

## Motivation and Exercise in Rural Postmenopausal Women

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### Abstract

**Purpose:** The purpose of this research is to explore the relationships among psychological needs, motivation regulations, autonomy support, and physical activity (PA) behavior in rural and urban postmenopausal women within the Self Determination Theory (SDT) framework.

**Sample:** The convenience sample included 114 rural postmenopausal women (RPMW) and 56 urban postmenopausal women (UPMW) recruited from three Midwestern states.

**Method:** Subjects completed surveys in paper form which included instruments to measure basic psychological needs, motivation regulations, autonomy support, and PA behavior.

**Findings:** Results indicate a mix of relationships among psychological needs and intrinsic motivation in rural and urban women. There was a significant correlation ( $r = .274$ ,  $n = 169$ ,  $p = 0.04$ ) between intrinsic motivation and relatedness in RPMW, indicating these women find motivation in meaningful relationships.

**Conclusions:** The strength of this research exists in the introduction of a significant correlation between intrinsic motivation to exercise and relatedness in RPMW. Previous work with SDT has shown autonomy and competence as motivating factors regarding physical activity behavior in women. This research indicates that for RPMW relatedness is also an important determinant of intrinsic motivation. This data suggests that psychological needs and motivational regulations are dissimilar for RPMW and UPMW regarding exercise behavior.

*Keywords:* motivation, exercise, rural postmenopausal women, self determination theory, osteoporosis awareness

### **Motivation and Exercise in Rural Postmenopausal Women**

Americans living in rural areas are more likely to die from preventable diseases than their urban counterparts (Center for Disease Control & Prevention [CDC], n.d.a.). Physical inactivity, a behavior clearly related to many health disorders, is the fourth leading cause of death worldwide (Kohl et al, 2012), and found more frequently in rural Americans (CDC, n.d.a.). In fact, rural postmenopausal women (RPMW) have the highest inactivity rates (Perry, Herting, Berke et al, 2013; Plonczynski, Wilbur, Larson, & Theide, 2008).

Physical activity (PA) can decrease a person's risk for several diseases including cardiac disease, diabetes, select cancers and osteoporosis (CDC, n.d.a.). Osteoporosis affects 52 million

Americans with estimated annual costs exceeding \$23.5 billion (Coleman et al., 2014). Caucasian postmenopausal women have a 50% lifetime probability of suffering an osteoporotic related fracture (Litwic, Edwards, Cooper, & Dennison, 2012). Caucasians constitute 77.9% of the rural population (Rural Health Information Hub, 2013), with approximately 5 million of those women age 65 or older (Bennett, Lopes, Spencer, & van Hecke, 2013). Although RPMW have a high chance for an osteoporotic related fracture, many tend to underestimate their osteoporosis related fracture risk (Matthews, Laya, & DeWitt, 2006). Exercise, a cost-effective (Garrett et al., 2011) and beneficial fracture prevention strategy (Howe et al., 2011) is underutilized in the referent population. In a United States study of 61,200 women, moderate levels of exercise reduced hip fracture rates by 55% (Feskanich, Willett, & Colditz, 2002). As the burden of osteoporosis and other non-communicable diseases escalate, risk factors such as physical inactivity become increasingly relevant (Durstine, Gordon, Wang & Luo, 2013).

### **Review of the Literature**

Exercise and PA are terms often used interchangeably. For clarity, exercise is a subcategory of PA. Exercise is planned PA behavior that is purposefully focused on improving or maintaining physical fitness, while PA is described as any bodily movement produced by skeletal muscles that require energy expenditure (Dasso, 2018). For the purpose of this research PA will be used.

Despite the well documented benefits of PA, the CDC estimates that only 24% of all adults meet the 2008 PA guidelines as put forth by the US Department of Health and Human Services (Whitfield et al, 2019). Americans remain inactive and RPMW are most sedentary (Wilcox, Oberrecht, Bopp, Kammermann, & McElmurray, 2005). These disparities are concerning as research indicates RPMW have a higher prevalence of osteoporosis-related vertebral fractures

(Gomez-de-Tejada Romero, 2014), and tend to underestimate their osteoporosis related future fracture risk (Matthews et al., 2006).

### **Rural Population and Physical Activity**

Culture, a learned system of shared values, is passed on through generations. Culture influences how people interpret what is happening and what they express about themselves (Vidaeff, Kerrigan, & Monga, 2015). One known characteristic of rural culture is that rural elderly experience social isolation (Baernholdt, Yan, Hinton, Rose & Mattos, 2012) and adapt to change slowly (Weidinger et al, 2008). They are independent and self-sufficient, displaying a social closeness that leads to distrust of *outsiders* (Dibartolo & McCrone, 2003). Rural populations are self-reliant (Wells, 2009), and hesitant to seek services (Goins, Williams, Carter, Spencer, & Solovieva, 2005). There is a higher population of elderly persons found in rural communities (CDC, n.d.b.; United States Census Bureau, n.d.a.). Rural residents often postpone healthcare services until they are acutely symptomatic (Peterson, Schmer & Ward-Smith, 2013). Rural residency is a predictor of PA level (Osuji, Lovegreen, Elliott, & Bronson, 2006), yet there is no clear understanding of motivation as it relates to physical activity level and residency.

### **Rural Women and Physical Activity**

In addition to cultural dynamics researchers report perceived personal barriers to PA participation in rural communities. Barriers identified for rural women include being too tired to participate in planned PA (Olsen, 2013; Peterson et al., 2013), lack of time and motivation (Osuji et al., 2006; Peterson et al., 2013), family and caregiving commitments (Olsen, 2013; Paluck, Allerdins, Kealy & Dorgan, 2006, Peterson et al., 2013, Wilcox, Castro, King, Houseman, & Brownson, 2000), fear of injury (Deshpande, Baker, Lovegreen, & Brownson, 2005) fear of “overdoing it” (Wilcox, Oberrecht et al., 2005), and being “too old” (Olsen, 2013). Other barriers

mentioned include “being overwhelmed” (Perry, Rosenfeld, & Kendall, 2008), “being lonely” (Paluck et al., 2006), “having no one to exercise with”, lacking confidence in ability to exercise (Wilcox, Oberrecht et al., 2005), and financial constraints (Goins et al., 2005; Peterson et al., 2013).

### **Rural Postmenopausal Women and Physical Activity**

Nursing literature reports demographic and psychosocial variables which correlate with exercise and PA behavior in RPMW (Dye & Wilcox, 2006; Osuji et al., 2006; Perry, Herting, Berke et al., 2013). For example, nursing research suggests demographics such as age negatively correlate with PA (Wilcox, Oberrecht et al., 2005), while education and health status (Perry, Herting, Berke et al., 2013) positively correlate with PA levels. King and colleague (2005) noted low socioeconomic status (SES) positively correlated with PA levels and suggested that “a visible walking culture may encourage neighborhood residents [regardless of their individual SES] to be more active” (King et al., 2005, p. 466). Additionally, King and colleagues (2005) suggest that residents in a low SES neighborhood may have fewer options for transportation and may need to rely on walking for day to day errands. Additionally, psychosocial variables such as attitude (Osuji et al., 2006), commitment level (Perry & Butterworth, 2011), self-efficacy (Dye & Wilcox, 2006), and perception of exercise (Goodwin, 2007) influence PA behavior. Support from family and friends is important to RPMW (Goodwin, 2007; Plonczynski, Wilbur et al. 2008).

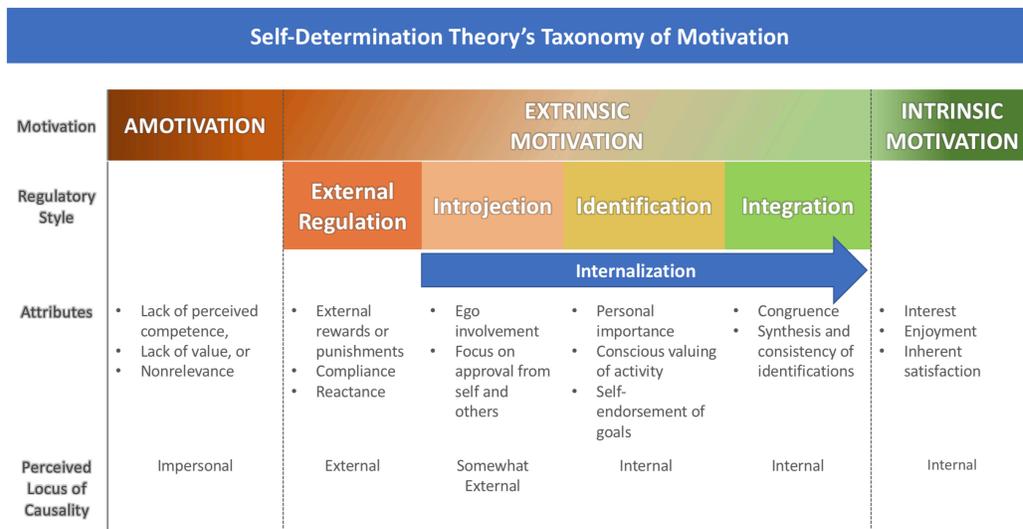
### **Theoretical Framework**

Self-determination theory (SDT), a recognized motivation theory used in the exercise literature for many years, identifies key psychological constructs that help explain what energizes behaviors such as exercise. Self-determination theory has been used to understand interpersonal support and motivation for behavior change in health-related areas such as tobacco cessation

(Williams & Deci, 2001; Williams, Niemiec, Patrick, Ryan, & Deci, 2009) and weight loss (Gorin, Poweres, Koestner, Wing & Raynor, 2014). This theory examines the effects of qualitatively different types of motivation, which energize behavior. These motivation regulations are measured on a continuum of increasingly internalized reasons for behavior, ranging from extrinsic to intrinsic (Table 1).

**Table 1**

*The Self-Determination Continuum*



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**Motivation Regulations and Psychological Needs**

Motivation regulations, best visualized along the SDT continuum (Table 1) reflect the extent to which one acts with volition. In the exercise literature, intrinsic regulation is associated with higher amounts of PA, identified regulation is predictive of initial short-term PA behavior adoption, and intrinsic motivation is most predictive of long-term exercise adherence (Teixeira, Carraca, Markland, Silva, & Ryan, 2012).

Within the SDT framework, when three basic psychological needs of autonomy, competence, and relatedness are met, individuals are more likely to act with intrinsic motivation (Deci & Ryan, 2002). Autonomy refers to having a sense of ownership in one's actions (Deci & Ryan, 2002). Competence is a sense of confidence in effective interactions with the environment (Deci & Ryan, 2002). Relatedness reflects the need and desire to feel connected to important others, while sharing a mutual goal (Deci & Ryan, 2002).

According to SDT, an autonomy supportive environment is needed to fulfill the basic psychological needs. Autonomy support provides an environment of encouragement that minimizes control and judgement (Deci & Ryan, 2002). Studies have shown a positive association between autonomous motivation and PA, as well as autonomy supportive health care climates and autonomous motivation (Ng et al., 2012).

### **Purpose**

This study explored the levels and relationships among perceived autonomy support, psychological need satisfaction, motivation regulations, and PA behaviors in both RPMW and UPMW within an SDT framework. The specific research aims were to determine 1) the relationship among perceived autonomy-support, basic psychological needs, motivation regulations, and PA behavior in RPMW and UPMW; and 2) the difference in levels of perceived autonomy-support, psychological need satisfaction, motivation regulations, and PA behavior between RPMW and UPMW. For this research, the United States Census Bureau (n.d.b.) classification of rural was used, which includes all areas outside of urban areas and employs the term rural interchangeably with nonmetropolitan described as populations, housing, and territory less than 50,000. The United States Census Bureau (n.d.b.) classification of urban was also employed for this study, the definition being “urbanized areas of 50,000 or more people”.

## Methods

### Design and Setting

This study used a comparative two-group descriptive correlational design and was conducted in a variety of community settings, such as churches, community centers, and libraries. Using G-power analysis for a priori MANOVA, with a medium effect size and alpha of 0.05, sample size estimate was 210. Participants were recruited from three Midwestern states, Illinois, Minnesota, and Wisconsin.

### Sample

This research began after receiving approval from the university institutional review board (IRB-2015-905304). Inclusion criteria consisted of women who 1) self-reported amenorrhea (natural, surgical or chemotherapy induced), 2) were able to read, speak, and understand English, and 3) were able to take part in PA. Research began in east central Illinois. After accepting a position at Mayo Clinic in Minnesota, the researcher concluded the study with study participants from Minnesota and Wisconsin. A convenience sample of 169 rural and urban postmenopausal women participated in the study over an 18-month period. Time restraints prevented achieving recommended sample size.

### Procedure

The principal investigator contacted rural and urban community centers, libraries, churches, and senior citizen centers, explaining the proposed research project and offering to present an osteoporosis educational session. To publicize the research and recruit participants, announcements were placed in local newspapers, church bulletins, and on library bulletin boards. Over the 18-month period, thirteen osteoporosis educational sessions were held in three Midwestern states. At each session, a 30-minute osteoporosis presentation was given, followed by

an opportunity for questions. After the presentation, the research study was explained in detail and attendees were invited to participate. After obtaining informed consent, those who agreed to proceed with the research completed the study measures.

## **Measures**

The study included four instruments to measure basic psychological needs, motivation regulations, autonomy support and PA behavior. Demographic information was collected to determine residence, race, ethnicity, age, education, height, weight, and employment status. Questions regarding menopause status, past bone health assessment (previous DEXA scan and past vitamin D assessment) were included.

**The Psychological Need Satisfaction in Exercise Scale.** The Psychological Need Satisfaction in Exercise Scale (PNSE) is an 18 -item questionnaire, with subscales assessing each of the three psychological needs perceived competence, autonomy, and relatedness (Wilson, Rogers, Rodgers & Wild, 2006). Using a Likert scale, each item is scored from one to six with one being “not true at all for me” and six being “very true”. Each subscale score is obtained by averaging the responses on the corresponding six items. The scores can range from six to thirty-six, with the higher scores reflecting greater need fulfillment. Cronbach’s coefficient for the PNSE questionnaire for this research was 0.803.

**Behavioral Regulation in Exercise Questionnaire.** The Behavioral Regulation in Exercise Questionnaire (BREQ-2) is a 19-item questionnaire that measures motivation regulations in the exercise context (Mullan, Markland & Ingledew, 1997). The BREQ-2 contains either three or four items measuring each of the following subscales of amotivation, external regulation, introjected regulation, identified regulation, and intrinsic regulation. Using a Likert scale, each subscale was measured from 0 to 4, with 0 being “not at all true” and 4 being “very true”. A mean score was

calculated for each set of motivation regulations. Cronbach's for this research were 0.627 for amotivation, 0.752 for external regulation, 0.649 for introjected regulation, 0.707 for identified regulation and 0.653 for intrinsic regulation.

**The Health Care Climate Questionnaire.** The Health Care Climate Questionnaire (HCCQ) has 15 items to assess participants' perception of the degree to which their health care provider is autonomy supportive, and a shortened version (Williams, Grow, Freedman, Ryan, & Deci, 1996). In this research, the shortened version was used to assess perceived autonomy support from family and friends. The modification for this research was terminology only, using "important others" in lieu of "healthcare provider". No psychometric testing was done of the shortened HCCQ using the term "important others" prior to using. Each item was scored using a Likert scale with 1 being "strongly disagree" and 7 being "strongly agree". The Cronbach's coefficient for the HCCQ in this research was 0.899.

**International Physical Activity Questionnaire.** The International Physical Activity Questionnaire (IPAQ) measured the dependent variable of exercise. This inexpensive and convenient tool is the most widely used and validated self-report measure of PA (Schembre & Riebe, 2011). The questionnaire is a seven-day recall tool that assembles information on time spent during the last 7 days sitting, walking, taking part in moderate intensity activity, and taking part in vigorous activity. The data collected from the IPAQ is reported in this research as a continuous variable. The volume of activity was computed by weighting each type of activity by its energy requirements defined in METs to yield a score in METs per minute per week. The MET value for computation of MET-minutes for walking was 3.3\*walking minutes\*walking days; for moderate intensity activities 4.0\*moderate-intensity activity minutes\*moderate intensity days; and for vigorous intensity, 8.0\*vigorous-intensity activity minutes\*vigorous intensity days. The walking,

moderate intensity, and vigorous intensity MET values were totaled yielding a total MET-minutes/week score. The Cronbach's coefficient for the IPAQ in this research was 0.427.

### Data Analysis

Statistical analyses were carried out using IBM SPSS for MacIntosh, version 25.0. Data analysis proceeded in sequential stages. Initially the data was screened for missing data. When more than 50% of the data was missing from any subscale, the case was deleted from further analysis (Tabachnick & Fidell, 2007). Second, if less than 50% of the data was missing from any subscale, missing values were replaced at the item level with the median substitution imputation protocol (Tabachnick & Fidell, 2007). Descriptive statistics characterized the subsamples of women (Table 2).

**Table 2**

*Demographic Characteristics of Study Sample*

Factors by Residence	N	Mean	Std. Deviation
Rural			
Age	114	67.62	10.99
Education	114	14.41	2.21
BMI	114	28.64	7.77
Urban			
Age	55	68.82	8.19
Education	55	15.16	2.43
BMI	55	26.37	4.90

BMI = Body mass index.

### Results

Approximately 97% of the rural and urban population of postmenopausal women identified themselves as Caucasian. The majority (98%) of women reported ethnicity as other than Hispanic. Urban postmenopausal women were approximately 1 year older, (M = 68.9, SD = 7.9) than the rural women (M = 67.6, SD = 10.8). The mean age of menopause for rural women (M = 48.2, SD = 5.9) and for urban women (M = 49.6, SD = 5.5) was similar. The UPMW had an average of 1

more year of education (15.2) compared to the RPMW at (14.4) years. More rural women had unknown osteoporosis status (60.0%) than urban (54.4%). Rural women had a higher average BMI at 28.6 compared to UPMW at 26.4.

### Residency, Psychological Needs, Motivation Regulations, and Physical Activity Behavior

A Pearson's correlation coefficient was used to explore the first research aim, determining the relationship among perceived autonomy-support, perceptions of basic psychological needs, motivation regulations, and PA between RPMW and UPMW (Table 3).

**Table 3**

*Pearson Correlation by Rural and Urban Residence*

Residence	PA	AS	IM	C	A	R
Rural						
PA	1	.159	.248**	.264**	.304**	.134
AS	.159	1	.322**	.321**	.275**	.514**
IM	.248**	.322**	1	.556**	.428**	.274**
C	.264**	.321**	.556**	1	.492**	.208*
A	.304**	.275**	.428**	.492**	1	.170*
R	.134	.514**	.274**	.208*	.179	1
Urban						
PA	1	.087	.249	.196	.028	.050
AS	.087	1	.247	.236	.328**	.400**
IM	.249	.247	1	.694**	.562**	.021
C	.196	.236	.694**	1	.561**	.128
A	.028	.382**	.562**	.564**	1	.298*
R	.050	.400**	.021	.128	.298*	1

PA = Physical Activity; AS = Autonomy Support; IM = Intrinsic Motivation; C = Competence; A = Autonomy; R = Relatedness. \* *Correlation is significant at the 0.05 level (2-tailed);*

\*\* *Correlation is significant at the 0.01 level (2-tailed)*

For urban women there was positive correlation between autonomy and relatedness ( $r = .298$ ,  $n = 169$ ,  $p = 0.05$ ). This was the only significant finding particular to urban women.

Rural women had a positive correlation between PA and intrinsic motivation ( $r = .248$ ,  $n = 169$ ,  $p = 0.01$ ), PA and autonomy ( $r = .304$ ,  $n = 169$ ,  $p = 0.01$ ), and PA and competence ( $r = .264$ ,  $n = 169$ ,  $p = 0.01$ ). Rural women also had a positive correlation between autonomy support and

intrinsic motivation ( $r = .322$ ,  $n = 169$ ,  $p = 0.01$ ), and autonomy support and competence ( $r = .321$ ,  $n = 169$ ,  $p = 0.01$ ). Rural women had a positive correlation between competence and relatedness ( $r = .208$ ,  $n = 169$ ,  $p = 0.05$ ). There was a positive correlation between intrinsic motivation and relatedness for rural women ( $r = .274$ ,  $n = 169$ ,  $p = 0.01$ ). After performing a Fisher's  $r$  to  $z$  transformation, to normally distribute the sample data (Fisher, 1921), only intrinsic motivation and relatedness in RPMW attained statistical significance ( $r = .274$ ,  $n = 169$ ,  $p = 0.04$ ).

### **Residency, Intrinsic Motivation, and Physical Activity Behavior**

To answer the second research aim, a one-way MANOVA tested for differences in motivation regulations, autonomy-support, psychological needs, and PA behavior in the postmenopausal women by residency status. Six dependent variables were used: autonomy, competence, relatedness, autonomy support, intrinsic motivation, and PA behavior. The independent variable was residency (rural versus urban). There were no significant differences between RPMW and UPMW on the set of dependent variables  $F(6,161) = 1.75$ ,  $p = 0.112$ ; Pillai's Trace = .061; partial eta squared = .06, therefore no further analyses were performed.

The overall METS per minute per week average for UPMW exceeded that of the RPMW (3302.7 versus 2652.3 METS value). Urban women spent more time in minimal walking (1318.2 versus 954.3 METS value) and also in moderate exercise (1318.2 versus 954.3 METS value). Rural women exceeded UPMW in vigorous activity (889.3 versus 844.9 METS value). There were no statistically significant findings for PA in either group of women.

An additional interesting aspect of this study was assessing bone health awareness in this group of women. Knowing that RPMW have a higher prevalence of osteoporosis-related vertebral fractures (Gomez-de-Tejada Romero et al., 2014) and tend to underestimate their osteoporosis related future fracture risk (Matthews et al., 2006), assessing bone health in this population was

valuable. Many women in this study (57.7%) had never had a bone health (osteoporosis) screening; this percentage was higher for RPMW (60.0%) than for UPMW (54.5%). The majority of RPMW had not undergone a vitamin D screening (64.2%), with a smaller percentage of UPMW unaware of their Vitamin D status (50.9%).

## **Discussion**

The purpose of this research was to examine the association of residency (rural versus urban) on motivation to exercise and PA behaviors in postmenopausal women, and to assess osteoporosis awareness in postmenopausal women. The importance of this study and the overall findings address in part the literature gaps regarding motivation and PA behavior in rural communities.

In this research, intrinsic motivation positively correlated with relatedness, autonomy support and PA in RPMW. For the RPMW in this research, an encouraging environment correlated with more autonomous motivation. Likewise exercise behavior positively correlated with more autonomous motivation. This is not a surprising finding as previous literature on RPMW found that friends and family, as well as a supportive environment was important. Social support was a facilitator of PA in most research done with this population (Dye & Wilcox, 2006; Goodwin, 2007; Osuji et al., 2006; Perry, Rosenfeld, Bennett & Potempa, 2007; Plonczynski, 2003; Wilcox, Bopp, Oberrecht, Kammermann & McElmurray, 2003).

The only statistically significant difference in correlations was the stronger relationship between intrinsic motivation and relatedness in RPMW. For RPMW, relatedness, like autonomy support and social support, was positively related to intrinsic motivation. Relatedness may impact PA behavior in rural postmenopausal women. Although this study did not reveal a significant correlation between PA and relatedness, this research did reveal a significant correlation between intrinsic motivation and relatedness for RPMW. In the SDT literature, intrinsic motivation is

associated with long-term exercise adherence (Teixeira et al., 2012). If rural women are more intrinsically motivated by relatedness, perhaps PA prospects in rural communities could focus on group exercise opportunities in churches, schools, libraries, or “group walks” rather than home based or individual exercise programs, where women can encourage one another, relate to one another, while building healthy exercise habits.

Family, friends, and social support have been cited as important constructs in earlier work with RPMW and PA. Relatedness according to SDT (Deci & Ryan, 2002) is a sense of being connected, which would include family, friends, and social support. However, the SDT literature has not found relatedness to predict motivation with regards to exercise behavior. Teixeira and colleagues (2012) found multivariate results consistently reported an absence of association between relatedness and PA, with findings from correlational analysis similar. The current study demonstrated a significant positive relationship between relatedness and intrinsic motivation, and a strong positive correlation between relatedness and autonomy support. Similar findings from Dye and Wilcox (2006) indicate social influence and emotional support from others were important for rural women.

Increasing PA can improve bone health (Segev, Hellerstein, & Dunsky, 2018). Many women are not aware of the bone benefits of exercise and many are not aware of their risk for osteoporosis and the sequelae of fragility fractures. Public awareness of bone health and osteoporosis continues to be low worldwide (Harvey et al., 2017). When examining bone health awareness in this group of postmenopausal women, most RPMW (60%) had not had a bone health screening, they were unaware. Likewise, 64% of the RPMW were uninformed of their vitamin D status.

## Limitations and Strengths

One limitation of this research study is the small sample size ( $n = 169$ ) and use of a convenience sample. This study was homogeneous with respect to population demographics which limit the generalization to Caucasian postmenopausal women. To address the issue of generalization, future research should include a larger sample size with more representation of all postmenopausal women, especially a greater proportion of women who are not Caucasian. Another limitation is using a self-report 7-day recall tool to measure PA in a sample of older women. The IPAQ is available and easy to use but subject to recall bias and measurement error. An issue when working with older adults is accurately recalling activities performed (Washburn, Smith, Jette, & Janney, 1993). Recall bias may be inflated with the age of the participants. Although the median age for this population was 68, many participants were in the eighth and ninth decade of life. Using an objective measurement tool such as an accelerometer could supply a more exact measure. An additional weakness to report is that a pilot test was not conducted after the term *important others* was exchanged for the term *healthcare provider* on the shortened form of the HCCQ.

The strength of this research is four-fold. First, as far as is known, this is the first study to measure the impact of residency on PA behavior, intrinsic motivation, autonomy support, and the three psychological needs as described in SDT in rural and urban postmenopausal women. Although PA has been studied in this population of women in the past, motivation as it relates to PA has not been measured. Second, although social support for PA is referenced as important to RPMW in earlier work, this research found a significant correlation between intrinsic motivation and relatedness in RPMW. Motivation to engage in health-sustaining behaviors such as PA is incredibly important yet exceedingly difficult to measure. This research study is an effort to introduce SDT to the nursing community and to demonstrate the utility and practicality of this

conceptual framework in health-related nursing research has demonstrated the utility of measuring motivation. Lastly, this research indicates RPMW are unaware of their bone health status

### **Conclusion**

The purpose of this research was to determine if residency influenced motivation to exercise in postmenopausal women. Although one cannot conclude a causal effect between residency, motivation, and PA behavior in this population of women, a significant positive correlation was found between intrinsic motivation and relatedness in RPMW. Rural postmenopausal women were intrinsically motivated by family and friends (autonomy support).

This data suggests correlates are dissimilar in the psychological needs and motivation regulations of RPMW and UPMW. Future research with both RPMW and UPMW must address the complexity involved with decisions that influence health-sustaining PA behavior.

Rural communities have greater health comorbidities and higher rates of inactivity. Rural postmenopausal women have higher rates of vertebral fractures (Gomez-de-Tejada Romero et al., 2014) and in this study, lower rates of bone health assessment. Physical inactivity counseling must extend beyond “exercise more”. Bone health assessment and education must be part of the discussion. When discussing physical inactivity, Advanced Practice Providers (APP’s) working in a rural setting should consider the value of relatedness as it pertains to intrinsic motivation for RPMW. In SDT, relatedness reflects the need and desire to feel connected to important others. As this research confirmed, feeling connected to others is important for RPMW. Initiating community-based group exercise programs in a local school, church, or library, may facilitate connectiveness for RPMW, thereby increasing intrinsic motivation and regular PA participation. As the burden of inactivity sequelae escalates, it is important to pursue further research in motivation, PA behavior, and bone health in rural populations. But it is equally important to

translate this research into practice. Rural nurses and rural APP's are in an excellent position to make the translation from research to practice.

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