit women from inheriting property (Dyson & Moore, 1983), which may reduce women's economic freedom. Purdah, the practice of secluding women and enforcing female modesty (Papanek, 1973), remains common in some parts of Northern India and may restrict women's mobility outside of the home. Additionally, Indian society places a strong emphasis on childbearing, especially the bearing of sons, and decisions regarding women's fertility are rarely solely her own (Dyson & Moore, 1983). These traditional ideas may contribute to women's low status; in 2014, the World Economic Forum ranked India 114 out of 142 countries in women's empowerment based on a composite score of key indicators, with especially low rankings for women's health and survival (141st) and economic participation and opportunity (134st) ("The Global Gender Gap Report," 2018). Thus, women's agency may be an especially important determinant of health in contexts where women have low agency, such as India.

Few studies have comprehensively investigated the effect of agency on health in India and other South Asian contexts. Although prior studies have not assessed the validity of agency measures and investigated a limited number of domains, they indicate that agency may be an important determinant of health in South Asia. Specifically, extant studies find that women's

greater freedom of movement is associated with higher levels of antenatal care and a greater likelihood of use of safer delivery care (Bloom et al., 2001), and that greater involvement in household decisions is associated with a lower prevalence of unintended pregnancy (Rahman, 2012), underweight or wasted infants (Shroff et al., 2011), and poor mental health (Patel et al., 2006). However, another study found that greater involvement in household decisions was associated with higher risk of intimate partner violence (Rahman et al., 2011).

1.5 The current study

In this study, we improve upon prior measurement and methodological approaches commonly used to investigate the health effects of low agency. We developed and empirically tested a measure of women's agency in rural India using many of the best practices identified in the literature, and we used this measure to investigate the longitudinal association between four domains of agency and mental health in one context where women experience low agency – rural Rajasthan, India. We also use a study design that better accounts for potential confounding factors; namely, an individual-level fixed effects approach in which individuals serve as their own controls, and thus time-invariant factors (such as personality or early life socioeconomic factors) are accounted for. We hypothesize that certain domains of agency may have a greater effect on mental health than other domains, and thus global summary measures of agency may obscure important relationships. While our study investigates the relation between low agency and CMDs, our research may help inform future research into the health consequences of low agency more broadly.

2 Methods

2.1 Data source

Our data come from a cluster-randomized trial evaluating the effect of access to an affordable daycare program on the well-being of women and young children. We conducted a household census in 160 rural tribal communities (village hamlets) in Rajasthan, India to identify eligible households; namely, households with a mother (either biological or guardian) of at least one daycare-eligible child (specifically, a child between one and six years old). We randomly selected one woman from each household meeting these criteria to take part in the study. Using this selection procedure, we identified 3899 potentially eligible women. Some women were interviewed and determined to be ineligible (n = 343). Among the remaining 3556 women, 127 could not be contacted after 3 attempts, 95 migrated before completion of the survey, 5 refused participation, and 152 were excluded due to other reasons, such as only one of two children were eligible for the daycare program. Thus, 3177 women participated in the study, for an overall participation rate of 89%.

Enrolled participants completed structured interviews verbally in Hindi. Interviews were usually conducted in respondents' dwelling or occasionally just outside their home. On a few occasions, the interview was conducted in a field or a neighbor's house. On average, interviews took approximately 60 minutes to complete. Wave 1 interviews were completed by 3177 women between January and May 2015, wave 2 interviews were completed by 3042 women between June and October 2016, and wave 3 interviews were completed by 2859 women between June and November 2017. We added measures of women's agency to

the wave 2 surveys, and therefore our analysis was restricted to women who completed the second and third survey waves (n = 2859), which we consider the baseline and follow-up in this study. Thus, among the 3556 potentially eligible women we identified, 2859 completed the last two survey waves of the survey and were included in our analysis (participation rate = 80%).

Interviewers completed training prior to each survey wave, including procedures to address confidentiality issues. Every attempt was made to respect respondents' privacy and administer survey questions soliciting sensitive information with only the interviewer and respondent present. In particular, enumerators were trained to remind respondents of the confidentiality of their responses and to ask anyone who may have been present to leave prior to the last survey section, which included sensitive questions about intimate partner violence. The survey team was roughly 50% female. We did not explicitly offer respondents the choice of their enumerator, but any requests for female interviewers were accommodated. Other survey procedures and quality control measures are available in the trial protocol [reference withheld to ensure blinding].

Women who participated in the study underwent an informed consent process. The study received ethics approval [details withheld to ensure blinding].

2.2 Measures

Interviewers collected agency, mental distress, and socio-demographic information during structured interviews. We developed the content of these structured interviews through a number of activities to ensure comprehension and suitability in this setting. A professional translator translated the survey questionnaire from English to the localized Hindi language, with the goal of retaining the meaning of questions (and thus was not necessarily a word-for-word translation). The translated questionnaire was reviewed by a project staff member with knowledge of the local dialect to ensure the original intent of the questions was preserved. Next, the face validity of the developed questionnaire was assessed by consulting individuals with local expertise, and questions were revised, added, or deleted based upon this feedback. The revised questionnaire was then pilot tested on 200 women living in communities adjacent to our study communities. The questionnaire underwent further modifications based upon the results of the pilot survey, and this modified questionnaire was used in our study.

We measured women's agency with 23 indicators that tap into four domains of agency, including freedom of movement (e.g., freedom to travel to the market alone), decision-making in the home (e.g., participation in decisions regarding the schooling of children), comfort with public engagement (e.g., comfortability speaking up in public regarding the misbehaviour of elected officials), and attitudes and perceptions (e.g., respondent agrees that a wife has the right to express her opinion, even if she disagree with her husband). Selection of these indicators was guided by prior theoretical and analytic work. Theoretical work, inspired by Sen's definition of agency within the Capabilities Approach (Sen, 1985), defines agency as the ability to identify goals and then act upon them (Kabeer, 1999). Agency includes intrinsic (e.g., women's attitudes about gender norms) and instrumental qualities (e.g., involvement in household decision-making and freedom to travel outside the home) (Miedema et al., 2018). Analytic work informed by theory finds that these intrinsic and

instrumental qualities tap into distinct domains of agency (Agarwala & Lynch, 2006; Ibrahim & Alkire, 2007; Malhotra & Schuler, 2005; Mason & Smith, 2003). Conceptual work suggests that indicators used to measure these domains may differ by context (Kabeer, 1999; Malhotra & Schuler, 2005; Mason & Smith, 2003), which is borne out by analytic work that finds some indicators of agency more relevant in some contexts than in other contexts (Agarwala & Lynch, 2006).

Using these principles, in a prior study we developed a measure of women's agency relevant to this study context [reference withheld to ensure blinding]. Briefly, we conducted a review of the literature measuring women's agency in South Asia to ascertain commonly identified domains, and then selected indicators of agency to measure these domains in rural India. These indicators came from the Demographic and Health Survey (DHS), Phase 7; the DHS's Women's Status Module; the National Family Health Survey (NFHS), Phase 3; and empirical studies investigating women's agency (Alkire et al., 2013; Kabeer et al., 2011; Schuler et al., 2010). We identified 40 potential indicators, which were reviewed by a local advisory committee for suitability and then pilot tested by women living in villages adjacent to our study communities. The full set of 40 indicators were then asked in our baseline survey (n = 3041). We tested our proposed measurement model, composed of distinct domains of agency, using confirmatory factor analysis (CFA). We compared a few competing models and excluded 7 indicators with low factor loadings. The final model identified in our study was composed of 23 indicators that measured 4 uncorrelated domains of agency and allowed two items to covary (i.e., decisions about whether respondent could work, decisions about where respondent could work).

We assessed whether the measurement model was consistent across survey waves by estimating and then comparing factor loadings for each survey wave. Because factor loadings were similar across waves, we fit a measurement model that used the same items and same factor loading across waves. Appendix 2 shows the baseline responses to each agency indicator, and Appendix 3 shows factor loadings used in the final measurement model. The measurement model fit the data well (Root Mean Square Error of Approximation = 0.029; Comparative Fit Index = 0.990; Tucker Lewis Index= 0.989). Using these factor loadings, we calculated summary scores for each domain of agency for each woman in each survey wave using Mplus software (Muthen & Muthen, 1998–2015). We also calculated an overall agency score using the factor loadings from each domain of agency; because some domains of agency have higher factor loadings than others, this approach retains the multi-dimensional nature of agency by using the relative contribution of each agency domain to measure women's overall agency. Thus, both our domain-specific and overall agency scores treat women's agency as a latent concept derived from the variables measured in our study. Missing data for these indicators was low (i.e., < 3% for any item), but in instances where responses were missing, Mplus used all available information to impute agency scores. Higher scores denote greater agency.

We measured mental distress with the 12 item General Health Questionnaire (GHQ-12) (Goldberg, 1972), translated into Hindi by Gautam et al (1987). The GHQ-12 asks 12 questions about an individual's mental distress symptoms "recently", such as losing sleep over worry and losing confidence in oneself. Each question has four response options, and

we used the 0–0-1–1 scoring system to classify responses as having some versus no distress. For example, one item asks, “have you recently been able to enjoy your normal day-to-day activities?” The response categories “less so than usual” and “much less than usual” would receive a score of 1 (denoting some distress), and response categories “more so than usual” and “same as usual” would receive a score of 0 (denoting no distress). Thus, scores can range from 0 to 12, with higher scores denoting more distress. A validation study comparing three different scoring methods found that this scoring system had the best classification properties (Goldberg et al., 1997), and it is commonly employed in India (Patel et al., 2008; Patel et al., 1998; Shamasundar et al., 1986; Shidhaye & Patel, 2010).

The GHQ-12 has undergone extensive psychometric evaluation. A recent systematic review of mental health measurement tools in LMICs found that it demonstrated some of the strongest psychometric properties among the roughly 20 assessed instruments (Ali et al., 2016). Within India, validation studies indicate the GHQ-12 performs well in a number of different populations and settings (Bandyopadhyay et al., 1988; Endsley et al., 2017; Gautam et al., 1987; Kashyap & Singh, 2017; Patel et al., 1998), and a comparison of 5 screening tools found that the GHQ-12 had among the strongest psychometric properties (Patel et al., 2008).

We measured a number of variables that may confound the relation between agency and mental distress. Socio-demographic variables included demographic indicators (i.e., age, caste, religion, educational attainment of respondent and her husband), household composition variables (i.e., number of sons in the household, marital status, number of months husband not living at home), women’s employment, and household wealth, which was measured with 23 asset-based indicators commonly used to measure wealth in India (International Institute for Population Sciences (IIPS) and ICF, 2015/2016). Wealth indicators included type of toilet facility, material of exterior wall, type of roofing, home electrification, source of drinking water, home ownership, whether the household had a savings account, and number of cell phones, watches/clocks, electric stoves, wood stoves, fans, televisions, bikes, motorcycles, wells, grain storage cans, pressure cookers, chairs/stools, beds, silver jewelry, gold jewelry, and wedding ornaments. We used a polychoric principal component analysis (PCA) to create a summary wealth score (Kolenikov & Angeles, 2004). We used a one component PCA that explained 26% of the variance in wave 2 interviews and 26% of the variance in wave 3 interviews. In addition, we measured women’s past year exposure to psychological and physical abuse using questions adopted from the Demographic and Health Survey’s Domestic Violence Module (United States Agency for International Development, 2014), which included 7 questions about physical abuse and 3 questions about psychological abuse in the past year. For each question, response categories included “not at all”, “sometimes”, and “often”. We classified women as experiencing physical or psychological abuse if they answered “sometimes” or “often” to any question in that category. Informed by Kabeer’s theory of the empowerment process (Kabeer, 1999), these measured socio-demographic factors can be conceptualized as resources that help facilitate the process of women gaining greater agency.

2.3 Analytic approach

Some factors that may confound the association between agency and mental distress, such as personality characteristics (e.g., pessimism, introversion) and early life experiences (e.g., child physical abuse, trauma) were not measured in our study. Therefore, we used a fixed effects approach to model the relation between changes in women's agency and corresponding changes in mental distress within the same individual. This approach accounts for fixed characteristics of individuals (e.g., personality traits) and past exposures (e.g., childhood trauma) by having individuals act as their own controls (Allison, 2005). However, because this approach models changes in individuals over time, time-varying characteristics that may confound the relationship – such as number of sons – must still be accounted for.

2.4 Statistical analyses

First, we estimated the bivariate association between socio-demographic indicators and agency scores. Next, using a fixed effects approach, we modeled the relation between the CFA-derived women's agency scores and mental distress using Poisson regression. We used Poisson regression because our outcome, number of distress symptoms, is a count variable (Hilbe, 2011). We controlled for two types of potential time-varying confounders. The first category consisted of likely confounders, including household wealth, the number of months a woman's husband was not in the home, number of sons, and marital status. The second category included variables with less empirical evidence about where they operate within the empowerment process and in the causal pathway with mental distress, and therefore may be confounders, mediators, or simultaneously mediators and confounders. This category included exposure to IPV (i.e., physical abuse, psychological abuse) and women's employment status in the last year.

Our main effect estimate is the predicted mean difference in the number of mental distress symptoms due to a one standard deviation increase in women's agency and its component parts (i.e., freedom of movement; decision-making in the home; comfort with public engagement; attitudes and perceptions). All regression models were run using a robust variance estimator to account for clustering of responses among women in the same village hamlet.

3 Results

Women had an average age of 31 years, and the majority were married (98%), belonged to a Scheduled Tribe (94%), and had never attended school (77%). Women reported an average of 1.8 (SD = 2.4) out of a possible 12 distress symptoms in baseline interviews, and 2.1 (SD = 2.6) out of 12 distress symptoms in follow-up interviews. The average length of follow-up was 369 days (SD = 37).

Table 1 shows summary statistics for our CFA-derived agency scores, which summarize women's responses to 23 questions. The frequency of women's responses to each of these questions in the baseline surveys are shown in Appendix 2. These responses indicate that women reported high agency in the domain freedom of movement, with most women

reporting they could go to many locations in the village alone, such as the market (91%) and a health center or doctor (89%). Women's responses to measures of attitudes and perceptions also indicate high agency, with most women agreeing that a woman should be able to work outside of the home if she wants to (93%) and a wife has the right to express her opinion, even if she disagrees with her husband (93%). However, women's responses to items capturing decision-making in the home indicate that women have lower agency in this domain, with many women uninvolved in decisions regarding their own healthcare (35%) and whether they could work (22%). Women also reported lower agency in the domain comfort with public engagement, with several women reporting they were not at all comfortable protesting the misbehaviour of elected officials (22%) or attending rural meetings unaccompanied (35%).

Table 2 shows the bivariate associations between women's agency, socio-demographic characteristics and mental distress scores. Women with higher agency were slightly older, were more likely to have attended school, had husbands living outside the home for more months, were more likely to work throughout the year, were less likely to report physical abuse in the past year, and reported fewer symptoms of mental distress. However, women with higher agency were also more likely to report past year psychological abuse. We found a similar pattern of relationships between these socio-demographic and health indicators and domains of agency (data not shown). These results lend support to the theory that women's economic, social, environmental, and human resources may lead to higher levels of agency (Kabeer, 1999; Malhotra & Schuler, 2005).

Figure 1 shows results from the individual-level fixed effects analysis. In models that controlled for the full set of time-varying confounders (i.e., household wealth, the number of months a woman's husband was not in the home, number of sons, marital status, exposure to past year physical abuse, exposure to past year psychological abuse, women's employment status in the last year), a one standard deviation increase in overall agency was associated with a reduction of 0.21 distress symptoms (95% CI: -0.32, -0.09), which corresponds to a 7% reduction (95% CI: 3%, 11%) relative to the mean. Unadjusted and partially adjusted (i.e., household wealth, marital status, number of months husband was not in the household in last year, number of sons) coefficient estimates are shown in Appendix 1.

We found that changes in some, but not all, agency domains corresponded to changes in mental distress and that these relationships changed upon control for other domains of agency (Figure 1). In models that adjusted for time-varying confounders, increases in decision-making in the home, attitudes and perceptions, and freedom of movement, but not comfort with public engagement, corresponded to a reduction in distress symptoms. However, in models also controlling for other domains of agency, decision-making in the home and freedom of movement were no longer associated with mental distress, and only attitudes and perceptions remained inversely associated with mental distress. Conversely, in the case of comfort with public engagement, the null association with mental distress became positive when the model included other agency domains.

4 Discussion

Using a comprehensive and multi-faceted measure of women's agency, we investigated the longitudinal association between changes in women's agency and changes in mental distress. Disentangling the effect of agency from other related concepts, such as the broader idea of empowerment, presents many challenges to researchers, and there is a dearth of research that measures agency in ways that satisfy many of the best practices identified in the literature. Our study demonstrates that comprehensive measurement can help clarify the effect of low agency and its constituent parts on women's health. The methods and approach used in our study may inform future research investigating the health effects of women's agency.

Population-based surveys indicate women have a higher prevalence of mood and anxiety disorders compared to men (Seedat et al., 2009; Steel et al., 2014), and our study adds to a growing body of evidence demonstrating that gender-specific factors might contribute to this higher prevalence. While our study is not the first to investigate the effect of agency on women's mental health, we used a comprehensive, theory-based measure of women's agency, which can help clarify this relationship. Prior studies from Egypt, Uzbekistan, and India show that women with more freedom to travel had fewer symptoms of CMDs (Hadley et al., 2010; Yount et al., 2014), and women with high household decision-making agency had either higher (Hadley et al., 2010; Yount et al., 2014) or lower symptoms of CMDs (Patel et al., 2006). We found that high agency in these two domains was associated with less mental distress in partially adjusted models, but in fully adjusted models that controlled for other domains of agency these associations disappeared. Our study found that two other domains of agency – which were not investigated in these prior research studies – were related to mental distress in fully adjusted models. Our results demonstrate that each domain of agency may have a different effect on mental health, and that these relationships may be affected by other domains. While our analytic strategy controlled for other domains of agency in fully adjusted models – thus implying other agency domains may confound relationships – alternatively certain domains may partially or fully mediate the effect of other domains. Thus, results from fully adjusted models should be interpreted cautiously. Due to only having two survey waves our study was not able to formally test if some agency domains mediated other domains, which could be an area of future research.

In fully adjusted models that controlled for other domains of agency, we found that domains measuring intrinsic agency (i.e., comfort with public engagement; attitudes and perceptions) were related to mental distress, whereas domains measuring instrumental agency (i.e., household decision-making; freedom of movement) were not. Intrinsic factors concern a woman's perception and attitudes, and thus it may be unsurprising that these domains are more closely related to mental health. While we found that intrinsic agency was more relevant to mental health, instrumental agency may be more relevant for other health outcomes. A women's ability to travel outside the home, for instance, may be more strongly related to physical health indicators such as utilization of antenatal care and immunization status.

While our results indicate some domains of agency may be more salient for mental health than other domains, these effects are likely highly dependent upon the context in which women live. Thus, while the differences in results seen in the literature could be a result of varying measurement or analytic approaches, they may also reflect true differences across contexts. For example, having high agency to travel outside the home may have positive effects on mental health by strengthening ties with relatives, neighbors, and the community. In contexts where freedom to travel is common for women, women with high mobility may benefit from strengthened social ties without experiencing negative social consequences. However, in contexts where having high mobility is unusual, women traveling alone may experience harassment when in public, which women report is commonplace and distressing in some Asian and Middle Eastern contexts (e.g., Bhattacharyya, 2014; Ilahi, 2009; Leach & Sitaram, 2007). Thus, higher agency may not necessarily translate into better mental health because women's experiences are dependent upon the context in which they live.

We found that women who expressed greater comfort with speaking up in public had higher levels of mental distress. While this result may seem counter-intuitive, having high agency in this domain may have negative social consequences in rural India. In our study, women had relatively moderate levels of agency in this domain: about a quarter of women reported they were uncomfortable speaking up in public regarding a man beating his wife, and about a third of women reported they were uncomfortable speaking up regarding protesting the misbehavior of authorities or elected officials. Women with high agency in this domain may reject traditional norms governing women's behaviors by speaking out publicly and challenging predominantly male authority, which might elicit a backlash from other community members, in the form of being ignored, talked over, or ridiculed. Additionally, women who are effective despite these barriers may be denied credit for their contributions, which could also be distressing. Studies of female leaders of local village councils (Panchayats) suggest that female leaders may get less credit for their contributions compared with their male counterparts (Beaman et al., 2010). Thus, being outspoken may elicit social consequences that may negatively affect mental health. Additional research could explore this hypothesis through qualitative interviews with women, or by conducting surveys that measure potential negative consequences of outspokenness.

Achieving gender equity and empowering all women and girls is one of seventeen Sustainable Development Goals identified by the United Nations (UN General Assembly, 2015), and our research shows that achieving this goal might have implications for women's mental health. While the majority of intervention studies have focused on women's economic empowerment (for reviews of economic interventions, see Buvinic & Furst-Nichols, 2016; Taylor & Pereznieto, 2014), we found that agency regarding household decisions (which include income- and work-related decisions) was not related to mental distress in models that controlled for other domains of agency. Thus, research that assesses the effect of interventions on other aspects of women's agency may be a fruitful area of future research.

Our study has a number of strengths, including a fairly large sample size, low loss to follow-up, and a theory-based measure of women's agency. However, there are limitations to consider. First, although the GHQ-12 is one of the best tools to measure mental distress in

India, there is growing recognition that mental health symptoms may be described or manifest differently in different contexts and cultures (Kirmayer, 2001; Kirmayer & Sartorius, 2007). One study among Indian women with a depressive disorder, for instance, found that women described their mental health symptoms as physical complaints, such as body aches and gynecological symptoms (Pereira et al., 2007). Thus, the GHQ-12, which was initially developed for Europeans, may miss some symptoms of distress in this population. Second, although our fixed effects approach accounted for fixed characteristics of individuals, there may be some residual confounding due to unmeasured time-varying factors. For example, women's social support may be an important resource that might increase her agency and also buffer stressful life events and thus protect against mental distress. Our study did not measure social support, which might have led to an over-estimation of our effect estimates. Third, although we used longitudinal data, we cannot completely rule out reverse causation. Women's mental distress may influence her perceptions of agency or her actual agency, and thus future longitudinal research with additional survey waves could tease out the directionality of this relationship. Fourth, our results may be to some degree context specific, and thus future research studies in other contexts could examine the generalizability of our results.

Conclusion

Using a comprehensive measure of women's agency, we found that an increase in women's overall agency was associated with modest reductions in mental distress, and distinct aspects of agency affected mental distress differently. Nuanced measurement into many domains of women's agency, together with research concerning gender empowerment interventions, has the potential to improve women's health and wellbeing.

Appendix

Appendix 1

Mean difference (95% CI) in GHQ-12 score due to 1 standard deviation increase in agency, rural Rajasthan, n = 2859

		Instrumental agency		Intrinsic agency	
	Overall agency	Decision-making in the home	Freedom of movement	Attitudes and perceptions	Comfort with public engagement
Unadjusted	−0.23 (−0.34, −0.12)	−0.55 (−0.95, −0.14)	−0.28 (−0.40, −0.16)	−0.78 (−0.98, −0.59)	0.01 (−0.10, 0.11)
Partially adjusted[a]	−0.22 (−0.33, −0.11)	−0.52 (−0.95, −0.09)	−0.27 (−0.40, −0.14)	−0.80 (−1.01, −0.60)	0.02 (−0.09, 0.13)
Fully adjusted[b]	−0.21 (−0.32, −0.09)	−0.49 (−0.93, −0.05)	−0.24 (−0.37, −0.10)	−0.77 (−0.98, −0.55)	0.00 (−0.11, 0.11)
Fully adjusted, plus controlled for other agency domains[c]		−0.05 (−0.55, 0.45)	−0.11 (−0.28, 0.07)	−0.83 (−1.08, −0.58)	0.22 (0.09, 0.35)

[a] adjusted for household wealth, marital status, number of months husband was not in the household in last year, number of sons.

[b] adjusted for household wealth, marital status, number of months husband was not in the household in last year, number of sons, past year physical abuse, past year psychological abuse, employment status.

[c] adjusted for household wealth, marital status, number of months husband was not in the household in last year, number of sons, past year physical abuse, past year psychological abuse, employment status, and other agency domains (decision-making in the home, attitudes and perceptions, freedom of movement, comfort with public engagement).

Appendix 2

Baseline responses to women's agency items, rural Rajasthan, n = 2859

		Who usually makes the following decisions:	Respondent only	Jointly with other family members	Respondent not involved
Decision-making in the home	Home decisions	Decisions about health care for yourself?	4%	61%	35%
		Decisions about how many children to have and when?	2%	89%	9%
		Decisions about whether to use contraception?	3%	87%	10%
		Decisions about the education of your children, including where they go to school and until which grade?	4%	78%	18%
		Decisions about visits to your family or friends?	4%	75%	21%
		Decisions about whether you can work?	23%	55%	22%
		Decisions about whether you can work?	19%	57%	24%
	Control over income	Decisions about making major household purchases?	1%	71%	28%
		Who decides how your husband's earnings will be used?	1%	71%	28%
		Do you agree or disagree with each statement:	Agree	Disagree	
Attitudes and perceptions		Husband should help with chores if wife is working	95%	5%	
		A married woman should be able to work outside the home if she wants to	93%	7%	
		A wife has a right to express her opinion even if she disagrees with what her husband is saying	93%	7%	
		Are you usually permitted to go to the following places on your own, only if someone accompanies you, or not at all?	Alone	Not alone	Not at all
Freedom of movement		To the market to buy things?	91%	8%	1%
		To a health center or doctor within the village?	89%	11%	0%
		To the community center or other meeting place within the village?	88%	11%	1%
		To homes of friends in the village?	90%	9%	1%
		To a shrine/mosque/temple/church within the village?	90%	10%	0%

		Do you feel comfortable speaking up in public to:	No, not at all comfortable	Yes, but with a great deal of difficulty	Yes, but with a little difficulty	Yes, fairly comfortable	Yes, very comfortable
Comfort with public engagement	Family-related issues	Protest a man beating his wife?	17%	9%	14%	41%	19%
		Protest a man divorcing or abandoning his wife?	18%	9%	15%	40%	18%
	Public-related issues	Help decide on infrastructure (like small wells, roads, water supplies) to be built in your community?	22%	10%	16%	35%	17%
		Ensure proper payment of wages for public works or other similar programs?	12%	8%	15%	40%	26%
		Protest the misbehaviour of authorities or elected officials?	22%	11%	20%	35%	13%
		Do you feel comfortable attending rural meetings unaccompanied?	34%	8%	11%	30%	17%

Appendix 3

Standardized coefficients for final measurement model, rural Rajasthan, n = 2859

Domain		Subdomain		Item	
Name	**coefficient (SE)**	**Name**	**coefficient (SE)**	**Description**	**coefficient (SE)**
Decisionmaking in the home	0.505(0.031)	Home decisions	0.867 (0.033)	Decisions about health care for yourself?	0.423 (0.016)
				Decisions about how many children to have and when?	0.714 (0.011)
				Decisions about whether to use contraception?	0.697 (0.014)
				Decisions about the education of your children, including where they go to school and until which grade?	0.525 (0.013)
				Decisions about visits to your family or friends?	0.609 (0.015)
				Decisions about whether you can work? *	0.463 (0.017)
				Decisions about where you can work? *	0.492 (0.015)
		Control over income	0.907 (0.041)	Decisions about making major household purchases?	0.578 (0.020)
				Who decides how your husband's earnings will be used?	0.568 (0.022)
Attitudes and perceptions	0.452 (0.031)	n/a	n/a	Husband should help with chores if wife is working	0.899 (0.036)
				A married woman should be able to work outside the home if she wants to	0.755 (0.035)
				A wife has a right to express her opinion even if she disagrees with what her husband is saying	0.473 (0.031)
Freedom of movement	0.698 (0.031)	n/a	n/a	To the market to buy things?	0.908 (0.007)

Domain		Subdomain		Item	
Name	**coefficient (SE)**	**Name**	**coefficient (SE)**	**Description**	**coefficient (SE)**
				To a health center or doctor within the village?	0.959 (0.005)
				To the community center or other meeting place within the village?	0.911 (0.007)
				To homes of friends in the village?	0.917 (0.008)
				To a shrine/ mosque/temple/ church within the village?	0.909 (0.008)
Comfort with public engagement	0.608 (0.029)	Familyrelated issues	0.859 (0.016)	Protest a man beating his wife?	0.965 (0.003)
				Protest a man divorcing or abandoning his wife?	0.959 (0.003)
		Non-family related issues	0.910 (0.017)	Help decide on infrastructure (like small wells, roads, water supplies) to be built in your community?	0.849 (0.007)
				Ensure proper payment of wages for public works or other similar programs?	0.853 (0.006)
				Protest the misbehavior of authorities or elected officials?	0.820 (0.006)
				Do you feel comfortable attending rural meetings unaccompanied?	0.711 (0.010)

*model allowed items regarding where you can work and whether you can work to covary

**model specified uncorrelated domains

***standardized estimates were estimated using the “stdy” option in Mplus with the variance of the latent variable agency fixed to 1.

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Research highlights

- Most research investigating women's agency uses simplistic, atheoretical measures
- We used a comprehensive, theory-based agency measure composed of 4 domains
- An increase in overall agency was associated with a reduction in mental distress
- Specific domains of agency varied in their association with mental distress

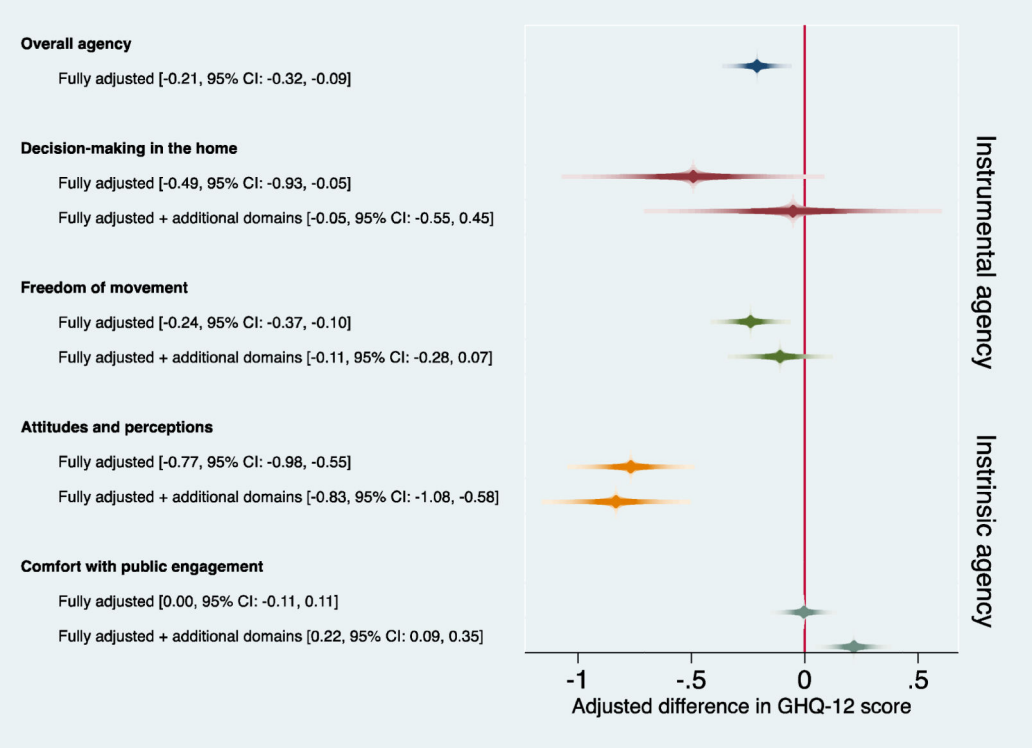

Figure 1. One standard deviation unit increase in agency score and corresponding change in mental distress

Fully adjusted: controlled for household wealth, marital status, number of months husband was not in the household in last year, number of sons, past year physical abuse, past year psychological abuse, and employment status.

Fully adjusted + additional domains: controlled for household wealth, marital status, number of months husband was not in the household in last year, number of sons, past year physical abuse, past year psychological abuse, employment status, and other agency domains (decisionmaking in the home, attitudes and perceptions, freedom of movement, participation in the community).

Table 1

Summary statistics of agency domains across survey waves (baseline & follow-up), n = 2859

	Mean	SD	Min	Max
Overall agency[a]	−0.12	0.67	−2.75	1.72
Household decision-making[b]	−0.02	0.32	−1.19	1.40
Freedom of movement[c]	−0.17	0.61	−3.03	1.09
Attitudes and perceptions[d]	−0.10	0.45	−1.70	0.63
Comfort with public engagement[e]	−0.02	0.70	−1.72	1.55

[a]Composed from the items used to measure the domains household decision-making, freedom of movement, attitudes and perceptions, comfort with public engagement

[b]Composed of 9 questions about women's level of involvement (i.e., respondent sole decision-maker, respondent involved in decision, respondent not involved in decision) in decisions regarding her health care, how many children to have and when, use of contraception, children's schooling, visits to family and friends, whether she can work, where she can work, major household purchases, and how a husband's income is used.

[c]Composed of 5 questions about women's level of freedom to travel to locations within the village (i.e., alone, not alone, not at all), including the market, a health center or doctor, community center or meeting place, friends' homes, and to a place of worship.

[d]Composed of 3 questions about women's opinion (i.e., agree or disagree) regarding if a husband should help with chores if his wife is working, that a married woman should be able to work outside the home if she wants to, and that a wife has a right to express her opinion even if she disagrees with her husband.

[e]Composed of 6 questions about women's level of comfortability speaking up publicly to: protest a man beating his wife, to protest a man divorcing or abandoning his wife, to help decide on infrastructure to be built in the community, to ensure proper payment of wages for public works, to protest the misbehavior of authorities or elected officials, and woman's comfortability attending rural meetings unaccompanied.

Table 2

Baseline socio-demographic indicators by level of agency, rural Rajasthan, n = 2859

	Tercile of agency		
	1st (low agency)	2nd (moderate agency)	3rd (high agency)
Demographic factors			
Age	30.8 (6.9)	31.1 (7.0)	31.8 (7.1)
Hindu religion	96%	96%	96%
Member of Scheduled Tribe	94%	94%	94%
Ever attended school (husband)	63%	65%	65%
Ever attended school (respondent)	17%	22%	30%
Time-varying factors			
Wealth score	−0.1 (1.3)	0.0 (1.3)	0.1 (1.4)
Married	98%	99%	98%
Number of months husband not living in household	1.9 (2.8)	1.9 (2.8)	2.2 (2.9)
Number of sons in household	1.8 (1.2)	1.8 (1.1)	1.9 (1.2)
Past year physical abuse	28%	27%	25%
Past year psychological abuse	26%	23%	35%
Works throughout the year	8%	9%	12%
Mental distress			
GHQ-12 score	2.3 (2.7)	1.7 (2.2)	1.6 (2.3)

[a] values are percent or mean (standard deviation)