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Multilevel Examination of Facility Characteristics, Social Integration, and Health for Older Adults Living in Nursing Homes

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Abstract

Objectives. Testing a model based on past research and theory, this study assessed relationships between facility characteristics (i.e., culture change efforts, social workers) and residents' social networks and social support across nursing homes and examined relationships between multiple aspects of social integration (i.e., social networks, social capital, social engagement, social support) and mental and functional health for older adults in nursing homes.

Methods. Data were collected at nursing homes using a planned missing data design with random sampling techniques. Data collection occurred at the individual-level through in-person structured interviews with older adult nursing home residents (N = 140) and at the facility-level (N = 30) with nursing home staff.

Results. The best fitting multilevel structural equation model indicated that the culture change sub-scale for relationships significantly predicted differences in residents' social networks. Additionally, social networks had a positive indirect relationship with mental and functional health among residents primarily via social engagement. Social capital had a positive direct relationship with both health outcomes.

Discussion. To predict better social integration and mental and functional health outcomes for nursing homes residents, study findings support prioritizing that close relationships exist among staff, residents, and the community as well as increased resident social engagement and social trust.

Key Terms: nursing homes; culture change; social networks; social engagement; structural equation modeling

Background

Despite improvements in nursing home policies and programs regarding quality of care and quality of life over the past 30 years (Capitman, Bishop, & Casler, 2005; Tolson et al., 2011; Weiner, 2003), research continues to show that older adults living in nursing homes spend the majority of their time during the day performing passive activities (e.g., sleeping, doing nothing, fidgeting, waiting, glancing at a television) and exhibiting little emotion (Harper Ice, 2002). Studies about residents' quality of life have identified that social relationships and connectedness can positively impact residents' lives (Cooney, Dowling, Gannon, Dempsey, & Murphy, 2013; Kane, 2001), and a number of interventions across the globe have shown to enhance social interactions, contribute to meaningful leisure, and increase nursing home participation (see Van Malderen, Mets, and Gors, 2013 for a review).

However, most of this work focuses on nursing homes as an isolated entity from the neighborhood or the community and therefore does not assess for the broader context of the social environment of older adults living in nursing homes. This makes it difficult to connect literature about nursing home residents with literature about older adults living in the community. Much could be learned from the multiple studies that have been done to understand and improve the lives of older adults living in the community related to social integration and health outcomes (e.g., Antonucci & Akiyama, 1987; Glass, Mendes de Leon, Bassuk, & Berkman, 2006; Jang, Mortimer, Haley, & Borenstein Graves, 2004; Mendes de Leon, Glass, & Berkman, 2003). Nursing home residents could benefit from these broader efforts to improve social integration of older adults (Gerritsen, Steverink, Ooms, & Ribbe, 2004) and communities could benefit by utilizing the strengths and resources of the nursing home population (Anderson & Dabelko-Schoeny, 2010). Thus,

the purpose of this study is to examine predictive relationships between facility characteristics, multiple aspects of social integration, and health and well-being for those living in nursing homes.

Social Integration Concepts

Social integration is a broad term that refers to the degree to which an individual is connected to others (i.e., in social relationships) and embedded in the community (i.e., with formal groups, organizations, services, activities) (Hooyman & Kiyak, 2011). Determining one's level of social integration often involves understanding multiple aspects of a person's social world (Berkman & Glass, 2000). In this study, four concepts often used in studies of the various aspects of social integration related to health outcomes are incorporated: *social networks*, *social capital, social support,* and *social engagement.* These concepts have distinct features related to social integration, yet all relate to one another. Each concept has been linked to health outcomes for older adults, but little research has examined these conceptual relationships for those living in nursing homes.

Berkman, Glass, Brissette, and Seeman (2000) developed a comprehensive framework that provides theoretical underpinnings for establishing how social networks influence health. Figure 1 provides a summary of the framework that guided this study. This theoretical framework has been tested among older adults (e.g., Ashida & Heaney, 2008; Fraser & Rodgers, 2009; Hogeboom, McDermott, Perrin, Osman, & Bell-Ellison, 2010), and this study extends this research to include older adults living in nursing homes. As a critical element to understanding social integration, social networks in this study are defined as a "web of social relationships that surround an individual and the characteristics of those ties" (Berkman & Glass, 2000, pg. 847). Social network analyses

are described as either studying egocentric networks, with the individual as the focal point, or sociocentric networks, with all members of a community or group and links represented (Marsden, 1990; Smith & Christakis, 2008). This study is interested in the characteristics of size, frequency of contact, and proximity for the overall egocentric networks of the nursing home residents and focuses on relationships in and out of the nursing home. As shown in Figure 1, social networks can provide social support and promote social engagement for individuals (Berkman et al., 2000).

Social support can be operationalized in three ways: social embeddedness (i.e., connections between individuals), perceived social support (i.e., availability and adequacy of supportive ties), and enacted support (i.e., actions and assistance actually provided by others) (Barrera, 1986). This study defines social support as actual support received and provided among individuals, including emotional, instrumental, appraisal, and information support (Berkman & Glass, 200). Social engagement is defined in this study as taking part in real life activities with others within the communities people live (both within and outside the facility) and refers to "performance of meaningful social roles for either leisure or productive activity" (Glass et al., 2006, p. 606). Social engagement has been conceptualized to include productive (i.e., activities that generate goods or services for an economic value, such as completing volunteer work or having paid employment) and social or leisure activities (i.e., activities that involve talking with others or taking part in activities with others that are enjoyable, such as playing cards).

The broader concept of social capital as it relates to the other three concepts is less clear. Social capital can be understood as having structural, individual-level (e.g., social networks) and cognitive, collective-level (e.g., norms of reciprocity, trust) components (Coleman, 1990; Ferlander, 2007; Forsman, Nyqvist, Schierenbeck,

Gustafson, and Wahlbeck, 2012b; Putnam, 1995). In this study, social capital is defined as collective feature of social structures, such as levels of interpersonal trust and norms of reciprocity and mutual aid, that arise from social networks, act as resources for individuals, and facilitate collective action (Coleman, 1990; Putnam, 1993). There is some evidence that neighborhood/collective-level social capital is related to higher social support and engagement (Cattell, 2001; Forsman et al., 2012b; Kawachi, Kennedy, & Glass, 1999; Putnam, 1995). Assessing for collective-level social capital was deemed important because older adults in nursing homes often have limited access to the community beyond the nursing home wall, and understanding perceived trust and reciprocity may help to understand an additional mechanism by which social integration may influence health for this population.

Connections to the Health and Well-Being of Older Adults

As reviewed by Berkman and Glass (2000), a vast literature dating back thirty years has established links between social networks and social support and physical and mental health, specifically all-cause mortality, cardiovascular disease, stroke, and infectious disease. Multiple studies have shown that social support predicts health outcomes (see Callaghan and Morrisey 1993 for a review). Though broadly recognized that increased social networks are positively associated with mental and physical health outcomes, "growing empirical evidence also suggests that structural (e.g., network size, frequency of contact, activity involvement) and functional (e.g., availability of emotional support) components of social networks may be differentially associated with various markers of well-being" for older adults (Huxhold, Fiori, & Windsor, 2013, p. 4). In a recent study of community-dwelling older adults, Ashida & Heaney (2008) found that having frequent contact with those in their social networks was associated with higher

social support, and perceived connectedness had a positive association with health status but not social support.

Social engagement has been shown to positively influence health for older adults, namely mortality, disability, and health care expenditures (Mendes de Leon et al., 2003). Jang et al. (2004) found that for older adults with extensive physical disabilities, social networks influenced social engagement, which contributed highly to increases in quality of life. Relationships between civic engagement/volunteering and health for older adults are quite clear, with researchers (e.g., Morrow-Howell, Hinterlong, Rozario, & Tang, 2003) finding that even low levels of involvement can influence well-being. Social group participation has also been shown to contribute to an increase in people's self-reported health (Poortinga, 2005).

Considered a neutral good (i.e., having both positive and negative effects), social capital has been closely linked to morbidity/mortality, self-rated health, mental health, and health behaviors, such as smoking, physical activity, diet, disease, and survival when ill (see Ferlander, 2007 for a review). For older adults in Finland, connections have been made between collective-level social capital and better mental health (Forsman, Herberts, Nyqvist, Wahlbeck, & Schierenbeck, 2012a). However in dense areas that experience high poverty and more crime and violence, social capital has been shown to predict higher rates of mortality for older adults (Cagney & Wen, 2008). Ferlander (2007) and Kawachi et al. (1999) state that the mechanisms by which social capital influences individual-level health have yet to be determined. In the nursing home environment, it may be possible that social capital as indicated by trust and norms of reciprocity (i.e., belief that people help out one another) may operate through support and engagement functions to influence health outcomes. For example, nursing home residents who report

high levels of trust and reciprocity may be more apt to take part in activities within the nursing home, which in turn relates to better health outcomes.

Nursing Home Influences

When assessing social integration for individuals living in nursing homes, the potential influence of facility-level characteristics and variation must also be taken into account due to their unique living environment. This study incorporates variables related to facility involvement in the culture change movement and the role of degreed social workers. Culture change in nursing homes (i.e., social, regenerative model of care in which residents are viewed and treated in ways that encourage growth, development, and production through improvements in the social and physical environments) has grown in popularity in the last fifteen years and has been endorsed by the Centers of Medicare and Medicaid Services. Many nursing homes are resistant to embrace culture change in fear of the cost and because empirical testing has yet to show that culture change is clearly an evidence-based practice that contributes to positive resident outcomes (Rahman & Schnelle, 2008; Stone, 2003).

Further, a study by Bern-Klug et al., (2009) found that about half of social services directors (49.5%) in nursing homes have an undergraduate or graduate degree in social work and that less than half (38%) of social service directors are licensed in social work. Social workers are specifically trained and committed to attend to the emotional and psychosocial needs of residents, and Simons (2006) found evidence of this identifying that nursing homes with degreed social workers on staff have less psychosocial deficiencies. This provides evidence that social workers do have an impact on the overall psychosocial needs of residents, but it is unknown if residents report better psychosocial outcomes when degreed social workers are on staff.

Present Study

Informed by past research and the Berkman et al. (2000) theoretical framework, this study tests a model explaining relationships between facility characteristics, social integration, and health outcomes. Between nursing homes, we hypothesize that:

H1: Nursing homes with greater levels of participation in essential elements of culture change are more likely to have residents with higher levels of social integration;

H2: Nursing homes with degreed social workers on staff are more likely to have residents with higher levels of social integration.

For Hypotheses 1 and 2, we do not specify the aspects of social integration because it is unknown which constructs have between-level variation and because this is a preliminary examination of these previously, untested relationships.

Within nursing homes, we hypothesize that:

H3: Social networks have a positive relationship with mental health and functional health and well-being indirectly through social support and social engagement;

H4: Social capital has a positive relationship with mental health and functional health and well-being indirectly through social support and social engagement.

Methods

Participants

We utilized a two-stage multilevel sampling technique to obtain a stratified (i.e., larger and smaller facilities) random sample of nursing homes in Northeast Kansas (N = 30), and a random sample of older adult residents from each of the nursing homes (N = 140, from each facility n = 3-6). Inclusion criteria ensured residents: (a) were at least 65 years of age, (b) were long-term stay (i.e., beyond the 100-day Medicare window for a short-term rehabilitation stay), (c) did not have a legal guardian (so that each individual

could personally consent to participate), and (d) did not have moderate to severe cognitive impairment (i.e., MDS 3.0 Brief Interview for Mental Status scores between 0-12 or MDS 2.0 Cognitive Scale scores between 3-10 indicating moderate to severe cognitive impairment). The overall consent rate for nursing homes was 38.9% and for residents was 75.7% (ranging from 50-100% across nursing homes). Each nursing home staff member and older adult resident was offered $20 cash or a gift card for personal use as compensation for participation in the study. The University of Kansas Human Subjects Committee of Lawrence approved all data collection procedures.

Data Collection

In order to gather information about culture change and social workers in nursing homes, administrators and social service directors completed brief surveys. For nursing home residents, survey forms were developed using multiple standardized measures. A planned missing data design (i.e., 3-form design) was utilized to ensure the interviews did not take longer than one hour (see Graham, Taylor, Olchowski, & Cumsille, 2006 for full explanation). This specialized methodological technique allows researchers to utilize the full set of questionnaire items while reducing respondent burden (Enders, 2010). Three trained interviewers asked participants questions from the survey and recorded responses. Residents' self-report of their own experience is considered the "gold standard" in this type of research (Kane & Kane, 2000); therefore, the use of a proxy was not permitted. To help participants choose responses for Likert scale questions, response choices were provided on laminated cards with extra-large print font. Older adults chose where they wanted to complete the interview, and most preferred to talk in their room. The measures

were pilot tested at one nursing home with ten residents. This ensured respondents were able to answer the questions without difficulty and verified the length of the interviews.

Standardized Measures

At the between-level (i.e., nursing home-level), *social workers* and *culture change* were the independent variables, and the constructs, *social networks* and *social support,* were the dependent variables. Other constructs did not demonstrate enough between-level variance (e.g., ICCs below .10) for multilevel analysis.

Culture change. Culture change was assessed using the Culture Change Instrument Leader Version (Bott et al., 2009), a tool developed and validated by the University of Kansas School of Nursing. The instrument includes Likert scale questions that generate sub-scale scores for the six essential elements of culture change (Doty, Koren, & Sturla, 2008): resident care, nursing home environment, relationships, staff empowerment, nursing home leadership, shared values, and quality improvement. In this study, the culture change scale had high internal consistency (α = .90). The sub-scale for relationships was included in this study (see Table 1 for a list of the questions).

[Table 1 about here]

Social work. The role of social workers was assessed by asking questions about the social services staff's experience, education, and job responsibilities. A measure for the number of staff with social work degrees was included in this study.

At the within-level (i.e., resident-level), the primary independent variables for the study were the latent constructs *social networks* and *social capital*. Additionally, the independent variables/latent constructs, s*ocial support* and *social engagement,* were used

to examine the potential indirect effects between social networks and social capital and the dependent variables. Two facets of health, *mental health* and *functional health and well-being,* were the dependent variables/latent constructs for the study. A latent construct is a theoretical or abstract concept that is not directly observed but can be inferred from multiple measured variables/indicators (Brown, 2006). See Table 2 for a delineation of the indicators measured for the social integration and health constructs. All variables were coded such that higher scores meant better outcomes (e.g, greater social networks, more engagement, better mental and functional health).

[Table 2 about here]

Social networks. *Social network* characteristics were measured using the concentric circle (i.e., egocentric network) approach (Antonucci & Akiyama, 1987; Ashida & Heaney, 2008). Totals were calculated for each resident: size (number of people), proximity (number of people within the nursing home and within 1-hour drive), and frequency (number of people with at least once a week contact). As previous research has shown the importance of within facility relationships for nursing home residents (Chou, Boldy, & Lee, 2002; McGilton & Boscart, 2007), a count of within facility network members was used to enhance the proximity measure for this population.

Social capital. *Social capital* was measured using the indicators norms of reciprocity and trust (Putnam, 1995). Norms of reciprocity and trust were assessed using Likert scale questions (Narayan and Cassidy, 2001) about whether people look out for themselves or try to be helpful and how much trust they have for different groups of people (e.g., other residents, staff, family members, people who live in the area close to the nursing home). Previous research has shown similar measures to be stable and

consistent across data sets and demonstrably reliable and valid for community-dwelling older adults (Norstrand & Xu, 2012). In this study, internal consistency for social capital was quite high (α = .79).

Social support. *Social support* was measured using a modified version of the Krause and Markides (1990) version of the widely used Inventory of Socially Supportive Behaviors (Barrera, Sandler, & Ramsay, 1981). This scale, found to have a four-factor structure, uses Likert scale questions to generate sub-scale scores for informational, tangible, emotional, and provided support. For this study, questions tailored to those only living in the community were eliminated, and facility-related examples were added. In this study, internal consistency for social support was high (α = .92).

Social engagement. *Social engagement* was measured using Likert scale questions about participation in various social activities within and outside the nursing home and a question about group/organization participation. The questions tapped into whether or not residents participated as well as the frequency of participation. The questions were derived from previous work (e.g., Glass et al., 2006; Jang et al., 2004; Mitchell & Kemp, 2000) and tailored to include activities pertinent to nursing homes. Based on the literature and conversations with nursing home social services staff, four indicators (i.e., productive/civic, nursing home activity participation, socializing, social group participation) were used. Internal consistency for social engagement in this study was acceptable (α = .62).

The social integration measures were chosen for each concept to establish content validity with the stated definitions, and multiple indicators were chosen for each concept in order to establish construct validity (see Table 2). Criterion-related validity was

established by examining the correlation table (see Table 3); all indicators for each construct positively correlated more highly with each other than with indicators for another construct and all indicators for the construct correlated at least moderately (e.g., r = .20 or greater) with other indicators (Floyd & Widaman, 1995).

Mental Health. *Mental Health* was measured using the Geriatric Depression Scale (Yesavage et al., 1983). In this study, the six subscales were calculated for the mental health construct based on previous work by Adams, Matto, and Sanders (2004), and three parcels were created based on standardized parameter estimates and correlations. Parcels tend to better approximate normality than individual items and are often considerably less complex when working to fit complex models (Brown, 2006). Internal consistency for the total scale in this study was high (α = .86).

Functional health and well-being. To measure *functional health and well-being*, the SF-12v2® was used. The scale has been shown to be reliable and valid with older adults of all ages, including those in nursing homes (Jakobsson, 2006). This study used the physical health and mental health scale scores as suggested by Cernin, Cresci, Jankowski, and Lichtenberg (2010) and Resnick and Nahm (2001). Internal consistency was acceptable for functional health and well-being in this study (α = .78).

Covariates. The covariates for the study included: *activities of daily living* (ADLs), *cognitive status*, and *socioeconomic status* (SES). The Katz Index of Independence in Activities of Daily Living was used to assess ADL limitations (Wallace & Shelkey, 2008). Inclusion criteria, as previously discussed, eliminated those with moderate to severe cognitive impairments. However, to control for mild cognitive impairment, a simplified and non-invasive test called the 6 Item Cognitive Impairment

Test was used (Brooke & Bullock, 1999). Finally, years of education was collected as a proxy for SES.

Analysis

All study hypotheses were tested by estimating a comprehensive two-level structural equation model. Multilevel structural equation modeling (MSEM) was used to analyze the data gathered in the study through *Mplus* version 7. Unruh and Wan (2004) recommend using MSEM for testing multidimensional frameworks that assess the complex relationships among individual resident factors, nursing home factors, and individual resident outcomes; however, few research studies, if any, have actually used it. This study utilized MSEM because it was necessary to simultaneously: (a) examine relationships between latent constructs and measured variables (SEM), and (b) assess the relationships of variables across multiple levels (multilevel analysis). Conducting MSEM made it possible to estimate variance (explained and unexplained) and path coefficients among individuals within the sample (within-level) and among nursing homes (between-level). In this study, the units of analysis were at both the individual-level (N = 140 residents) and group-level (N = 30 nursing homes). Approximately 30 group-level units are needed to conduct multilevel analysis (Bickel, 2007), and an individual-level sample size of 120 satisfies the demand of the ML estimator (Little, 2013).

Prior to conducting MSEM, a number of steps were performed, including extensive data assessment and cleaning (before and after data imputation), missing data analysis using multiple imputation, and assessment of the measurement model using multilevel confirmatory factor analysis (MCFA). Because the histograms indicated some concerns regarding normality, we used robust maximum likelihood (ML) estimation in all structural equation modeling, as this adjusts the model chi-square and associated fit

statistics and the model standard errors when questions exist regarding normality of continuous data (Muthén & Muthén, 2010) and ensures the data can be understandably interpreted (Yuan, Chan, & Bentler, 2000). ML estimators also allow for multilevel analyses with unbalanced groups (Byrne, 2012), and research has shown promising results using ML estimation when group-level sample sizes are small (Bell, Morgan, Kromrey, and Ferron, 2010). In order to determine if models are accurately fitting the data and to compare nested models when using MSEM analyses, we utilized various criteria for identifying unnecessary or problematic parameters, including the assessment of: (a) multiple fit indices to assess overall goodness of fit (i.e. model chi-square (X^2), the normed chi-square (X^2/df), the root mean square of approximation (RMSEA), comparative fix index (CFI), and the standardized root mean square residual (SRMR)); (b) the presence or absence of localized areas of strain in the solution; and (c) the interpretability, size, and statistical significance of the model's parameter estimates (Brown, 2006; Kline, 2005).

For the measurement model, all latent constructs had at least two indicators, and factors with two indicators were constrained to equality rather than letting them be freely estimated (Little, Lindenberger, & Nesselroade, 1999). At the suggestion of Hox (2002), between-level residual variances were fixed to zero. This is suggested when Level 2 sample sizes are small and when the true between-level variance is close to zero and non-significant. At the within-level, four errors terms were freely estimated. The final MCFA model had overall acceptable fit based on $\chi 2/df$, RMSEA, and SRMR ($\chi 2$ = 336.38 $df = 182$; $\chi 2/df$ = 1.85; RMSEA = .07; CFI = .88; $SRMR_W$ = .07; $SRMR_B$ = .21). The amount of variance in each indicator that was accounted for by its latent construct ranged from 0.40 to 0.98. Some of these values are lower than the ideal standardized

factor loadings of .70 or higher, but all values are higher the cut-off value of .30. Floyd and Widaman (1995) recommend removing indicators if the standardized factor loadings are below .30. A structural model was then tested from the measurement model. Cognitive status and ADLs were included as covariates for every construct, and SES was included as a covariate for social networks and social capital.

Results

Among nursing homes, the mean number of licensed beds was 106.63, and ranged rather considerably from 46 to 269 beds. About 83% of nursing homes were in semi-urban or urban counties, though nursing homes from rural counties represented about 15% of the participants. The mean number of nursing home survey deficiencies for study participants was 12.5, whereas the average number in Kansas at the time of the study was 10.0 and in the United States was 7.5. Overall, this sample is generally representative of the population of nursing homes included in this study, with the exception of chain membership and occupancy rate. Participating nursing homes were less likely to be a part of a chain and had greater occupancy rates than non-participants.

Residents' age ranged from 65-103 (M = 83.07, SD = 9.02). The sample was 74.3% female and 25.7% male. Most participants identified as White (92.7%). Over half of participants were widowed (55%), and 15% were married. Approximately one-third (37.1%) graduated high school. Most participants (61.4%) utilized Medicaid and other governmental funds to pay for the nursing home care, and 35% paid with private funds. The sample matches expected characteristics for nursing home residents in Kansas. Network size for residents was approximately 10 people; about seven network members lived/worked in the facility (M = 4.43) or within one hour of the facility (M = 3.04), and they had frequent contact with about five people.

[Table 4 about here]

Table 4 reports key findings for nested models and includes model fit statistics used to evaluate the best-fitting final model that tested study hypotheses. A test of the hypothesized model indicated somewhat acceptable model fit ($\chi 2$ = 410.970, *df = 188, p* < .01; $\chi 2/df$ = 2.18; RMSEA = .09; CFI = .83; $SRMR_W$ = .08; $SRMR_B$ = .21). However, examination of parameter estimates indicated that some of the predicted paths were non-significant. Therefore, in effort to identify the most parsimonious model that mostly closely matches the measurement model statistics, non-significant predicted pathways were removed one at a time. The final model includes only significant pathways for predictive relationships, though non-significant correlations between latent constructs/observed variables were retained to provide less biased estimates of the predicted paths. Overall, the final model showed acceptable fit ($\chi 2$ = 344.18, *df* = 188, *p* < .01; $\chi 2/df$ = 1.83; RMSEA = .07; CFI = .88; $SRMR_W$ = .07; $SRMR_B$ = .20). Considering the complexity of the model, the final model appears to offer a reasonably close fit to the data. We prefer the more parsimonious model depicted in Figure 2.

[Figure 2 about here]

The between-level effects in the top half show that the culture change relationships sub-scale has a positive predictive relationship with social networks (β_B = .60, *SE* = .31, *p* < .05) and that the greater numbers of social workers is significantly positively associated with social support (β_B = .83, *SE* = .39, *p* < .05). H1 and H2 are supported. This indicates that residents who live in nursing homes in which close relationships exist between staff, family, residents and the community (see Table 1 for

measures assessed) report greater social networks. Further, residents in nursing homes with social workers report greater social support.

The within-level effects in the bottom portion show that social engagement, indirectly through social networks, has the highest positive unique effect on mental health ($\beta_W = 0.43$, $p < .001$) and functional health and well-being ($\beta_W = 0.56$, $p < .001$). However, social support, indirectly through social networks, has a negative unique effect on functional health and well-being ($\beta_W = -0.39$, $p < .001$) and does not have a significant relationship with mental health. H3 is partially supported. There was no support for an indirect effect of social capital on the health constructs via social support and engagement. Hypothesis 4 is not supported. However, social capital does have a significant direct unique effect on mental health ($\beta_W = 0.34$, $p < .01$) and functional health and well-being ($\beta_W = 0.41$, $p < .01$).

The influence of the covariates on each of the social integration constructs was non-significant. ADLs and cognitive status did have predictive relationships with mental health and functional health/well-being (*p's* < .05). Therefore, ADLs and cognitive status do explain a fair amount of the variance in mental health and functional health and well-being, with the standardized parameter estimates ranging from .19 to .28. Importantly these values were not higher predictors of mental health and functional health and well-being than the social integration constructs.

Discussion

This study identified a number of predictive relationships between facility characteristics, multiple social integration constructs, and health for older adults living in

nursing homes. Based on the identified comprehensive two-level structural equation model, we report several notable findings.

Informing culture change initiatives, study findings support and extend previous research on the importance of close relationships between residents, family, staff, and community members (Chou, Boldy, & Lee, 2002; McGilton & Boscart, 2007). Because many nursing homes are resistant to culture change activities due to time and resource barriers (Capitman et al., 2005; Rahman & Schnelle, 2008), it is important to identify particular aspects or components of culture change that have the most potential impact. Specifically, the study findings between nursing homes (i.e., relationship sub-scale of culture change had a predictive relationship with residents' social networks) and within nursing homes (i.e., social networks have indirect relationships with residents' mental and functional health) indicates that nursing homes that dedicate efforts towards relationship-building can potentially produce meaningful differences in residents' social integration and health outcomes. Further evidence of this is seen in a study of assisted living residents in which perceived friendliness of residents and staff had greater influence on psychological well-being than other measures of social integration (Park, 2009). This does not mean other aspects of culture change are not important, but relationship building, in particular, should be at the forefront of quality improvement efforts.

Related to social workers, this study supports findings from previous studies (Simons, Bern-Klug, & An, 2012) indicating that nursing homes with degreed social workers have the capacity to provide better psychosocial care. Related to the within-level findings that social support does not positively influence health, it is possible that older adults living in nursing homes may be receiving extensive social support from nursing

home staff, so the most important function of network members, such as family and friends, may be identifying or supporting older adults in taking part in meaningful engagement activities (e.g., playing games, volunteering). Future studies utilizing qualitative methodology may be able to shed light into these ideas.

Next, we found that engagement in productive, meaningful, social activities and in social groups has the greatest predictive relationship with health (both mental and functional health) for older adults in nursing homes. This relates to previous research showing a strong connection between social engagement and decreased disability and depression for community-dwelling older adults (Glass et al., 2006; Mendes de Leon et al., 2003) as well as an intervention study showing that exercise and social activity can improve everyday function and sleep for long-term care residents (Lorenz et al., 2012). This present study provides evidence of the importance of identifying and encouraging meaningful social engagement for each resident that utilizes each individual's social networks and is tailored to each resident's unique strengths and interests.

Finally, the final model showed a direct positive predictive relationship between social capital and both health constructs. In examining the social capital construct, social capital explained a greater amount of the variance in trust (69.9%) than norms of reciprocity (24%), meaning that trust was the primary predictor. Though clearly collective-level social capital plays a role in understanding mental and functional health of nursing home residents, this study identified that social trust does not operate through support or engagement to influence health for those living in nursing homes. Interestingly, this may be a function of the nursing homes. Though within facility relationships can be important for nursing home residents, the reality is that many people move into nursing homes and live closely with other residents and receive extensive care

from workers, but often times do not become close with many of these individuals. However, it is still important that the resident feels as if he or she is a part of the greater community and can trust people who live and work in the nursing home. Therefore, building interpersonal trust is one mechanism that could contribute to better outcomes in health and well-being (Forsman et al., 2012b). Future research could assess whether living in nursing homes high in social capital or rich in within-facility relationships is protective for individual-level health. Comparisons could also be made based on whether nursing homes are in rural or urban areas, as research has shown that geographical setting should be taken into account when assessing relationships between social capital and health outcomes for older adults (Norstrand & Xu, 2011).

There are a number of recognized limitations in this study. First, we were not able to assess differences over time or establish causal relationships between social integration and health. Though this study was informed by a strong evidence base (Berkman et al., 2000) and substantial literature, longitudinal research is needed to establish potential causal relationships. Because the study sample was limited to Kansas, this does limit the generalizability for the resident and the nursing home samples. However, every attempt was made to ensure random sampling for nursing homes and residents, so strong comparisons can be made to other areas that have similar geographic or population characteristics.

Related to the older adult sample, it is recognized that this sample included older adults with relatively high cognitive functioning, which is approximately 25% of older adults in nursing homes (Kaye, Harrington, & LaPlante, 2010). This level of cognitive functioning was needed in order to ensure older adults could answer the questions, but this does provide limitations. Future work should be completed to better understand

relationships between social integration and health for older adults who have moderate to severe cognitive impairments. Furthermore, though the sample sizes were reasonably substantial considering the data collection efforts and time frame of the study, the reality is that for advanced statistical analysis, like MSEM, there were limitations to what could be determined from the data, particularly for between-level testing. Related to measurement, we suggest that further work is needed to identify better measures for assessing social capital and social engagement for older adults in nursing homes, possibly differentiating between within-facility versus out-of facility relationships and activities. Future research could be done using hierarchical linear modeling to determine which social integration measures are the strongest predictors of individual-level health in nursing homes.

In conclusion, future research and policy change are needed to better integrate nursing homes and residents into the community, improve current perceptions of nursing homes, and support new approaches for people who live there. This study documents the importance of relationships, engagement, and social trust for the health and well-being of older adults in nursing homes, lending evidence to areas for future intervention work.

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Table 1. Relationships Sub-Scale for Assessing Culture Change

Choose best response for each questions: Never, Sometimes, Often, Always
Staff work with the same group of residents.
Families know who takes care of their loved ones.
The outside community is involved in nursing home care.
We meet with family members to explain their role in their loved one's care.
Families visit their loved one.
This nursing home has community volunteers.
Children from the community participate in programs with residents in the nursing home.
This nursing home takes time to remember residents who die.
Residents and staff are encouraged to talk about their feelings when a resident dies.
Residents choose to spend time with each other on their own.

Table 2. Social Integration and Health Constructs and Their Indicators

Constructs	Indicators
Social Networks	Size
	Proximity
	Frequency
Social Capital	Norms of reciprocity
	Trust
Social Support	Informational
	Tangible
	Emotional
	Provided
Social Engagement	Socializing
	Nursing Home Activity Participation
	Productive/Civic
	Social Group Participation
Mental Health	Dysphoric Mood/ Withdrawal-Apathy-Vigor
	Worry/Memory
	Agitation/Hopelessness
Functional Health	Physical Health
	Mental Health

Table 3. Correlations Among Key Study Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Size	1																	
2. Proximity	.79**	1																
3. Frequency	.73**	.82**	1															
4. Reciprocity	.12	.09	.06	1														
5. Trust	.15	.11	.12	.48**	1													
6. Informational	.21*	.19*	.22*	-.04	.10	1												
7. Tangible	.20*	.18*	.16	.01	.19*	.46**	1											
8. Emotional	.35**	.32**	.31**	.05	.20*	.59*	.62**	1										
9. Provided	.20*	.22**	.15	-.26**	-.03	.48**	.42**	.67**	1									
10. Productive/Civic	.14	.18*	.19*	-.06	.02	.19*	.10	.27**	.39**[1]	1								
11. Socializing	.40**	.44**	.45**	.21*	.04	.05	0.14	.21*	.13	.28**	1							
12. Activity Participation	.14	.21*	.27**	.11	.03	.32**	.22**	.35**	0.19*	.46**	.44**	1						
13. Social Groups	.08	.03	.11	.06	.08	.09	.14	.16	.08	.23**	.21*	.35**	1					
14. Dysphoric Mood/W-A-V	.19*	.15	.20*	.24**	.27**	.06	.16	.29**	.26**	.26**	.36**	.35**	.27**	1				
15. Worry/Memory	.22**	.13	.13	.17*	.27**	-.02	.10	.18*	.11	-.06	.24**	.04	.08	.63**	1			
16. Agitation/Hopelessness	.21*	.21*	.28**	.18*	.34**	-.01	.04	.14	.22**	.12	.34**	.27**	.23**	.80**	.62**	1		
17. Physical Well-Being	-.01	.02	.08	.17*	.30**	-.08	-.04	-.06	-.06	.19*	.25**	.29**	.10	.49**	.41**	.52**	1	
18. Mental Well-Being	-.01	-.05	.02	.17*	.21*	-.09	-.01	.03	.01	.00	.19*	.24**	.23**	.57*	.52*	.55**	.52**	1

*p<.05. **p<.01. ***p<.001.

Table 4. Model Fit Indices for Comparison of Nested Models

Model	X^2	*df*	*p*	RMSEA	CFI	SRMR-W	SRMR-B	ΔX^2	Δdf	*p*
Measurement Model	336.38	182	<.01	.07	.88	.07	.21			
Hypothesized Model	410.97	188	<.01	.09	.83	.08	.21	74.49	6	<.01
Final Model	344.18	188	<.01	.07	.88	.07	.20	66.79	0	<.01

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