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Nature Connection Changes Throughout the Life Span: Generation and Sex-Based Differences in Ecowellness

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We investigated whether ecowellness significantly differed based on participants' generation status (i.e., millennial, Generation X, and combined baby boom/silent generation) and biological sex using a 2 × 3 analysis of variance. A statistically significant interaction suggested that millennial men in the sample had lower levels of ecowellness compared with millennial women, a pattern in biological sex that held for individuals in the combined baby boom/silent generation group. In contrast, male Generation X participants had higher ecowellness levels compared with their female counterparts. Results are described through a life course health development perspective, and implications for professional counseling and future research are discussed.

Keywords: age, ecowellness, generation status, sex differences, connectedness to nature

The natural environment, including urban green spaces, wilderness landscapes, and technological nature, has been shown to positively affect human health and wellness across the life span (Frumkin et al., 2017). Nature contact contributes to reductions in psychophysiological stress (McSweeney et al., 2015), improved mood (Li et al., 2018), enhanced focus and concentration (Faber Taylor & Kuo, 2011), and social cohesion (Baklien et al., 2016). Nearby nature (e.g., nature close to one's home) has also been associated with reduced risk for cardiovascular disease (Gascon et al., 2016) and increased happiness (Capaldi et al., 2014).

Reese and Myers (2012) introduced the ecowellness construct in the professional counseling literature to provide counselors and researchers with an

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intentional framework for integrating nature into traditional clinical settings. They defined *ecowellness* as one's sense of appreciation, respect for, and awe of nature that results in greater feelings of connectedness and overall sense of wellness. Reese (2013) operationalized ecowellness through the development of the EcoWellness Inventory (EI), and Reese and Lewis (2019) recently identified multivariate relationships between the seven EI subscales and factors of the indivisible self model of wellness (IS-Wel; Myers & Sweeney, 2008) through the Five Factor Wellness Inventory (Myers & Sweeney, 2005). They found that the ecowellness model was intricately related with the IS-Wel, including one canonical function they labeled as "Indivisible Wellness." Nearly every ecowellness factor was found to be related to the IS-Wel, suggesting that the ecowellness construct is an integral component of wellness.

Little research has been dedicated to understanding how sociodemographic variables such as generation status and biological sex might influence ecowellness or other related constructs (e.g., nature connectedness, nature relatedness). This clarity is needed to begin investigating how clients across the life span may benefit most from the integration of ecowellness into counseling. The purpose of this article is to report the findings of a study in which we analyzed significant differences in ecowellness based on generation status (i.e., millennial, Generation X, baby boom, and silent generation) and biological sex using a factorial design. Results are discussed through a life course health development (LCHD) perspective, and implications for professional counseling practice and future research are described.

SEX AND GENERATION DIFFERENCES IN ECOWELLNESS

LCHD is a theoretical framework in which wellness across the life span is characterized as dynamic, complex, and adaptable (Halfon & Forrest, 2018; Halfon & Hochstein, 2002). Wellness includes a host of health indicators, such as cognitive, social, emotional, spiritual, physical, and cultural domains. Whereas the human body's physical systems often decline with age, other areas of holistic development may continue to flourish until one's death. Additionally, the wellness priorities or resources of each developmental epoch may vary based on a variety of sociodemographic factors. In fact, as people grow older, perceptions of wellness tend to remain consistent or gradually increase (Hudson et al., 2016). Whereas some research suggests that perceived wellness begins to decline in people's mid-60s or early 70s (Baird et al., 2010; Mroczek & Spiro, 2005), researchers have also found that older generations tend to engage in wellness strategies as effectively as younger generations despite their increased risk for encountering physical health–related stressors (Hamarat et al., 2002). Hamarat et al. (2001) explored life satisfaction across three adult cohorts (18 to 40 years, 41 to 65 years, and 66 years and older). They found that the use of wellness resources (e.g., confidence, acceptance, social support) positively

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predicted life satisfaction for individuals ages 41 and above but not those in the 18-to-40-year cohort. It is interesting that differences in the utilization of wellness resources in terms of biological sex seem to be nonexistent, mixed, or dependent on the constructs explored in this literature (Della Giusta et al., 2011; Hamarat et al., 2001, 2002).

Ecowellness, or nature connection as a means to facilitate wellness, serves as one possible resource when professional counselors work with clients. Research suggests that individuals later in the life span experience greater connection with nature than do their younger counterparts (Finlay et al., 2015; Haluza et al., 2014; Zhang et al., 2014), with growing concerns that younger generations may be spending less time in nature because of factors such as technology and urbanization (Larson et al., 2019; Louv, 2005). Richardson et al. (2019) identified a teenage dip in nature connectedness beginning in one's early teens that does not fully recover until around 30 years of age. They theorized that this temporary reduction in nature connectedness might occur on account of a variety of adolescent developmental tasks that take precedence over connection with nature, such as social belongingness, self-exploration, and career.

Cervinka et al. (2012) explored relationships between connectedness with nature and perceptions of wellness in five studies that surveyed 547 adults in Austria. They categorized adults into three age groups: under 26 years of age, between 26 and 44 years, and above 44 years. They found that individuals over the age of 44 consistently scored higher on perceptions of nature connection than did either of the other two age groups. Women also scored higher than men. Haluza et al. (2014) surveyed 1,500 adult participants in determining predictors of nature connectedness with sociodemographic variables. They found that women were more connected with nature than were men and older participants were significantly more connected with nature compared with younger participants. In a recent Australian study, Dean et al. (2018) found that the nature relatedness construct was rated higher among individuals who were over the age of 45 years, who were not working, and who identified as female. In contrast to this body of work, some research suggests that those over the age of 65 spend less time with natural places based on their physical mobility, level of connectedness to nature, living situation (i.e., whether they lived alone), and home type (van Heezik et al., 2020).

This tentative but growing area of inquiry suggests that (with few exceptions) individuals of older generation status and women tend to experience greater nature connection and, subsequently, may experience greater wellness by using nature contact as a resource. This research may have noteworthy implications for counselors working with clients across the life span and biological sex, although additional research is needed. Thus, the purpose of this study was to (a) determine whether similar patterns in age and biological sex present in the nature connectedness literature apply to the construct of ecowellness and (b) examine whether these two sociodemographic variables interact to provide a

more complex, and potentially helpful, picture of ecowellness when working with clients across the life span and biological sex. In particular, we explored the following research questions:

Research Question 1: Is there a main effect of generation status on overall ecowellness?
Research Question 2: Is there a main effect of biological sex on overall ecowellness?
Research Question 3: Is there an interaction between generation status and biological sex on overall ecowellness?

On the basis of previous multidisciplinary research, we hypothesized that women and individuals of older generation status would report greater levels of overall ecowellness. However, researchers to date have yet to examine whether biological sex interacts with generation status to affect perceptions of ecowellness. Thus, we lacked a directional hypothesis in examining this research question.

METHOD

The study reported in this article was one focus of a broader research effort in which we explored the factor structure of the EI (Reese et al., 2015) and initial validation of the assessment by examining relationships with hypothetically related constructs (Reese & Lewis, 2019). After receiving institutional review board approval, the first author recruited research participants through a secure registry of research volunteers in the United States called ResearchMatch (https://www.researchmatch.org/), which was established by academic institutions and the National Institutes of Health in the United States (Harris et al., 2012). We randomly selected participants from the database and contacted them on three separate occasions (i.e., an initial recruitment email contact and two reminder emails) across 14 days. All participants were a minimum of 18 years old when they completed the online Qualtrics survey (https://www.qualtrics.com/).

Defining Generation Status

For the purposes of this article and the analyses reported, we used the current definition of generation status developed by the Pew Research Center (Dimock, 2019). The silent generation includes individuals born between 1928 and 1945, the baby boom generation consists of individuals born between 1946 and 1964, Generation X includes individuals born between 1965 and 1980, and the millennial generation includes individuals born between 1981 and 1996.

Participants

We recruited 1,136 individuals from ResearchMatch. Of those recruited, 792 participants completed the EI (69.7% response rate). Ages of the participants

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ranged between 19 and 84 years, spanning the millennial (n = 274, 34.6%), Generation X (n = 206, 26.0%), baby boom (n = 266, 33.6%), and silent (n = 34, 4.3%) generations. Twelve participants (1.5%) did not report their age. The mean age of the participants was 41.5 years (SD = 14.7). The sample included 658 (83.1%) women and 124 (15.7%) men. Ten participants (1.3%) did not indicate their biological sex. (Percentages may not total 100 because of rounding.) With respect to race/ethnicity, most participants identified as White (n = 649, 81.9%), followed by African American (n = 32, 4.0%), Asian or Pacific Islander (n = 24, 3.0%), Hispanic or Latina/o (n = 16, 2.0%), and Native American (n = 7, 0.9%). Sixty-four participants (8.1%) did not report race/ethnicity information. Participants represented 38 different states of residence. Regarding highest level of education, 317 participants (40.0%) had an advanced degree, 301 (38.0%) had a bachelor's degree, 79 (10.0%) had earned an associate's or trade/technical school degree, and 95 (12.0%) had attained a high school diploma.

Measure

The EI (Reese, 2013) consists of 61 attitudinal statements, which are answered on a 4-point Likert scale (1 = *strongly disagree*, 4 = *strongly agree*). The assessment addresses thoughts, emotions, and behaviors related to one's perceived nature connection and how these attitudes are associated with wellness (e.g., "Nature brings about pleasant thoughts for me"). It includes seven subscales: Physical Access, Sensory Access, Connection, Protection, Preservation, Spirituality, and Community Connectedness. Physical access is having the ability to access nature in one's nearby environment. Sensory access includes having indirect access to nature through technological forms of nature (e.g., nature sounds, images, videos), nature views, or pictures. Connection involves the incorporation of nature into one's identity, such as engaging in nature hobbies, having positive memories of nature, and experiencing important relationships in nature. Protection, or nature self-efficacy, is feeling effective in identifying aspects of nature that can promote or inhibit one's health. Preservation is having a sense of environmental agency and feeling like one makes a positive impact on nature. Spirituality is marked by feeling a sense of oneness with nature or feeling closer to one's life-guiding beliefs and values. Finally, community connectedness is feeling a sense of community with others in or around natural places. In the current study, the internal consistency coefficients for the EI total and subscale scores ranged between .71 (Protection) and .96 (total score). Total and subscale scores are calculated by using a linear transformation and range between 25 and 100. The higher the score, the greater the respondent's ecowellness. For the purposes of this study, we focused on the EI total score.

Data Analyses

We analyzed the data using a 2 × 3 analysis of variance (ANOVA) using SPSS (Version 25.0). For the ANOVA, overall ecowellness (as measured by the EI

total score) served as the dependent variable. The independent variables included biological sex (two levels: male and female) and generation status (three levels: millennial, Generation X, and combined baby boom/silent generation). Because relatively fewer participants represented the silent generation in this study and nature connectedness researchers have often combined the baby boom and silent generations in their studies (Cervinka et al., 2012; Dean et al., 2018; Haluza et al., 2014), we combined these two generations when performing our data analyses. The ANOVA test violated the homogeneity assumption, even after we performed several data transformations. Therefore, the results should be interpreted with caution.

RESULTS

To address the research questions, we used a 2 × 3 factorial ANOVA to examine differences between biological sex and generation status on the dependent variable overall ecowellness. The overall ANOVA produced a significant main effect for biological sex, $F(1, 774) = 4.40$, $p = .036$, and generation status, $F(2, 774) = 9.91$, $p < .001$. Specifically, men in our sample scored significantly lower on ecowellness compared with women, and both Generation X and baby boom/silent generation participants had higher ecowellness scores than did millennial participants. The ANOVA also produced a significant interaction effect, $F(2, 774) = 4.17$, $p = .016$, with a small effect size (partial $\eta^2 = .01$). See Table 1 and Figure 1.

DISCUSSION

Our results supported the two main effect hypotheses. Participants in the millennial group scored lower on ecowellness than did participants in both the Generation X and baby boom/silent generation groups, and women were more ecowell compared with men. The main effect results are consistent with previous research, wherein scholars have consistently found that as adults age, they tend to be more connected with nature and that women tend to experience greater

TABLE 1

Results of Factorial Analysis of Variance Examining Generation Status, Biological Sex, and Overall Ecowellness

Variable	*SS*	*df*	*M*² *F*	*p*
Biological sex	501.33	1	501.33	.036
Generation status	2,260.38	2	1,130.19	<.001
Biological Sex × Generation Status	951.58	2	475.79	.016
Error	88,216.35	774		
Total	93,810.27	779		

Note. $N = 792$.

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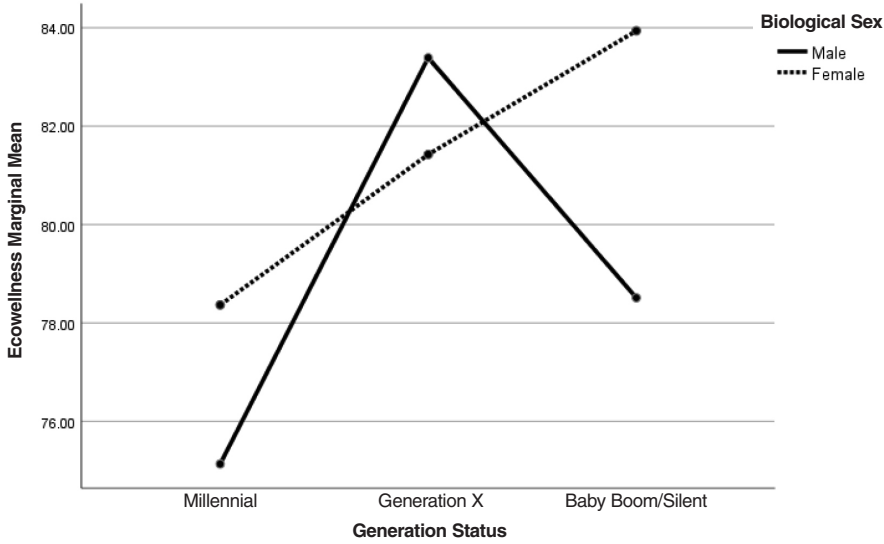

FIGURE 1

Disordinal Interaction Effect Between Generation Status and Biological Sex on Overall Ecowellness

Note. Millennial men had lower overall ecowellness compared with millennial women, and this pattern also held for the baby boom/silent generation group. However, the pattern shifted for the Generation X group, wherein men had higher ecowellness compared with their female counterparts.

nature connection than do men (Cervinka et al., 2012; Finlay et al., 2015; Haluza et al., 2014). Our study's contribution to the literature lies in the interaction effects identified between biological sex and generation status. We found that baby boom/silent generation women were the most ecowell group within the sample and millennial men were the least ecowell group. Millennial women were more ecowell than millennial men but marginally less ecowell than baby boom/silent generation men. Furthermore, Generation X women were more ecowell than both millennial and baby boom/silent generation men but less ecowell than Generation X men. It is fair to say that the trends of these findings may once again be consistent with the previously cited research, but with one notable exception. For men, ecowellness peaked in the Generation X group, and for women, ecowellness peaked in the baby boom/silent generation group.

LCHD theorists postulate that wellness across the life span is complex and adaptable given the broad number of factors and developmental needs that influence wellness beyond aging (Halfon & Forrest, 2018; Halfon & Hochstein, 2002). The developmental needs of millennials, for example, may focus on inward identity development and exploration, and thus, nature connection may take a back seat to other life tasks given that some research suggests that

nature connection decreases between the teen and young adulthood years (Richardson et al., 2019). The developmental needs of many individuals at midlife (e.g., Generation X) might include navigating midcareer stress while also balancing responsibilities that include caring for children who are staying home longer and aging parents who are living longer (Chuang, 2019). Some research suggests that men within this generation value an active lifestyle and have greater concerns about body image to maintain a sense of youthfulness (Mellor et al., 2017). In contrast, Generation X women often tend to be responsible for not only maintaining a career but also serving as the caregiver for children in the home (Chuang, 2019). Some research also suggests that the postparental period can be particularly difficult on midlife women (Lippert, 1997). Such possible differences in biological sex in Generation X might serve as one possible explanation for these differences in ecowellness between Generation X men and women identified in this study, although additional research is needed. Moreover, many individuals within the baby boom and silent generations may have more time to focus on wellness activities compared with younger generations because they have transitioned out of a career and into retirement. Nevertheless, baby boomers and members of the silent generation are often trying to maintain overall wellness in the face of physical decline. Men in the baby boom and silent generations may be particularly likely to experience decline in their physical health before their female counterparts (Kalben, 2000), which may have contributed to lower ecowellness scores in the baby boom/silent generation men in our study.

Implications for Counseling

Our findings provide professional counselors with possible insights for integrating ecowellness with clients based on generation status and biological sex, although we encourage counselors to use caution when making ecowellness-focused treatment decisions based on these factors, given that this is the first study wherein interaction effects have been identified. For both millennial men and women, counseling interventions might target introducing the concept of ecowellness as a possible wellness resource. For example, some research suggests that millennials use or rely on technology to a greater extent than do older cohorts (Van Volkom et al., 2014). Additionally, screen time is associated with reduced nature connectedness among younger populations (Larson et al., 2019), which may have adverse implications for health and wellness. Taking selfie photos, for example, has been linked with lower levels of nature connectedness (Richardson et al., 2018). Counselors should ask young adult clients about their screen time and whether it is possible to engage in ecowellness-based activities to balance out their use of technology in order to promote stress reduction and attention restoration.

The sensory access domain of ecowellness might be introduced as a way to scaffold client engagement with nature (see Reese et al., 2016). That is, in addition to encouraging younger clients to learn about possible outdoor-based strategies for using ecowellness as a resource, counselors might explore ways

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that technological nature might be integrated into a client's treatment or wellness planning. For example, Crawford et al. (2017) studied the effectiveness of a mobile application in connecting youth with nature during a place-based education experience. Results suggested that the mobile application was just as helpful in connecting youth with nature as the other nontechnological conditions. Thus, rather than encouraging millennial clients to eliminate use of technology, counselors can work with these clients to balance or integrate their use of technology with access to nature. Relatedly, counselors can invite clients to explore ways in which sounds, scents, and images of nature might be interspersed throughout a client's daily life, which have been shown to promote stress reduction and attention restoration (Alvarsson et al., 2010; Annerstedt et al., 2013; Conrad & Adams, 2012). Counselors can help clients working in office settings that lack windows or views of nature to identify and strategically place nature images in their workspaces. Favorite natural scents can be used to prevent and mitigate stress, and counselors can help clients decipher which nature sounds might be of greatest benefit to help them relax.

When serving Generation Xers, professional counselors might aim to help these clients identify realistic ways of accessing nature in addressing midlife wellness. In particular, Generation Xers may have little time to use nature as a resource compared with other generations based on possible life tasks related to midcareer, shifts in family structure, and biological changes (Chuang, 2019). Counselors should remain attuned to the possible ways that issues related to biological sex affect these issues without making assumptions. For example, whereas some Generation X clients may have adult children and experience a sense of "empty nest," others within this generation may have young children still within the home (Degges-White & Myers, 2006) while concurrently navigating midcareer. Similarly, assumptions should be avoided based on biological sex as they relate to work and family involvement, such as a working father's involvement in child-rearing.

With regard to working with baby boomers and members of the silent generation, professional counselors may need to help some older clients overcome physical limitations and other client-identified barriers that may adversely affect access to nature. As previously noted, some research suggests that adults over the age of 65 spend less time with natural places based on their physical mobility, level of connectedness to nature, living situation (i.e., whether they lived alone), and home type (van Heezik et al., 2020). Thus, counselors might work with clients to identify specific strategies for bolstering ecowellness, such as accessing nearby garden spaces, engaging in guided meditation, accessing nature via technology, and broadening conceptions of nature to include views of nature. More specifically, professional counselors working with men in the older generations might consider exploring sociocultural factors affecting perceptions related to nature connection as a possible wellness resource. For example, engaging in nature-based activity that aligns with "traditional" gendered views of masculinity may make ecowellness more accessible to some men. Certainly, counselors must not stereotype clients based on generation status or biological

sex, but the findings of this study may help counselors develop greater awareness of biological sex and life-span issues that affect client views on ecowellness.

Implications for Counseling Research

Our findings also provide additional direction for counseling research. First, further research using the EI is needed with greater attention to enrolling members of the silent generation, especially given that some recent research has found a reduction in nature contact and connection among individuals older than 65 years of age (van Heezik et al., 2020). Researchers might also invite participants to consider specific motivating, enabling, and inhibiting factors (e.g., technology and recreation preferences, education, career, caretaking for children and aging parents) for pursing ecowellness-based experiences as part of achieving broader health and wellness. Next, research is needed wherein a more diverse sample is recruited to determine whether differences exist based on race/ethnicity and across gender. Additionally, research that pilots actual ecowellness interventions is needed, including attention to tailoring interventions to individuals across gender (i.e., beyond binary definitions of biological sex) and generation status. Researchers might first focus on interview or focus group processes by gender and/or generation status to gauge nature interests and work toward randomized controlled trials in assessing the effectiveness of such wellness interventions when integrated into counseling. Finally, research is needed wherein scholars explore the ecowellness of individuals belonging to Generation Z (persons born after 1996), a population that has grown up with exponential growth in technology relative to other generations (Turner, 2015) and shown to possess less nature connectedness compared with other generations (Richardson et al., 2019).

Limitations

A primary limitation of this study included a homogeneous sample, and thus, generalizability is limited. Most participants identified as White, female, and college educated. It is quite possible that racially/ethnically and educationally diverse individuals may rate ecowellness differently than the participants in this study. For example, previous research suggests that populations with lower household incomes tend to lack the same level of safe access to local parks compared with more affluent communities (Kessel et al., 2009). Additionally, the word "nature" conjures different images and experiences for different people based on cultural context and life experience. For example, Byrne (2012) explored perceptions of nature within a Latino community in Los Angeles and found that, generally speaking, the community preferred time with others in nature as opposed to time spent alone in nature. Many participants felt that this way of spending time in nature was discouraged by the general public and that "White" ways of spending time in nature (i.e., in quiet solitude) were more readily favored. Such cultural differences and possible marginalization are important because they may affect the kinds of nature experiences clients

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have and, ultimately, one's level of ecowellness. Thus, it is vitally important to conduct additional research with a more diverse sample prior to generalizing the findings beyond those studied in this sample.

Another limitation is that our ANOVA test violated the homogeneity assumption, even after we performed several data transformations. Consequently, there is an increased risk of a Type I error. Therefore, the results of our study should be considered tentative and should be interpreted with caution. Our findings also do not imply causality; that is, age and biological sex do not cause ecowellness, or vice versa. Finally, because we combined baby boomers with the silent generation in our analyses, our understanding of how these two populations may differ in terms of ecowellness is limited.

CONCLUSION

The natural environment has positive effects on human health and wellness (Frumkin et al., 2017), and some scholars in professional counseling are beginning to integrate nature into traditional counseling settings (Reese & Myers, 2012). We explored whether the variables of biological sex and generation status might interact to provide foundational insight into ecowellness, which may have implications for ecowellness counseling interventions based on these sociodemographic factors. The results of this study deepen understanding of previous research, wherein women and older generations have been found to experience greater connection with nature (Cervinka et al., 2012; Finlay et al., 2015; Haluza et al., 2014). Our findings contribute additional insight into how biological sex and generation status may interact to affect perceptions of ecowellness, which may have potentially important counseling implications. Depending on generation status and biological sex, professional counselors may identify different client barriers to and motivations for accessing nature. Regardless, counselors should never assume a particular ecowellness type based on a client's identities, although our findings may provide counselors with a possible starting place for understanding how ecowellness intervention planning and development may differ based on generation status and biological sex.

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