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Preface

In the first article of this issue, Piper, Smith, Jeria, and Intrieri argue the importance of domain specificity in measures of self-directed learning as a theoretical foundation for developing the Self-Directed Learning for Exercise Scale. Their study included 368 autonomous exercisers and 217 novice exercisers. After following a systematic method of validation, Piper et al. present an 11-item scale that is useful for both scientific research and exercise instruction.

In the next article, Cooper explores the self-directed learning activities of women in understanding more about menopause. This research follows previously published articles that investigate the role of self-directed learning with health promotion. Cooper engaged in survey research and produced 227 usable responses (109 engaged in learning about menopause) from women aged 35-55 years who, thus, represent various stages of menopause (i.e., from beginning the perimenopause transition to early postmenopause).

Finally, Ponton presents findings from a descriptive study of a single, private university that suggest full professors exhibit higher than normative levels of learner autonomy. This result supports the notion that doctoral education—which has the goal of developing scholars of which full professors arguably serve as a representative sample—should structure instruction that promotes learner autonomy.

Acknowledgement

Professor Gary Confessore has been a member of the *IJSDL* editorial board since 2004, which included service after earning emeritus status from The George Washington University in 2008. As author/coauthor of numerous SDL books/articles, 2007 recipient of the Malcolm Knowles Memorial Self-Directed Learning Award, 2016 inductee of the International Adult and Continuing Education Hall of Fame, and longtime principal of Human Resource Development Enterprises, he has brought a wealth of knowledge while serving as a peer reviewer for submitted manuscripts. Because he continues to regularly travel to East Asia as a speaker, consultant, researcher, and mentor, he has decided to resign from the editorial board.

Thank you, Gary, for your service!

Michael K. Ponton, Editor

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DEVELOPMENT OF THE SELF-DIRECTED LEARNING FOR EXERCISE SCALE

Tim Piper, Thomas Smith, Jorge Jeria, and Robert Intrieri

The development and score validation of the Self-Directed Learning for Exercise Scale (SDLES) will be explored. The SDLES instrument was tested on 368 autonomous exercisers and 217 novice exercisers. Scores from the instrument demonstrated a high level of validity support and predictive ability for categorizing exercisers.

Keywords: self-directed learning, exercise, domain-specificity, unified validation theory, confirmatory factor analysis, exploratory factor analysis, McDonald's omega, factorial invariance, OCLI, SDLRS

Since the original concepts of self-directed learning (SDL), spawned by early works of Knowles (1975), Tough (1979a, 1979b), and Candy (1991) that were later extended by the learning-how-to-learn concepts of Smith (1982), the body of research has expanded greatly. Much of the early works of Tough (1978, 1979a) were concerned with the exploration of the frequency and motivations that drive SDL activities. Other research has investigated methods for measuring SDL (Guglielmino, 1977; Oddi, 1984). Much of the literature is based upon the scores obtained from the various SDL instruments that measure individuals' aptitude for being self-directed. What may be less understood is how specific these scores reflecting general self-directedness relate to contextually-based SDL.

Based upon the assumption that SDL is an inherent personal attribute, survey instruments have been developed to measure SDL readiness and continued learning. Two primary instruments for measuring SDL, which were developed independently to measure the complexity of characteristics, abilities, and attitudes of self-directed learners, are cited widely in the literature. The Self-Directed Learning Readiness Scale (SDLRS) developed by Guglielmino (1977) measures attitudes and characteristics of readiness to engage in SDL. This scale was later retitled the Learning Preference Assessment (LPA; Guglielmino & Guglielmino, 1991). The other primary SDL instrument used in the research for which validity evidence has been generated in the adult education literature is the Oddi Continued Learning Instrument (OCLI; Oddi, 1984).

Guglielmino (1977) developed the items in the SDLRS to reflect attitudes, abilities, and personality characteristics that were most related to SDL. Guglielmino found that scores from the SDLRS reflected eight factors: (a) openness to learning, (b) self-concept as an effective learner, (c) independence in learning, (d) personal

responsibility for learning, (e) love of learning, (f) creativity, (g) orientation for future learning, and (h) being in possession of basic problem-solving and learning skills.

In an attempt to create a unified theory to explain SDL, Oddi (1986) created and validated the scores obtained from the OCLI, which consists of personality characteristics common to those engaged in SDL. Scores from the OCLI were found to reflect three factors or dimensions: (a) proactive drive versus reactive drive, (b) cognitive openness versus defensiveness, and (c) commitment to learning versus aversion to learning. The refinement of the list of items resulted in the OCLI in use today.

Besides the support from the seminal research of both Guglielmino and Oddi, other researchers have provided validity evidence supporting the SDLRS/LPA and the OCLI. Both scales have been used extensively in adult education. Both Torrance and Mourad (1978) and Delahaye and Smith (1995) provided validity evidence for the SDLRS and the LPA. Similarly, validity evidence has been generated for scores from the OCLI as a measure of overall SDL ability (Harvey, Rothman, & Frecker, 2006; Oddi, 1984, 1986).

While considerable validity evidence is available for both scales, both lack domain specificity that may be the reason for some of the conflicting validity support. In a commentary, Baveye (2003) strongly challenged the value of the SDLRS because it is focused on the “easily measured perceptions of SDL readiness rather than on actual, observed SDL endeavors” (p. 445) and stated that “perceived readiness may correlate positively, not correlate at all, or correlate negatively with actual behaviors” (p. 445) and that the application of “vague and potentially misleading psychometrics instruments currently in use” (p. 446) is difficult to interpret with any certainty to specific domains. This is likely the case with the OCLI as well as it also measures a general SDL ability and lacks a domain-specific aspect.

Statement of the Problem

The theoretical underpinnings of the current study are based upon assumptions attributed to SDL. Silen and Uhlin (2008) have called into question one common assumption that SDL is a general attribute, and this assumption leads to a common error found in much of the SDL research: the oversimplification of the SDL concepts. Based upon the review of the SDL literature, most research measures general self-directedness, and it is not uncommon for individuals' scores to indicate high levels of self-directedness on these general measures of SDL.

The present study does not assume the belief, posited by many authors, that SDL is an innate personality characteristic (Artis & Harris, 2007; Brockett & Hiemstra, 1991; Candy, 1991; Guglielmino, 1977; Merriam, Caffarella, & Baumgartner, 2007). Recent researchers have framed their studies around this common assumption only to call it into question during their findings and discussion (Kicken, Brand-Gruwel, Van Merriënboer, & Slot, 2009; Ponton, Derrick, & Carr, 2005). If SDL is an innate personality characteristic, there should be research that delineates individuals whose personality characteristics do not include SDL abilities. Studies that have measured SDL in a broad

range of populations have failed to uncover low SDL scores (Gieve & Clark, 2005; Gremmo & Riley, 1995; Kungu, Kinyanjui, & Machtmes, 2011; Reio & Davis, 2005).

Tough (1979a, 1980) voiced concerns about interpreting scores from the SDLRS or OCLI in a generalized manner. His main concern was related to the “inappropriateness of trying to generalize too simply about why people learn” (Tough, 1980, p. 6). The use of general, self-directed assessment tools offers a glimpse into the self-directedness of individuals; however, unless they are content specific, they may be inadequate and leave many questions unanswered.

The concept of SDL is widely accepted in the adult education field yet relatively little is understood with respect to domain-specific SDL. The lack of domain-specific SDL assessment tools leads to the potential for inappropriate generalizations based on the SDL inventories commonly utilized by researchers. There are currently few domain-specific SDL instruments in the literature, and the instruments that do exist are directed primarily toward the healthcare professions and accounting (Curran, Kirby, & Fleet, 2006; Fisher, King, & Tague, 2001; Robertson, Umble, & Cervero, 2003; Smith, 2001; Williamson, 2007).

There is a gap in the literature related to SDL research that can be utilized by the exercise scientists for applications in their field of practice. One of the primary roles of the exercise science professional is to teach individuals about health, wellness, and exercise. Part of this teaching involves specific content knowledge aimed at healthy lifestyle choices. To align with the adult education literature related to SDL that grounds this investigation, the term regular exerciser will be viewed through the lens of personal autonomy and will be referred to as autonomous exerciser. Exercise scientists currently do not know if autonomous exercisers are generally self-directed individuals or self-directed specifically for exercise. There is research that explores adult education concepts as they apply to exercise adherence (Garcia & King, 1991) and views adherence through a trait approach related to self-efficacy, an underpinning of SDL. Other than those in health and wellness fields, exercise knowledge is not likely linked to other work-related SDL undertakings. Exploring SDL in autonomous exercisers may provide some insight into this previously overlooked domain-specific SDL pursuit.

The following studies analyzed an annual, 36-hour, ultra-endurance event that involved heavy backpack hikes, various military style physical training events, swimming, lifting, carrying, and running, all performed without the benefit of sleep. Piper, Gentry, Van Ginder, McMillan, and Decker (2013) administered the OCLI to competitors in the ultra-endurance event. The researchers found that this sample of racers scored an average of 127 out of a possible 168, indicating that they were highly self-directed. McMillan and Piper (2014) used the SDLRS to measure SDL on a sample of ultra-endurance racers and found that individuals involved in ultra-endurance competition demonstrated above average SDL scores as measured by the SDLRS, scoring an average of 237.75 that is above the adult mean of 214 for the SDLRS. Lindfors, McMillan, Piper, and Decker (2013) found that this same sample of individuals also exhibited a unique personality typology when assessed with the Carl Jung Trait Typology Test. The most dominant personality traits showed that participants were 87% intuitive and 100% judging, indicating that they preferred to plan

and organize their actions based upon perceived patterns and with a focus on future possibilities, qualities important to the completion of ultra-endurance activities.

These investigations utilized known measures of SDL and personality characteristics but fail to determine if these individuals are self-directed in a more general sense or, if instead, they are self-directed for the specific domain of exercise. Based upon this review of the literature and subsequent observation of the lack of research to explore the possible domain-specificity of SDL, there is a need to answer the concerns of Oddi (1986) regarding the over-generalization of SDL when it is potentially a domain-specific ability. The need for contextually-based assessments of SDL is clearly needed yet only a few career-specific instruments are available. The lack of content specific, self-directed learning assessment tools leads to the potential for inappropriate generalizations based on the SDLRS, OCLI, and similar general SDL inventories commonly utilized by researchers.

If the goal is to investigate a specific domain, it is important that the boundaries and content of the investigation be specific to the domain constructs. The use of “construct-linked scales make it possible to link theory to data, and thus to test the predictions of domain theories” (Bunderson, 2003, p. 1). Understanding a domain requires construct-relevant inquiry that represents the assorted activities, difficulties, and assessment of formats that are specified by the limitations and makeup of the construct that is being assessed. One area of adult learning in which SDL is certainly relevant involves exercise and physical activity. Exercise is important to improving health and wellness, but the SDL practices of those who engage regularly in exercise remains to be investigated. If individuals are attempting to improve their health, it would seem intuitive that they would seek SDL activities specific to exercise and physical activity. The exercise professional’s role is to educate clients about health, wellness, and exercise. Research on SDL, however, is lacking in the field of exercise science. If scores from an instrument are found to exhibit validity and they are found to be different between the autonomous and novice exercisers, this evidence may support the concept of domain-specific SDL.

Statement of the Purpose

The purpose of this study was to develop and provide validity evidence for scores from an instrument that measures self-directed learning (SDL) in exercisers. The instrument developed for this dissertation will be referred to as the Self-Directed Learning for Exercise Scale (SDLES).

Method

Research Questions

To direct the research, four primary research questions were addressed:

RQ₁: Do scores from the SDLES reflect a 3-dimensional structure?

RQ₂: Is there evidence of internal consistency reliability for scores from the SDLES?

RQ₃: Do scores from the SDLES exhibit factorial invariance by type of exercisers (novice exerciser [NE] vs. autonomous exerciser [AE])?

RQ₄: Does the SDLES discriminate between autonomous exercisers and novice exercisers and in a different manner than the OCLI?

Design

The intention of this study was to determine if the SDLES had the potential to become an instrument for future application of the study of SDL for the domain of exercise. The hierarchy of analysis of the SDLES followed the procedures for applying unified validation theory outlined by Cook and Beckman (2006). The five sources of evidence to support construct validity include (a) content, (b) response process, (c) internal structure, (d) relations to other variables, and (e) consequences. The method used to provide support for construct validity will be explained within the findings.

Sampling

All participants were recruited through direct contact, e-mail, and social media solicitation. Both descriptive and inferential statistics were used to analyze the data. The participant sample consisted of 18 to 60-year-old individuals who were engaged in exercise but were not employed in an exercise science-related field or profession. The mean age was 37.30 years ($SD = 11.47$). A total of 424 females (72.5%) and 161 males (27.5%) completed the study. The ethnicity of the sample was predominantly White/Non-Hispanic ($n = 552$, 94.4%), with the remainder being Black/African American ($n = 18$, 3.1%), Asian American ($n = 8$, 1.4%), Native American ($n = 5$, 0.9%), Hispanic/Spanish ($n = 15$, 2.6%), and either European American or European Asian ($n = 3$, 0.5%). Of the 585 total participants, 368 individuals exercised for at least 3 days per week for 6 months or more and were classified as autonomous exercisers (AE). The remaining 217 participants were exercising but at a level below that of the AE and were classified as novice exercisers (NE).

Findings

Content: Source 1 Supporting Construct Validity

To establish content support for the SDLES, an extensive review of the literature regarding prior SDL research and items was developed to represent the aspects of SDL found in the OCLI developed by Oddi (1986). Validation of 28 SDLES items was determined through a qualitative review by an expert panel that consisted of three individuals who had extensive knowledge of SDL, the OCLI, and exercise concepts. Each panel member reviewed the instrument, assessed how well the instrument adequately measured the three dimensions of SDL outlined by Oddi (1986), and offered feedback regarding wording, presentation, and appropriateness for the intended target population of exercisers. Based upon the feedback and comments from the panel

individual items were modified. The response scale for the instrument is as follows: 1 = *very seldom*, 2 = *seldom*, 3 = *sometimes*, 4 = *often*, and 5 = *very often*.

Response Process: Source 2 Supporting Construct Validity

The response process is concerned with the thought processes of participants taking part in the research and their understanding and familiarity with the item response format. The SDLES and OCLI were taken in an online format using *Qualtrics*. This format is user-friendly and easy to complete with only remedial computer or smart phone skills.

Internal Structure: Source 3 Supporting Construct Validity

To address RQ₁, the internal structure of the SDLES was explored. The internal structure of an instrument addresses reliability and factor structure. To assess the internal 3-dimensional structure of scores from the SDLES, a factor analysis was performed on the data. This step helps establish that the items developed for the SDLES are representative of the construct of SDL.

For the purposes of analysis, the dataset was randomly split into two distinct samples: (a) a developmental sample used for initial assessment of structure and, if deemed necessary, exploratory analysis; and (b) a confirmatory sample used to validate hypothesized models found with the developmental sample. Descriptive statistics for the developmental and confirmatory samples, as expected, mirrored those of the full sample.

Commonly accepted criteria for assessing model fit in structural equation modeling include a nonsignificant chi-square statistic, Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) values greater than .95, root mean square error of approximation (RMSEA) values less than .06, and standardized root mean square residual (SRMSR) values less than .08 (Hu & Bentler, 1999). Statistical significance of the chi-square statistic, however, often occurs even with good-fitting models when large samples are used (Bentler & Bonett, 1980), so the CFI and TLI are more commonly used with large sample sizes such as in the current study.

A 3-factor model was assessed using the developmental sample and based on the three dimensions of SDL posited in the OCLI. These three correlated factors included (a) proactive drive, (b) cognitive openness, and (c) commitment to learning. The Satorra-Bentler chi-square statistic for this 3-factor confirmatory factor analysis (CFA) structure fitted to the 28 items of the SDLES was statistically significant, $\chi^2_{SB}(347) = 1,297.21$, $p < .001$. Indices of model fit were CFI = .745, TLI = .723, RMSEA = .098 (CI90: .094 - .102), and SRMSR = .079 thereby indicating poor model fit. Thus, CFA revealed that the SDLES did not reflect the expected 3-dimensional structure.

Because the hypothesized 3-dimensional structure of the SDLES data was not supported, exploratory analysis using the developmental sample was performed. Exploratory factor analysis (EFA) is an established method for latent factor modeling (Cudeck & MacCallum, 2007) in situations with unknown structure. Due to nonnormality of the scores, principal axis factoring was chosen for the extraction method (Fabrigar, Wegener, MacCallum, & Strahan, 1999). Items are assumed to be correlated, so solutions for factors were examined using promax rotation.

Of the factor extraction methods that Courtney (2013) reviewed, Horn’s (1965) parallel analysis (PA) was found to be one of the best for latent factor extraction. Of all the methods reviewed, PA was found to be the most accurate and least biased of the other methods reviewed (Ruscio & Roche, 2012). In the present study, parallel analysis carried out on the developmental sample of the SDLES initially revealed a 5-factor structure. However, when this 5-factor model was assessed with CFA using both the developmental and confirmatory samples, model fit was still poor thus indicating the 5-factor structure was also incorrect.

For final SDLES structure determination, factor extraction was required. Exploratory analysis was performed resulting in various EFA models with poor-performing items considered for removal from the scale. Criteria for item removal included low communalities, cross-loadings on other factors, and low loading weights. Additionally, the substantive nature of each item as it related to other items within factors was considered. A total of 17 items were eliminated from the SDLES based on these criteria. The final selection of 11 items supported a proposed 2-factor model (see Figure 1). The first factor reflects a combination of items related to reasons for exercising as well as processes that stimulate interest in exercising more and is labeled “motivation.” The second factor is learning about, reflecting upon, and analyzing information about exercise and is labeled “cognition.”

| Factor 1 – Motivation | Factor 2 – Cognition |
|--|--|
| I regard physical challenges as motivation to learn more. | I identify the important points when reading literature on exercise. |
| My exercise routine keeps me interested in learning more about improving my health and training. | I actively seek research-based evidence of statements or claims about exercise. |
| I find that reaching physical goals inspires me to learn more. | I enjoy exploring information beyond my planned training program. |
| I find that failing to reach physical goals inspires me to learn more. | I am able to relate knowledge about what I learn to my exercise training. |
| I value critique of my exercise as an important component of my learning. | I am able to analyze and critically reflect on new ideas, information, methods, or personal experiences related to exercise. |
| Interacting with others helps me learn more about exercise. | |

Figure 1. Final SDLES after factor extraction and item reduction.

A 2-correlated-factor EFA conducted on these 11 items, using principal axis factoring with promax rotation, indicated that the two factors explained 55.81% of the variance with 46.28% explained by the factor motivation and 9.53% explained by the factor cognition. The two factors were allowed to correlate in the analysis as they both measure similar, yet distinct, factors of SDL for exercise. A moderate ($r = .63$) correlation was observed between the factors. The pattern matrix showed that all factor loadings were above 0.5 and no substantial cross-loadings were present. Item loadings onto their respective factors ranged from 0.58 to 0.81 for the motivation factor and from 0.57 to 0.88 for the cognition factor.

To assess the proposed 2-factor structure developed from the EFA, a CFA was performed on the developmental sample. The chi-square statistic for the 2-factor CFA structure fitted to the 11 items of the SDLES was significant, $\chi^2_{SB}(43, N = 292) = 97.66, p < .001$, indicating a poor fit, but this was likely an artifact of the large sample size. Other fit indices more appropriate for application to large samples showed good model fit with CFI = .959, TLI = .948, RMSEA = .06 (CI90: .049 - .083), and SRMSR = .048. Thus, the CFA of the SDLES data using the developmental sample supported a 2-factor structure.

CFA was carried out next using the confirmatory sample. The Satorra-Bentler chi-square statistic for the 2-factor CFA structure fitted to the 11 items of the SDLES was statistically significant, $\chi^2_{SB}(43, N = 293) = 93.81, p < .001$, although, as stated previously, this is a common occurrence with large samples. Other indices showed good model fit, with CFI = .96, TLI = .948, RMSEA = .06 (CI90: .046 - .081), and SRMSR = .041. Thus, the CFA of the SDLES data using the confirmatory sample supported the 2-factor structure.

To explore RQ₂, McDonald's omega (Dunn, Baguley, & Brundsen, 2014) was computed. McDonald's omega, unlike the more ubiquitous Cronbach's alpha (Cronbach, 1951; Guttman, 1945), does not assume a tau-equivalent structure and has comparatively less tendency to underestimate congeneric variables (Dunn et al., 2014). McDonald's omega computed on scores from the confirmatory sample revealed $\omega = .87$ for the cognition factor and $\omega = .86$ for the motivation factor. Both values indicate that scores from these subscales have a high degree of internal consistency reliability and reliably measure the underlying 2-dimensional structure of the construct.

Relations to Other Variables: Source 4 Supporting Construct Validity

Relationships to other variables are assessed by comparing the AE and NE groups using the two subscale scores that emerged for the SDLES. This step helps provide evidence that, as would be expected, SDLES scores differ between those who are AEs in their exercise program compared to those who are still NEs. This step addresses RQ₃. Factorial invariance testing helps determine if the SDLES functioned in a similar manner for distinct groups of participants and whether it had a similar structure for AEs and NEs. As recommended by Dimitrov (2010), a "forward" or sequential constraint imposition method based upon chi-square difference tests was used to test for factorial invariance. The ΔCFI is a commonly recommended and robust fit index for assessing factorial invariance when sample size is large (Cheung & Rensvold, 2002; Hu &

Bentler, 1999; Miles & Shevlin, 2007). When using Δ CFI for determination of factorial invariance, a negative Δ CFI value that is less than -.01 indicates a lack of invariance (Cheung & Rensvold, 2002; Dimitrov, 2010).

Results pertaining to a sequential series of models fitted to assess measurement invariance (models M1-M3) and structural invariance (model M4) can be found in Table 1. Measurement invariance assessed with the robust Δ CFI statistic suggested that item uniqueness invariance was supported for all comparisons (Δ CFI = -.003, -.007, and -.005, respectively). These results suggest that the scores of the SDLES exhibit “strict” measurement invariance by type of exerciser (AE vs. NE). At the level of strict measurement invariance, the instrument possesses metric invariance, scalar invariance, and uniqueness invariance because, correspondingly, equal factor loadings, equal indicator intercepts, and equal item uniqueness are evident between the two exercise groups AE and NE (Dimitrov, 2010). Strict measurement invariance indicates that the SDLES scores for AE and NE can be meaningfully compared with an equivalent degree of measurement precision.

Structural invariance is a measure of the precision of the scoring structure to the construct domain being assessed (Dimitrov, 2010). A comparison of models M4 with M3 provides a test of structural invariance. For this comparison, the value of Δ CFI (Δ CFI = -.001) was not more extreme than Cheung and Rensvold’s (2002) -.01 criterion, providing evidence for structural invariance. Based upon these analyses, the SDLES possesses metric invariance, scalar invariance, uniqueness invariance, and structural invariance, allowing for comparison of factor means with the same precision for each group.

Table 1. *SDLES Testing for Measurement and Structural Factorial Invariance Across NE and AE*

| Model | Model Description | χ^2 SB ^a | df | Scaling for MLR | Comparison | $\Delta \chi^2$, Sattora-Bentler scaled chi-square dif. (TRd) ^b | Δ df | CFI | Δ CFI | |
|---------|----------------------------|--------------------------|-----|-----------------|------------|---|-------------|------|--------------|------|
| M0 1 | Configural invariance | 207.985 | 86 | 1.1859 | - | - | - | .948 | -- | .070 |
| M1 2 | Weak (metric) invariance | 233.038 | 95 | 1.1667 | M1-M0 | 25.0530* | 9 | .945 | -.003 | .068 |
| M2 3 | Strong (Scalar) invariance | 249.309 | 104 | 1.1556 | M2-M1 | 15.6159** | 9 | .938 | -.007 | .069 |
| M3 4 | Strict invariance | 272.150 | 115 | 1.1594 | M3-M2 | 22.9470*** | 11 | .933 | -.005 | .068 |
| M4 5 | Structural invariance | 276.031 | 116 | 1.1640 | M4-M3 | 3.4070 | 1 | .932 | -.001 | .069 |

Note. ^aSB = Yuan-Bentler scaled χ^2 statistic; ^b χ^2 = computer using scaling correction factor.

* $p = .003$; ** $p = .001$; *** $p < .001$

Consequences: Source 5 Supporting Construct Validity

The final step in the Cook and Beckman (2006) model for instrument score validation deals with the consequences of the findings from the SDLES. If a lack of validity evidence was found for the SDLES, it would indicate flaws with the instrument. Cook and Beckman stated that “evidence of consequences is the most controversial category of validity evidence and . . . least reported evidence source” (p. 166). By utilizing multiple sources of validity evidence for the SDLES, any unexpected or unintended consequences of the SDLES assessment were detected and addressed resulting in the final version of the SDLES that exhibits strong evidence of construct validity. Since the SDLES exhibits strong validity evidence, RQ₄ can be assessed. Binomial logistic regression was carried out on the sample with type of exerciser (autonomous vs. novice) used as the binary dependent variable and either (a) the subscale scores from the SDLES, (b) the total SDLES score, or (c) the total OCLI scores were used as predictors. Predictor variables were standardized as *z*-scores prior to use as predictors in the analysis.

The logistic regression model using the SDLES subscale scores as predictors predicted the binary outcome significantly better than the constant-only model, $\chi^2(2) = 58.684, p < .001$. The Hosmer-Lemeshow goodness-of-fit test revealed a poor model fit, $\chi^2(8) = 18.711, p = .016$, but this is not unexpected with such a large sample size (Allison, 2013). Based on Nagelkerke’s R^2 , the model explained 13.00% of the variance in the outcome. Using a 50% cutoff classification rule, the model correctly predicted 65.80% of the cases. Among novice exercisers, 30.00% were classified correctly; among autonomous exercisers, 87.00% were classified correctly (see Table 2).

Table 2. *SDLES Classification Table*^a

| Observed | Predicted | | Percentage Correct |
|----------------------|------------------|----------------------|--------------------|
| | Novice exerciser | Autonomous exerciser | |
| Novice exerciser | 65 | 152 | 30.00 |
| Autonomous exerciser | 48 | 320 | 87.00 |
| Overall percentage | | | 65.80 |

Note. ^aCut value is .500.

Both the cognition and motivation subscales significantly predicted type of exerciser, $\chi^2(1) = 13.99, p < .001$ and $\chi^2(1) = 9.95, p = .002$, respectively. Odds-ratios for each predictor indicated that each *SD* increase in the cognition subscale scores resulted in a 1.53 times increase in the odds of being classified as an AE while each *SD* increase in motivation subscale scores resulted in a 1.42 times increase in the odds of being classified as an AE.

To assess the extent to which the SDLES composite score predicted type of exerciser (autonomous vs. novice), logistic regression was performed again. The full

model predicted the outcome significantly better than the constant-only model, $\chi^2(1) = 58.52, p < .001$. The Hosmer-Lemeshow goodness-of-fit test revealed a poor model fit, $\chi^2(8) = 20.387, p = .009$, but this is not unexpected with such a large sample size (Allison, 2013). Based on Nagelkerke's R^2 , the model explained 13.00% of the variance in the outcome. Using a 50% cutoff classification rule, the model correctly predicted 66.30% of the cases. Among NEs, 31.80% were classified correctly; among AEs, 86.70% were classified correctly (see Table 3).

Table 3. *SDLES Composite Score Classification Table^a*

| Observed | Predicted | | Percentage Correct |
|----------------------|------------------|----------------------|--------------------|
| | Novice exerciser | Autonomous exerciser | |
| Novice exerciser | 69 | 148 | 31.80 |
| Autonomous exerciser | 49 | 319 | 86.70 |
| Overall percentage | | | 66.30 |

Note. ^aCut value is .500.

Examination of the regression coefficient indicated that SDLES composite scores positively predicted the likelihood of being an AE, $\chi^2(1) = 50.83, p < .001$. The odds-ratio for this predictor indicated that each *SD* increase in the SDLES composite score resulted in a 2.00 times increase in the odds being classified as an AE.

To assess the extent to which OCLI scores predicted type of exerciser (autonomous vs. novice), a logistic regression was performed. The model using OCLI total score as a predictor did not predict significantly better than the constant-only model, $\chi^2(1) = 0.87, p = .352$. Based on Nagelkerke's R^2 , the model explained only 0.002% of the variance in the outcome. Examination of the regression coefficient affirmed that OCLI composite scores did not significantly predict the classification of exercisers as AE versus NE, $\chi^2(1) = .87, p = .352$.

When comparing the SDLES and the OCLI, the logistic regression results indicate that the SDLES significantly and positively predicted an individual as AE versus NE, but OCLI scores did not significantly predict this outcome.

Conclusions

The present study involved the development and assessment of the SDLES. The development and assessment of the SDLES was grounded in the work of Messick (1995) who conceived the unified validation theory to establish a basis for scale use and interpretation related to a given construct as well as assessment of the value of implications and social consequences. The procedures for instrument validity support proposed by Messick, as delineated into five criteria by Cook and Beckman (2006), were fulfilled by the SDLES. Applying a unified theory of validity resulted in a process that provided validity evidence for the SDLES scores.

As Candy (1991) stated, “autonomy has both a personal and a situational dimension” (p. 412). He expressed his concerns about SDL, stating that research has failed to recognize the “situation-specific or context-bound nature of personal autonomy” (p. 412). The need for contextually based SDL is indicated by Candy, yet these types of instruments are not readily available. Validity evidence for scores resulting from instruments measuring SDL has been provided by Guglielmino (1977) and Oddi (1986); however, these instruments are not contextually based and may not be ideal for investigating domain-specific SDL.

The current evidence indicates that the SDLES can be used to generate meaningful information regarding SDL for the domain of exercise. The 11-item SDLES demonstrated a high degree of internal consistency and reliably measured the underlying 2-factor structure. The SDLES possesses strict measurement invariance, allowing for comparison of factor means with the same precision for each group of exercisers sampled. The instrument also possesses structural invariance, supporting the contention that it measures the underlying construct of SDL for exercise. The SDLES subscale scores for motivation and cognition as well as the total composite scores significantly predict an individual as an AE or NE. On the other hand, the previously established and supported SDL instrument that was used for comparison, the OCLI, did not produce scores that possessed a predictive value for either type of exerciser.

Using the SDLES provides valid measures of SDL for exercise, making it possible to quickly and clearly ascertain the level of a client’s domain-specific SDL and better understand the client’s level of learning autonomy and dedication to physical self-improvement. With a method to assess the exercise-specific self-directedness of autonomous exercisers, the development of effective formal education programming, exercise instruction, and scientific literature is more attainable. The validity evidence generated for scores from the SDLES results in the ability to confidently use the SDLES to better understand if an individual is at the level of autonomy or just beginning to explore exercise. The SDLES can be confidently used to help learn about and subsequently educate both the novice and autonomous exerciser.

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BEYOND THE TABOO: DO WOMEN ENGAGE IN SELF-DIRECTED LEARNING TO INFORM THEMSELVES ABOUT MENOPAUSE?

Jamie Cooper

Six thousand new women enter menopause each day. Although women who have an understanding of perimenopause before they begin their own transition frequently have less distress than women who do not, in general women usually want more information than they receive. The purpose of this research was to explore the self-directed learning actions of women regarding their search for information about menopause; to learn if they were, in fact, seeking information on their own; if so, when, why, and the degree of difficulty they may have experienced. It also sought to explore the efficacy of the communications women had with their health care providers about their perimenopause transition and to learn if the information they needed was being provided within the health care system. This study found that fewer than half of women between 35-55 years of age had researched menopause. Those who did were symptom driven, and the majority used the Internet as a resource. Most were satisfied with the information they found on their own, but several had many questions left unanswered. Additionally, health care providers were not an active resource, and some women reported frustration with their health care encounters. This study demonstrated the need to connect adult education with health promotion.

Keywords: perimenopause, socioecological model, health promotion, adult education, health education, health related quality of life, provider communication, healthy aging

Knowledge about the menopause transition has the potential to be an important factor in the way a woman experiences the perimenopause transition, yet women frequently want more information than they receive (Hunter & O’Dea, 1999). In 1996, more than 10% of the world population was comprised of postmenopausal women (Hill, 1996). Every single woman living through midlife will experience menopause either naturally, chemically, or surgically. According to the American Congress of Obstetricians and Gynecologists (2011), it is estimated that 6,000 women reach menopause every day and by 2020 the number of women over 55 years of age will approach 46 million. That population is huge.

During the latter part of the 20th century, there was a marked increase in research regarding women’s health; however, little of that research has focused on

women's health at midlife (Henrich, 2000, 2004). Perimenopausal, menopausal, and postmenopausal women have health needs that are different from both younger women as well as men in the same age group (Hill, 1996). Perimenopause, the period a woman at midlife experiences as she transitions from menses to menopause, is a complex process. Beyond the physiological changes she undergoes, a woman's experience of perimenopause can also be influenced by her feelings about aging, sociocultural background, and individual life events (Lorber & Moore, 2002; Niland & Lyons, 2011; Van de Wiel, 2014). Additionally, research indicates (Ayers, Forshaw, & Hunter, 2010; Buchanan, Villagran, & Ragan, 2002; Choi, 1993; Mackey, 2007; Mishra & Kuh, 2006; Walter, 2000) that a woman's foreknowledge of the menopause transition may impact her attitude toward menopause, and her attitude toward menopause may impact her perimenopause experience including the degree of distress she experiences; however, there has been little research regarding how women gain this knowledge about menopause. Buchanan et al. (2002) asserted that how a woman experiences menopause often "directly depends on the amount and types of information received" (p. 101). One source of information may be from health care providers (HCPs); however, women feel they are not receiving enough information (Hunter & O'Dea, 1999). Additionally, previous research has not demonstrated how a woman's knowledge of menopause may be leveraged by HCPs to help facilitate her menopause transition.

Menopause has the unique status of being both a part of a woman's reproductive life and also part of her aging process. Healthy aging is a public health issue as distress during perimenopause has a direct impact on a woman's health-related quality of life (HQOL). Healthy People is a health promotion and disease prevention agenda authored by the Department of Health and Human Services (HHS) that has as its goal the improvement of our nation's health by providing science-based national objectives. Healthy People 2020, the third of these agendas, includes four overarching goals among which is to "promote quality of life, healthy development, and healthy behaviors across all life stages" (Office of Disease Prevention and Health Promotion, 2018, para. 5). Healthy People 2020 asserts that the way to these goals is through the many topics and objectives put forth in the agenda. Two objectives that are directly relevant to this discussion are improving HQOL and improving health care quality by improving health communication strategies. Therefore, as part of a healthy aging process, understanding if or how women seek information outside of the health care system may inform health educators and others how to best support women through this life stage for improved HQOL. Additionally, Healthy People 2020 establishes the import of effective communication with the HCP if women are relying on the HCP as a resource.

To begin to understand how to best help women through this transitional life stage, this study sought to understand what women thought was important and how they were educating themselves. Specifically, this study sought to explore women's self-directed learning (SDL) actions as they sought information about menopause to learn if they were, in fact, seeking information on their own, and if so, when, why, and the degree of difficulty they experienced. It also sought to explore the efficacy of the communications women had with their providers about their perimenopause transition and to learn if the health care system was providing women with the information they needed.

As early as 1971, Tough found that adult learners spend considerable time learning one-on-one with a teacher, in groups without a teacher, or even on their own. Thus, understanding the SDL actions women are taking at midlife, where they are going for information, why they are searching, and what obstacles they encounter will allow those who interact with them—particularly HCPs and adult educators—to think about ways to facilitate their search primarily by creating learning opportunities and assisting with goal setting and finding reliable resources.

This research was conducted using the conceptual model of the Personal Responsibility Orientation (PRO) model of self-directedness in learning (Brockett & Hiemstra, 1991). Although a consensus regarding theories of self-directed learning is not available (Rothwell & Sensenig, 1999), Brockett and Hiemstra developed a conceptual model that incorporates both the instructional methods of SDL and the learner characteristics of self-directedness in the PRO model. In this model, both the instruction and the learner function within the learner's social context. According to the PRO model, it is personal responsibility that links both the learner characteristics and the instructional method.

Method

The data for this discussion were derived from a larger study regarding women's health at midlife. An exploratory study was conducted using an online survey questionnaire. The minimum sample size sought was 131 completed surveys. The desired sample size was calculated using a power of 0.8 which Cohen (1992) considered high, an alpha level of .10, and an effect size of 0.3 that Cohen considered a medium effect size. The alpha level and effect size are appropriate since, as Cohen indicated, exploratory studies may hold a less rigorous standard for rejection.

Sample

This study included women aged 35-55 years, were able to read English, who had not entered menopause due to chemotherapy or surgery, and had computer access. The average age of menopause in the United States is 51; perimenopause, or the transition into menopause, can begin 10 or more years earlier. Beginning with women who were 35 thus included women, on average, just before reaching the beginning of the perimenopausal transition. Women at 55 were, on average, just finishing the transition and were perhaps a few years postmenopausal. Thus, the sample included women who were just about to begin the perimenopause transition, were actively transitioning, or were just postmenopausal.

Instrumentation

Data were collected by a validated online survey questionnaire administered through the Qualtrics Enterprise software that included two sections. The first section collected demographic information such as (a) age, (b) marital status, (c) level of education, and (d) race/ethnicity. The second section was branched thus allowing participants to see

only the questions that were relevant to them. This kept the questionnaire as short as possible thereby diminishing response fatigue. The purpose of this section was to obtain information regarding if, why, and how participants had learned about menopause.

The survey asked women directly, "Have you researched menopause?" Answers were either *yes* or *no*. To understand why participants had engaged in this learning task, women were asked specifically whether they had had conversations with their HCP and if they had been symptomatic when their research began. They were also provided a space to provide free response answers for other reasons.

Women were also asked if they had used 11 particular resources to find information about menopause that required *yes* or *no* answers: a medical website, a nonmedical website, books, magazines, their friends, their mothers, other family members, women's health centers, television or other media, or a talk show host. Respondents were then offered an opportunity to provide a free response answer to share resources the researcher may not have included.

Next women were asked why they had or had not chosen each learning resource and if they had difficulty finding the information they sought. These questions were answered using *yes*, *no*, or *I'm not sure* replies. Those who indicated that they had had difficulty were asked to explain in free response format. If they did not use a particular resource, they were asked to reflect on why not again answering in free response format.

As a final survey question, women were asked if they would like to include any final information for the researcher or advice for other women. These answers were provided in free response format.

Procedures

This study received IRB approval through the review board of a southeastern university in the United States. The questionnaire was distributed by inviting women to participate via flyer, business card-like invitations, and social media. To reach additional participants, a snowball component was also used in which participants were asked at the end of the survey to invite other women to the study who they thought would be eligible to participate thus increasing the potential number of respondents.

To understand the percentage of women actually investigating menopause, the *yes* or *no* question that asked directly was examined utilizing a relative frequency distribution to understand the proportions of these variables to the sample. Additionally, confidence intervals were computed around the sample proportions to estimate the population proportions using SAS 9.4, which was used to determine all confidence intervals for this study.

To understand women's motivations for beginning SDL actions, responses to questions involving HCP communication and symptom presentation were examined utilizing a relative frequency distribution to understand the proportions of these variables to the sample; confidence intervals were computed around the sample proportions. Additionally, free response answers were examined for patterns and common themes as well as deviations from those themes using Qualtrics Enterprise software.

To understand which resources women were using to investigate menopause, *yes* or *no* responses to each resource were examined independently utilizing a simple frequency distribution to illustrate more and less common topics and resources. Additionally, confidence intervals were computed around the sample proportions to estimate the population proportions.

Women responded to a final question asking for additional comments in free response format. These responses were examined for patterns and common themes as well as deviations from those themes using Qualtrics Enterprise.

Limitations/Delimitations

Although a desired outcome of this study was to obtain the most diverse sample possible, because it was administered online, participation was restricted to those who had Internet access.

Additionally, every perimenopause experience is unique. Some women may not have experienced any disruption in their lives throughout their transition while others may have had a negative perimenopause experience. Because participation in this study was voluntary and uncompensated, it is possible that women who responded were more likely those who experienced distress.

The age range of participants included women of the average age from the time just before the onset of the perimenopause through just after the average age of menopause. Moreover, this study excluded women who had entered menopause due to chemotherapy or surgery. It is possible that women anticipating surgical removal or chemotherapy/radiation ablation of their ovaries may engage in SDL; however, these actions would comprise a different preparatory process since the learning would be for an event that women would know is taking place. These women would also most likely have had conversations with their HCPs.

Findings

For purposes of this study, SDL was considered to be the learning actions taken independently by women when they either came to understand a need on their own, were directed to find information, or another individual suggested they look for information on the menopause transition.

Responses from women younger than 35 or older than 55 were discarded prior to analysis as were responses from women indicating they had experienced surgical or chemical menopause. The survey received 227 usable responses. Fewer than half of the women participating in this survey indicated that they had engaged in any kind of learning action regarding menopause (48%, $n = 109$). Even though the numbers of women engaging in research about menopause increased with age, nearly a third of those likely to be approaching the end of the perimenopause transition, 50-55, had not investigated menopause at all.

Women in this study most likely to research menopause were 45 or older. Of the 109 participants who engaged in SDL actions, only 8% ($n = 9$) of those women were 35-39, and 13% ($n = 14$) 40-44; however, 29% ($n = 32$) were 45-49 years, and 50% (n

= 54) were 50-55 (cf. Table 1). Chi-square tests used to examine bivariate relationships between demographic characteristics and women who had researched menopause demonstrate that the single most significant factor predicting a woman's likelihood of engaging in research regarding menopause is her age, $p < .001$, with a fairly large Cohen's w effect size (0.43).

Table 1. *Distribution of Participants Researching Menopause by Age*

| Age | Yes | | No | | CI 90 |
|-------|----------|----------|----------|----------|----------|
| | <i>n</i> | <i>P</i> | <i>n</i> | <i>P</i> | |
| 35-39 | 9 | 8 | 38 | 32 | 11%, 30% |
| 40-44 | 14 | 13 | 36 | 31 | 19%, 39% |
| 45-49 | 32 | 29 | 21 | 18 | 49%, 70% |
| 50-55 | 54 | 50 | 23 | 19 | 61%, 78% |

Note. Yes = researched menopause ($n = 109$), No = did not research menopause ($n = 118$). $\chi^2(3, N = 227) = 41.34, p < 0.001, w = 0.43$

Women who engaged in research regarding menopause most frequently indicated that experiencing symptoms was the reason for initiating a search (see Table 2). Of note, although 66% of the women who had researched menopause received at least some information from their HCP, only 2% of these women indicated that their HCP had encouraged them to find information on their own as per Table 2.

Table 2. *Commonly Stated Motivations for Women Seeking Information About Menopause*

| Responses | <i>n</i> | <i>P</i> | CI90 |
|--|----------|----------|----------|
| Experiencing symptoms other than hot flashes and changes in menses | 45 | 42 | 34%, 50% |
| Hot flashes | 23 | 22 | 16%, 29% |
| Change in menses | 22 | 21 | 15%, 28% |
| It was just time/the right age | 7 | 7 | 4%, 12% |
| General curiosity | 7 | 7 | 4%, 12% |
| Concern about mother's experience | 6 | 6 | 3%, 11% |
| HCP suggested | 2 | 2 | 0.6%, 6% |

Note. $n = 106$ (i.e., not all participants responded to this question and some provided more than one answer).

Sources Used and Satisfaction With Information Found

More women utilized a medical website than any other resource (80%; see Table 3). These women most frequently cited reliability and accuracy as their primary reasons for using a medical website, using words to describe their feelings about medical websites such as “reputable,” “truthful,” and “medical research.” One respondent, seeking medical information she was not receiving from her physician said, “I couldn’t get answers from actual doctors, so I was hoping MD websites would be the next best thing.” Another shared that her doctor had told her she was imagining things so she felt she needed to find medical information on her own. The women in this study indicated that they were, for the most part, satisfied with the information they found on these sites.

Nonmedical websites were used less frequently (28%; see Table 3) than medical websites (80%). All website users appreciated the convenience and privacy but those using nonmedical websites also appreciated the voices of real women and a sense of community. As one woman stated, “the medical sites provide clinical information but not much on how it feels to be going through menopause.” There were also women who used both medical and nonmedical sites to try to find a balance or a range of information because, as one woman shared, “I felt desperate and attempted to discover information wherever I could.”

Table 3. *Resources Utilized to Research Menopause*

| Age | Yes | | No | | No Reply | | CI90 |
|------------------------|----------|----------|----------|----------|----------|----------|----------|
| | <i>n</i> | <i>P</i> | <i>n</i> | <i>P</i> | <i>n</i> | <i>P</i> | |
| Medical website | 87 | 80 | 20 | 18 | 2 | 2 | 81%, 91% |
| Nonmedical website | 31 | 28 | 69 | 63 | 9 | 8 | 24%, 39% |
| Friends | 59 | 54 | 38 | 35 | 12 | 11 | 51%, 66% |
| Mothers | 29 | 27 | 66 | 61 | 14 | 13 | 22%, 37% |
| Family members | 19 | 17 | 75 | 69 | 15 | 14 | 12%, 24% |
| Books | 17 | 16 | 80 | 73 | 12 | 11 | 14%, 26% |
| Magazines | 8 | 7 | 88 | 81 | 13 | 12 | 5%, 13% |
| Women’s center | 18 | 17 | 76 | 70 | 15 | 14 | 13%, 25% |
| Talk show | 2 | 2 | 94 | 86 | 13 | 12 | 0%, .06% |
| Television/other media | 4 | 4 | 90 | 83 | 15 | 14 | 0%, .44% |

Note. *n* = 109. Percentages may not equal 100% due to rounding.

More than half (54%; see Table 3) of the participants who researched menopause turned to their friends as a source of information. Women felt they could learn from their friends’ experiences as well as gain a variety of perspectives. Another very important reason to talk with friends, though, was for support and, as one woman shared, “to see if they had similar experiences, for support, to share as friends do about

life.” The motivation for one woman to find support among her friends was not quite so positive, though, as she stated that “misery loves company.”

Not as many women turned to their mothers (27%; see Table 3) as to their friends, but the reasons for turning to mothers were often the same: perspective, experience, and support. Additionally, mothers could provide the insight of family history. Some women expressed a tremendous respect for their mothers; as one woman stated, “she is my ultimate teacher.” Some women thought this question was simplistic with one woman believing that finding information from one’s mother is self-evident by stating, “the obvious choice, no?”

Seventeen percent (see Table 3) of the respondents looked to family members other than mothers for many of the same reasons—primarily family history and similarity of experience—although there was also comfort in what they saw as a familial bond. Most of these women spoke to sisters or aunts; however, one woman turned to her husband and children, stating,

[My] husband and children gave me comfort and let me talk so they saw changes in me and that helped me too even though I wasn’t all that open to accepting that they ALSO saw the changes (specifically moods).

Other resources women were asked specifically about were books, magazines, classes, or women’s centers. They were even asked if they had gotten information from a television talk show. Finally, respondents were also provided a space to provide a free response to indicate sources not included; however, no responses were included in this free response option.

Books were not often utilized as a first resource (16%; see Table 3). Frequently when a book was used it was because the women just considered themselves to be “book people.” Some preferred books because they believed books would have more in-depth information, and one woman indicated she was happy to have the ability to keep the book as an ongoing resource as needs arose. Sometimes others such as friends or physicians had referred women to specific books, and one woman felt that a book was safer, indicating that she had found too much “scary information” on the Internet and felt she was better able to control her learning with a book.

Eight women (7%; see Table 3) gained information from magazines, usually indicating that magazines were one of many sources as they were gaining information anywhere they could find it. There were no women who gained information from a class with at least one woman indicating she thought the idea of a class was silly.

A description of women’s center was not included in the survey, leaving that definition to the respondents’ perceptions. Eighteen women (17%; see Table 3) indicated they received information from a women’s center.

With the current plethora of daytime talk shows geared toward women, it was thought that women would find information on these shows helpful. However, only 2% of the respondents indicated that they had gotten any information at all from a talk show; these respondents were in the 50-55 age group.

Reasons Women Did Not Choose Resources

The reasons women chose not to use the different resources were varied. Reasons may have involved money or convenience as well as reasons that were profoundly personal.

When considering the use of medical websites, those that chose not to use them indicated that they preferred a personal connection with individuals rather than the distance of the perceived institution. The types of individual respondents generally turned to instead included friends, family members, medical professionals, and even an acupuncturist.

Many of those using medical websites chose not to use nonmedical websites; the reasons many gave for not using nonmedical websites were the same reasons they chose to use medical websites. Their perception of nonmedical websites was that they would provide information that was “anecdotal,” “bogus,” or “misinformed” whereas medical websites would provide information that was “truthful,” “reliable,” and “accurate.” One participant summed it up by saying, “the logical thing to do seemed to be to go to a medical website with facts rather than blogs with opinions.” Another reason women chose medical over nonmedical websites was that the information they were looking for was medical in nature, and they did not believe they would find that type of information from a nonmedical source. Finally, some respondents reported concern about “wandering into inappropriate websites” or being sold supplements.

Most often when women chose not to discuss menopause with their friends it was because they believed their friends were too young to worry about it yet while others felt the topic was too personal or too embarrassing. One woman stated, “I don’t like people to know I am thinking about this” while another was not willing to ask her friends questions about sex drive. There were also respondents who indicated that it was just easier to look online.

With regard to talking with their mothers, although one woman indicated that consulting her mother was the obvious choice, that was not the case for everyone. One reason women did not go to their mothers for information about menopause was due to unavailability. Sometimes mothers were simply geographically unavailable; however, some (17%) were unavailable due to a relationship that was not close enough to discuss something so personal. One woman confided that “she thought I was ridiculous as I started to worry.” Another said, “my mom doesn’t really talk about it and she doesn’t have much to share about her experience.” Other mothers had already passed away (34%) or had dementia (5%). Some mothers had no experience to share as they had had hysterectomies before experiencing perimenopause.

Among women not willing to turn to family members, most indicated that they did not have close female family members, thus establishing a clear criteria for someone who can help as being female. Other women did not want family members to know they had such concerns or were looking for information.

Women who chose not to use books for the most part felt that the Internet was just more convenient; however, a few were unwilling to expose a concern by taking a book from the library, and one woman indicated she was unable to afford the purchase of a book. Most felt magazines were unreliable or untrustworthy, unlikely to contain

“medical information,” including one woman who felt that magazine content is heavily influenced by advertisers. Another simply exclaimed, “who can believe that crap!”

Those not using a health care center either felt like the information was available more conveniently elsewhere while others indicated the expense would keep them away, particularly without insurance covering the trip or having no insurance at all. In one case, a woman’s HCP advised against it: “The family PA I asked said I was too young at 34. So I stopped looking for answers.”

Degree of Difficulty Experienced

Women were asked directly if they had difficulty finding the information they were looking for. Most respondents expressed they had not; however, a substantial number (27%) expressed that they did have difficulty. These participants were asked to describe their difficulty in a free response format. After conducting a content analysis by listing responses and clustering by theme, two primary themes became evident: the availability of information and the philosophy of HCPs.

Sixty-three percent of the women indicating that they had had difficulty in their search stated that the information that they needed was just not available, particularly if, as one participant stated, a woman did not have a “cookie cutter experience.”

With regard to the availability of information, most women agreed that if they wanted information regarding common symptoms such as hot flashes, the information was readily available if she wanted to treat them with hormone therapy. If she was looking for something nonmedical, the information became more difficult to find.

In addition to having difficulty finding information regarding physical symptoms outside the most common experiences, women also expressed difficulty finding information on nonphysical symptoms stating, “there should be much more about the memory loss and cognitive impairment” and, “everyone knows about hot flashes, but no one talks about so many of the other symptoms such as depression, anxiety, sleep.”

Though most women were not concerned about the accuracy of the information they found, a few expressed difficulty in discerning credible information since, as one woman stated, “all [information providers] have an agenda.” Another woman felt that even if the information was available, it was often “behind a pay wall” to subscribers who wished to pay for the information.

Women who expressed difficulty communicating with their HCPs (21%) expressed not feeling as though they were taken seriously or that their HCPs had a fixed approach to treating symptoms and were not willing to listen to their patients:

It was difficult to find a doctor who had the same philosophy about menopause that I did. I did not want to go on birth control pills and I did not want to have a hysterectomy if I absolutely didn't have to have one.

One woman shared that “I figured I was on my own to experience whatever may happen to my body with no help from any sources,” so she gave up trying to communicate. Another still felt it was her responsibility for not receiving adequate

information from her HCP because she did not ask: “The problems are probably that I didn't ask for much information. So I didn't get a lot.”

Discussion

Although most women participating in this study did not engage in SDL to research menopause on their own, women who did choose to investigate menopause were able to take ownership of their thoughts and actions, the central concept of Brockett and Heimstra's PRO model. Additionally, women's investigation of menopause was clearly influenced by factors within the social context.

When women chose to investigate menopause, they were primarily symptom driven or anticipated a problematic perimenopause transition. Many women of all age groups did not consider menopause an important topic of conversation, but it was less important for younger women in particular.

The investigations undertaken by younger or nonsymptomatic women were more casual and less urgent than those of women who were older or experiencing symptoms. As women began to notice symptoms as they aged, their search began to take on a greater urgency thus indicating a likely relationship between the age at which SDL actions are initiated and the age at which the experience of symptoms begins.

Being symptomatic was the primary reason women sought information about menopause. Women sought to learn what perimenopause symptoms were as well as how to treat them, how long symptoms would last, and if their experiences were normal.

Those who engaged in SDL to investigate menopause were able to take responsibility for their learning even without support from family members or with perceived neglect or misinformation from the health care community.

Many women relied on their HCPs for information but often found that information was not provided. Moreover, women did not report that their HCPs were involved in initiating their search for information.

Among the women who did not receive guidance from their HCPs or at least the guidance they wanted, most sought information on the Internet primarily from what they perceived to be medical websites. The most common reason for an Internet-first approach was simply the convenience though privacy was also a consideration.

Even without direct HCP involvement, once women began the task of learning about menopause they became responsible for their learning (cf. Brockett & Hiemstra, 1991; Stockdale & Brockett, 2011). Although sometimes the accuracy of information found was important, most often women were content with whatever information was found in a simple Google search. As Candy (1991) found, at least initially resources chosen are the ones that are readily available more so than “any objective measure of their appropriateness” (p. 178). In this study, nearly three-fourths of the respondents (73%) expressed that they had no concerns about the accuracy of the information they found. Of those having concern, 13% made no attempt to verify the accuracy of their information

Women valued the voices of other women both within a strong network of friends or family or on websites created by women for women.

Although print media was not highly utilized, there were still women who found comfort in having a book on hand as a resource. Others valued the convenience of a quick-to-read magazine article.

Implications for Practice

Research shows that a woman's knowledge and attitudes about menopause can have a direct bearing on her perceived distress in the transition (Buchanan et al., 2002; Choi, 1993; Norton, Chilcot, & Hunter, 2014; Walter, 2000). Buchanan et al. (2002) asserted that "a lack of communication about menopause affects women's perceptions of their experience" (p. 100), leading to a negative perception of menopause as an illness. If foreknowledge positively impacts a woman's menopause transition, understanding what women know, when and how they come to know, and why some women engage in SDL while others do not will assist educators in "understanding the changes and transitions in adults' lives [that will] enable [us] to anticipate learning needs" of the women with whom they work as well as "understand how life events facilitate or inhibit [their] learning" (Knowles, Holton, & Swanson, 2011, p. 221).

Women have indicated that increased knowledge of the menopause transition before their perimenopause has begun has a real potential to have a positive impact on the transition. Foreknowledge has the potential to empower women to make choices about their health from a place other than fear.

Because women have access to information from a variety of places but fewer options regarding personal concerns that are less common such as cognitive or sexual changes, community-based education projects offer a potential solution. Therefore, perhaps the foremost implication from this study has been the demonstration of a need to connect adult education with health promotion. English (2012) has indicated that utilizing a community-based, health promotion approach to health education concerns takes the idea of health education away from a simple distribution of literature when someone gets sick to actually promoting healthy activities within communities.

However, to successfully include menopause education in health promotion, menopause must first be normalized and included in the larger conversation of human reproduction and aging. One respondent even suggested that we include menopause in the prepubescent discussions of sex education and physical maturation. Little girls in the United States are taught that one day they will begin to menstruate and that this marks the beginning of her life as a physiological woman. It is a rite of passage; a sign of growing up. But the end of this process is never discussed; it is often also seen as a rite of passage, but rather than having the positive connotation of growing up, it is seen as a sign of growing old.

To that end, women need ready access to accurate, complete, reliable information. Health promoting activities can take place within an individual's community such as in programs created by faith-based organizations. There is one such program offered by the Couple-to-Couple League, which was founded by two lay Catholics. Menopause is taught as part of a natural family planning series, demonstrating that there are ways to incorporate community-based menopause education into educational initiatives with larger overall goals. When possible, health

education activities should be directed by women and include the voices of women who have already experienced the transition.

However, many women have indicated that they rely on their HCPs to guide them; therefore, ensuring accurate, timely information provided through clinical practice groups is also important. Women have reported feeling frustrated when they believe their HCPs are ignoring their concerns or that they cannot or will not provide them with the information they need. Therefore, it is important that providers not only more fully understand the menopause transition but also become familiar with the entire range of treatment options.

Beyond the provider level, these women's health concerns should be addressed by educational and professional organizations such as the American Medical Association, accrediting agencies that ensure the quality of medical education programs such as the Liaison Committee on Medical Education, and similar institutions for other HCP fields such as those for physician assistants and advanced registered nurse practitioners. Providers hearing the concerns of women at midlife and exploring treatment in the ways in which they believe they need is equivalent to culturally competent, patient-based care.

Additionally, because women turn most frequently to the Internet, HCPs should consider developing a source of practice-endorsed web information. This information could include information developed by the practice or at the least a list of trusted sites to guide a woman's search.

When asked for final comments, one woman stated,

The mood swings are few, but hot flashes are often and I thought they were a phase that would end. I understand they may occur for years to come, and so WHY didn't anyone TELL ME BEFORE?? I want to tell every young woman what she is in for, I have many women in my life and No One Told Me until I got old enough to start this????

Health promotion connected to adult health education has the potential to have a true, favorable impact on women's experience during the perimenopause transition. Health education is a must if the next 6,000 new women entering menopause each day no longer need to ask this question, *why didn't someone tell me?*

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SELF-EFFICACY IN AUTONOMOUS LEARNING: A PRELIMINARY STUDY OF FULL PROFESSORS

Michael K. Ponton

The purpose of this descriptive study was to compare the self-efficacy in autonomous learning levels of full professors with normative statistics associated with the U.S. nontraditional adult population. As self-efficacy in autonomous learning—subsumed under the general field of self-directed learning—has been studied and posited as being an important goal of doctoral education in supporting the development of scholars, the premise of this study was to determine whether or not such scholars (i.e., the assumption was that graduate teaching faculty who have earned the rank of *Professor* represent this population) reflect higher than normative levels of this psychological construct. The Appraisal of Learner Autonomy was e-mailed to all full professors at a single, private university ($N = 37$) with a response rate of 81% ($n = 30$). The research hypothesis that such faculty will exhibit higher levels is supported by the findings ($p = .037$) thus encouraging the use of instructional strategies that promote self-efficacy in autonomous learning for emerging scholars.

Keywords: Appraisal of Learner Autonomy, learner autonomy, self-efficacy, faculty

Veysey (1965) outlined the history of the development of graduate education in the U.S. based upon the German model of the 19th century, which was described by Hart (1874)—a doctoral graduate of Gottingen University and U.S. professor—as follows:

The university instruction in Germany does not attempt to train successful practical men [*sic*], unless it be indirectly, by giving its students a profound insight into the principles of the science and then turning them adrift to deduce the practice as well as they can from the carefully inculcated theory. Its chief task, that to which all its energies are directed, is the development of great thinkers, men [*sic*] who will extend the boundaries of knowledge. (p. 259)

Harvard's President Eliot commented in 1869 that “the University as a place of study and instruction is, at any moment, what the Faculties make it ... [and that] progress comes mainly from the Faculties” (“Addresses,” 1869, pp. 51-52) but that it was “very hard to find competent professors” (p. 53). Thus, this emerging model of advanced instruction that focused on scholarly inquiry developed by studying under eminent professors sent thousands of Americans abroad and mainly to Germany (Ponton, 1999).

As a consequence of the growing popularity of this form of graduate education, “the American Ph.D.... was directly modeled on its German prototype” (Brubacher & Rudy, 1997, p. 195) that then also addressed the demand for a new type of scholarly professoriate. “The quality of university education, then, is determined by its object, and that object is to train... *future professors*” (Hart, 1874, p. 257). As Ponton (2014) asserted, “the doctoral degree represents to society that the holder is able to independently and completely address a research question via self-directed study, research, analysis, and interpretation; that is, perform the work of an independent scholar” (pp. 99-100). Such doctorally-educated academics are then able to work as professors thereby continuing the educational cycle for new generations of scholars.

Regional accrediting bodies approved by the U.S. Department of Education offer credentialing guidelines that recommend faculty members who teach graduate (i.e., postbaccalaureate) coursework should hold an earned doctoral or terminal degree—as appropriate—in their respective teaching discipline (cf. Southern Association of Colleges and Schools Commission on Colleges, 2006). As an example of an appropriate terminal degree (i.e., a degree that does not require a dissertation or similar culminating experience), faculty members in schools of law that offer the first-professional juris doctor (J.D.) degree should hold the J.D. degree.

In the U.S., there are numerous faculty ranks that include professorial as well as nonprofessorial ranks (examples of the latter are instructor and lecturer ranks). The typical professorial ranks are assistant professor, associate professor, and full professor (Bess & Dee, 2012); “full professor” is a commonly used moniker to distinguish the official rank of *Professor* from lower professorial ranks. An assistant professor is typically a candidate for promotion to associate professor (with tenure, if applicable) in the sixth year of his or her appointment; if promoted, the time period from associate to full professor is more variable—though there may be a minimum by policy—and may not occur at all (i.e., faculty often retire at the rank of associate professor; Bess & Dee, 2012). Promotion is based upon evidence provided by the candidate that supports his or her effectiveness in teaching, service, and scholarship (Bess & Dee, 2012). Regular reviews (typically annual) also occur to provide additional scrutiny in these three areas of performance. In this regard, academics not only must develop as scholars in order to earn the right to hold a doctoral or terminal degree but also must continually pass further muster in this area should they become professorial faculty in order to continue or advance in rank.

By 2003, there were 681,800 full-time faculty members in U.S. degree-granting higher education institutions of which 194,400 ($P = 28.5\%$) were at the rank of Professor; for all instructional faculty, 462,700 ($P = 67.9\%$) held either a first-professional ($n = 56,100$) or doctoral degree ($n = 406,600$) as the highest degree (National Center for Education Statistics [NCES], n.d.-a). By 2013, the total number of full-time faculty members had increased to 791,391 although the number at the rank of Professor had decreased to 181,530 (NCES, n.d.-b), which might reflect (a) retirement of senior faculty, (b) the time lag between initial appointment and promotion, (c) increased promotion hurdles (e.g., increases in teaching or service loads that weaken the scholarship portion of promotion applications), or (d) an increase in nonprofessorial appointments ineligible for promotion (e.g., instructor, lecturer, or other types of

contingent faculty). Whatever the reason, those who hold the faculty rank of Professor have demonstrated an extremely high level of scholarship well beyond that required for their terminal degree, initial appointment, and (typically) promotion to associate professor as reflected in their representation of only 22.9% of all full-time faculty in 2013 (NCES, n.d.-b).

The purpose of this study was to determine if graduate teaching faculty (i.e., faculty whose primary duty is to teach graduate level coursework) who have earned the rank of Professor (i.e., full professor) reflect higher than normative levels of self-efficacy in autonomous learning for U.S. nontraditional adults with minimally a high school education. The history of graduate education in the U.S. and extant promotion practices support the hypothesis that their journey to earn a terminal degree and the highest professorial rank reflects an above average level of learner autonomy with which self-efficacy in autonomous learning has been shown to be related (Ponton, Carr, Schuette, & Confessore, 2010, 2016). If the findings support this hypothesis, developing within advanced graduate students a strong sense of efficacy in autonomous learning should be an explicit educational focus. Although there has been some work in this instructional direction already (e.g., Ginnings & Ponton, 2017), support for this direction has been mainly theoretical; thus, evidence that scholars—Professors are assumed to be a representative sample of this population—actually possess a stronger than normative level of self-efficacy in autonomous learning is required.

Method

Ponton, Derrick, Hall, Rhea, and Carr (2005, 2016) presented the Appraisal of Learner Autonomy (ALA; see Appendix) as a measure of self-efficacy in autonomous learning. Self-efficacy has been supported empirically as an important factor in human agency (Bandura, 1997); therefore, Ponton, Derrick, Hall, et al. argued that measuring this construct is essential in furthering an understanding of learner autonomy. The 9-item final version of the ALA (Ponton, Derrick, Hall, et al., 2005, 2016) was argued as valid and has been used as part of the LAP since its first publication in 2005 (note that the ALA is unlicensed and, thus, is freely available for research).

The 9-item ALA was e-mailed to Regent University Professors ($N = 37$) appointed in the graduate schools of Business & Leadership ($n = 7$), Divinity ($n = 4$), Education ($n = 9$), Government ($n = 1$), Law ($n = 9$), and Psychology & Counseling ($n = 7$)—the College of Arts & Sciences faculty were excluded as this faculty has lesser scholarship requirements for promotion due to greater teaching loads associated with primarily undergraduate education—that represents 22.6% of the 164 full-time faculty members (Regent University, 2018). Administrative faculty (i.e., full-time administrators with faculty appointments) or distinguished faculty (i.e., faculty who received appointments due to professional achievements) were not included in order to focus on Professors as representative of the population of scholars. Second ($n = 22$), third ($n = 19$), and fourth ($n = 17$) reminder e-mails were sent 7, 11, and 15 days, respectively, after the initial e-mail. Thirty completed instruments (81% response rate) were received; one faculty member from Divinity, two from Law, and four from Psychology & Counseling did not respond. For this group, Table 1 presents the

institutions at which they earned their highest degree; as per the U.S. Carnegie classification (“The Carnegie Classification,” 2017), 72% of the 18 institutions represented were doctoral universities with higher ($n = 3$) or highest ($n = 10$) research activity that 67% of the 30 respondents attended ($n = 20$).

Table 1. *Institution of Highest Degree (n = 30)*

| Institution of Highest Degree | <i>n</i> |
|------------------------------------|----------|
| Regent ³ | 6 |
| Virginia Commonwealth ⁵ | 3 |
| Virginia ⁵ | 3 |
| Chicago ⁵ | 2 |
| Emory ⁵ | 2 |
| George Washington ⁵ | 2 |
| Cornell ⁵ | 1 |
| Florida State ⁵ | 1 |
| Fuller Theological ² | 1 |
| Indiana ⁵ | 1 |
| Marquette ⁴ | 1 |
| Monash ⁶ | 1 |
| Old Dominion ⁴ | 1 |
| Pittsburgh ⁵ | 1 |
| Syracuse ⁵ | 1 |
| Wales ⁶ | 1 |
| Wheaton ¹ | 1 |
| William and Mary ⁴ | 1 |

Note: Carnegie classification: ¹Baccalaureate college: Arts & Sciences focus; ²Special focus 4-year: faith-related; ³Doctoral university: moderate research activity; ⁴Doctoral university: higher research activity; ⁵Doctoral university: highest research activity; ⁶No classification: non-U.S. institution.

Findings

Descriptive statistics for all responses ($n = 30$) are presented in Table 2 ($M = 623.3$, $SD = 171.4$), and the histogram of scores presented in Figure 1. One response was identified as an outlier (i.e., the minimum score of 170 was 3.02 standard deviations below the mean; cf. Rovai, Baker, & Ponton, 2014, p. 103) and was removed. The descriptive statistics for the resultant sample ($n = 29$) are presented in Table 3 ($M = 638.9$, $SD = 151.1$), and the histogram of scores presented in Figure 2; all scores are within two standard deviations of the mean. The distribution is platykurtic (i.e., “flat” in shape reflecting a negative kurtosis) and positively skewed; however, after dividing by the respective standard errors, normalized kurtosis and skewness statistics are less than

2 thereby suggesting a tenable normality assumption (cf. Rovai et al., 2014, p. 193). For this group, Cronbach's alpha coefficient for the 9-item ALA was .87, which represents "good" internal consistency (cf. Rovai et al., 2014, p. 404).

Table 2. *Descriptive Statistics (n = 30)*

| | Statistic | SE |
|---------------------|-----------|-------|
| <i>M</i> | 623.27 | 31.29 |
| CI95 Lower Bound | 559.28 | |
| CI95 Upper Bound | 687.26 | |
| Median | 612.50 | |
| <i>SD</i> | 171.37 | |
| Minimum | 170.00 | |
| Maximum | 900.00 | |
| Interquartile Range | 306.50 | |
| Skewness | -.31 | .43 |
| Kurtosis | -.01 | .83 |

Table 3. *Descriptive Statistics: Outlier Removed (n = 29)*

| | Statistic | SE |
|---------------------|-----------|-------|
| <i>M</i> | 638.90 | 28.05 |
| CI95 Lower Bound | 581.43 | |
| CI95 Upper Bound | 696.36 | |
| Median | 620.00 | |
| <i>SD</i> | 151.08 | |
| Minimum | 440.00 | |
| Maximum | 900.00 | |
| Interquartile Range | 301.00 | |
| Skewness | .24 | .43 |
| Kurtosis | -1.39 | .85 |

SELF-EFFICACY OF GRADUATE FACULTY

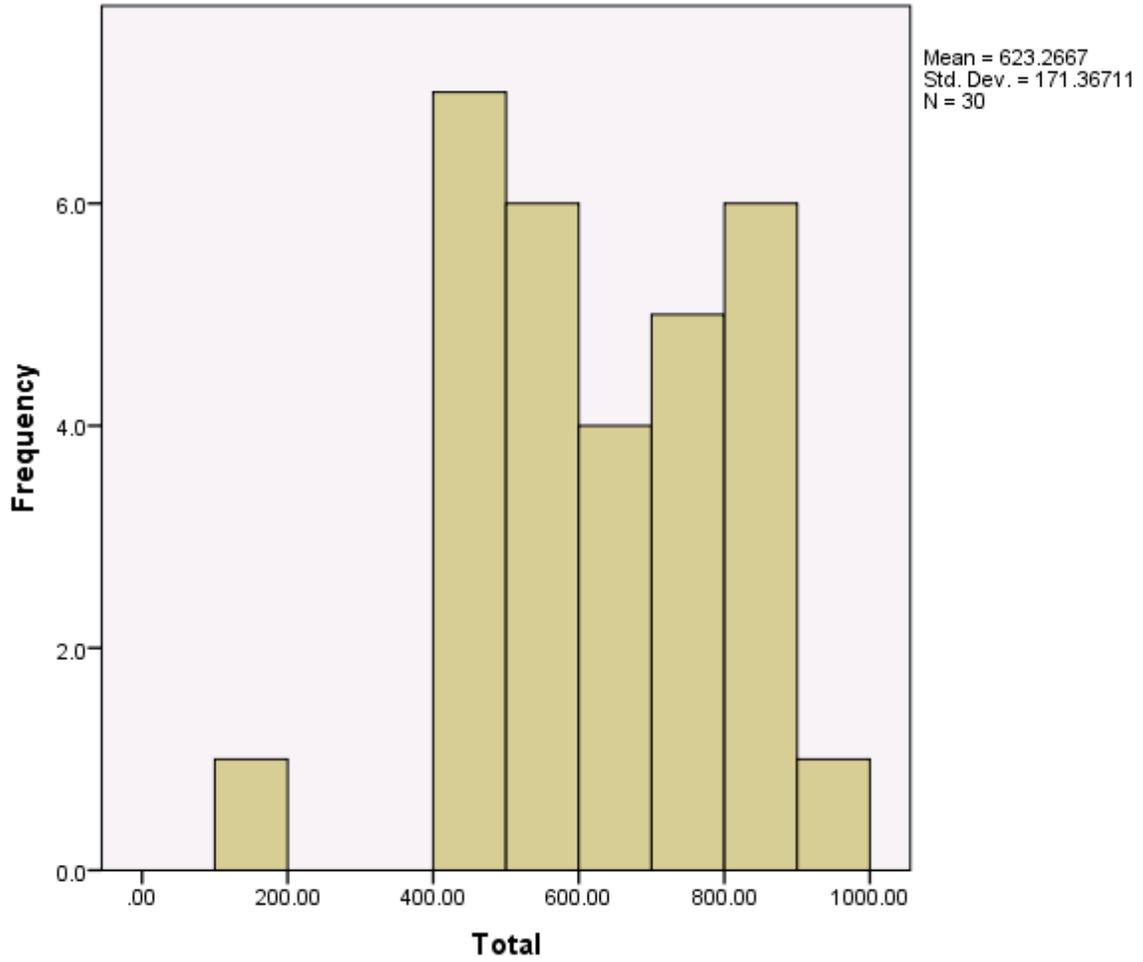


Figure 1. Histogram of responses ($n = 30$).

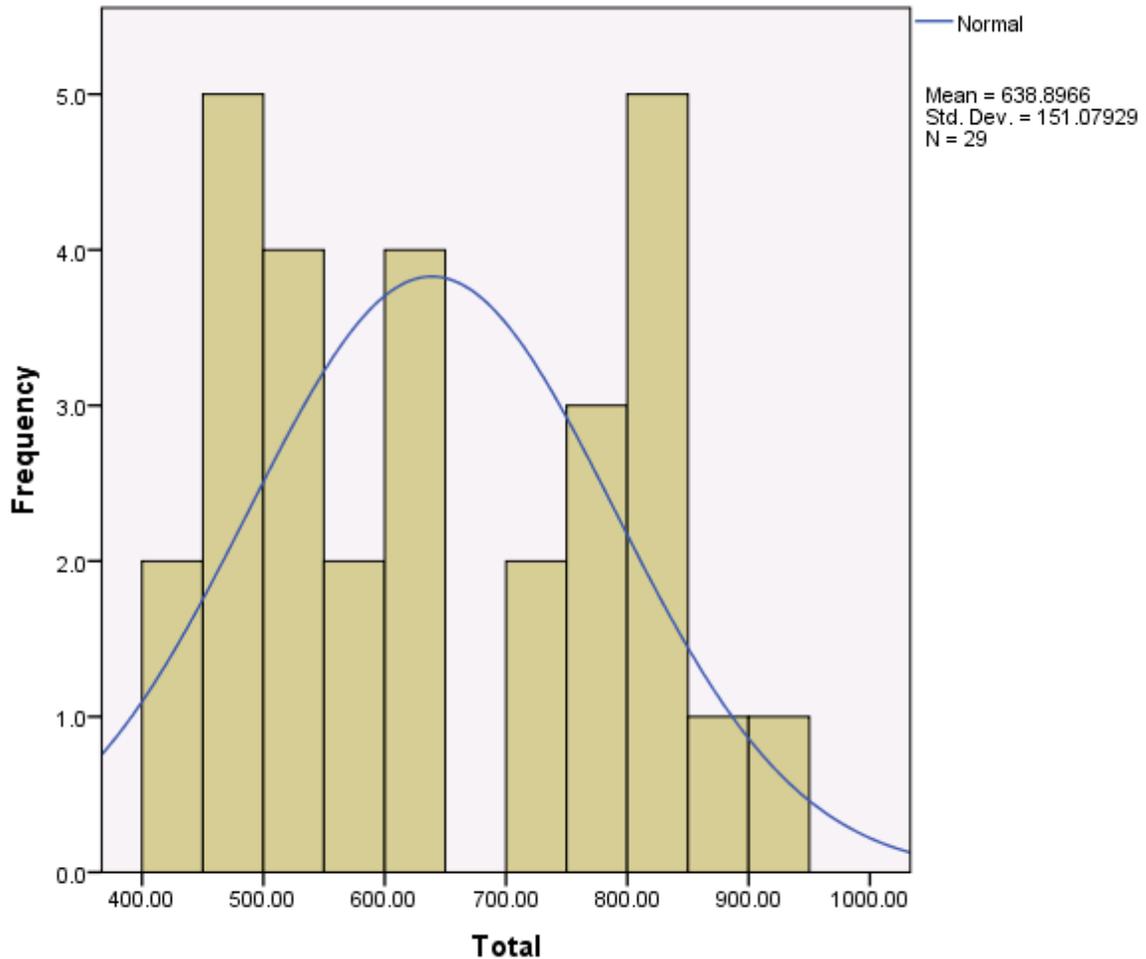


Figure 2. Histogram of responses: Outlier removed ($n = 29$).

Using a stratified estimation technique (cf. Ponton & Rovai, 2018), Ponton (2017) estimated the normative mean (577.5) and standard deviation (151.8) for the ALA for the U.S. population of nontraditional adults (age range 25-64) with at least a high school education. Resultant one-sample t test, $t(28) = 2.18$, $p = .037$, $CI_{95} = [581.4, 696.4]$ (see Table 4), provided support for the research hypothesis that Professors exhibit higher than normative levels of self-efficacy in autonomous learning. Together, Cohen's $d = .41$ and $r = .38$ approximate a medium effect size (cf. Rovai et al. 2014, p. 244). Note that effect size is inversely related to sample size; thus, the relatively small sample size of this study would reduce the practical effect realized for a given t statistic.

Table 4. *One-sample T Test*

| Test Value | <i>t</i> | <i>df</i> | <i>p</i> (2-tailed) | Mean Difference | CI95 of the Difference | |
|------------|----------|-----------|------------------------|--------------------|------------------------|--------|
| | | | | | Lower | Upper |
| 0 | 22.77 | 28 | <.001 | 638.90 | 581.43 | 696.36 |
| 577.5 | 2.19 | 28 | .037 | 61.40 | 3.93 | 118.86 |

Discussion

Using a nonprobability sample of predominately U.S. and East Asian adults (i.e., at least 18 years of age; $n = 2,147$), Ponton and Carr (2016) showed that the mean ALA score was statistically greater at the .05 level for those holding a graduate degree ($n = 584$) as compared to those holding a bachelor’s degree ($n = 358$) as well as for those holding a bachelor’s degree as compared to those holding a high school diploma ($n = 1,205$). For graduate degree holders from this previous dataset, $M = 615.7$; descriptively, the ALA mean for Professors in this study ($M = 638.9$) is slightly higher than those holding a range of graduate degrees in the previous Ponton and Carr (2016) study (see Table 5). Note that this difference is not statistically significant ($p = .39$; see Table 6) but that the power of the difference test is extremely weak (.14; see Table 7). However, descriptively the current findings are consistent with what might be expected with the previous Ponton and Carr (2016) findings that showed an increase in mean ALA score for increasing levels of education for adults; that is, this previous study supports the research hypothesis of the current study.

Table 5. *Descriptive Statistics Comparison*

| Group | <i>n</i> | <i>M</i> | <i>SD</i> | <i>SEM</i> |
|--------------------------|----------|----------|-----------|------------|
| IJSDL 13.1 Graduate Data | 584 | 615.68 | 141.51 | 5.86 |
| Regent Professor Data | 29 | 638.90 | 151.08 | 28.06 |

Table 6. *Independent Samples T Test: Comparison of Ponton and Carr’s (2016) Graduate Data With Current Professorial Data*

| | <i>t</i> | <i>df</i> | <i>p</i> (2-tailed) | CI95 of the Difference | |
|-----------------------------|----------|-----------|------------------------|------------------------|-------|
| | | | | Lower | Upper |
| Equal variances assumed | -.86 | 611 | .390 | -76.25 | 29.83 |
| Equal variances not assumed | -.81 | 30.49 | .424 | -81.70 | 35.28 |

Note. Levene’s Test: $F(1, 27) = 1.11, p = .293$; thus, homoscedasticity is tenable.

Table 7. ANOVA: ALA Comparison of Ponton and Carr's (2016) Graduate Data With Current Professorial Data

| Source | SS | df | MS | F | p | Power ^b |
|-----------|-----------------------|-----|-------------|---------|-------|--------------------|
| Corrected | | | | | | |
| Model | 14885.43 ^a | 1 | 14885.43 | .74 | .390 | .14 |
| Intercept | 43485865.39 | 1 | 43485865.39 | 2157.83 | <.001 | 1.00 |
| Group | 14885.43 | 1 | 14885.43 | .74 | .390 | .14 |
| Error | 12313222.72 | 611 | 20152.57 | | | |
| Total | 245526372.00 | 613 | | | | |
| Corrected | | | | | | |
| Total | 12328108.14 | 612 | | | | |

Notes. ^a $R^2 = .001$ (Adj $R^2 = .000$); ^bComputed using $\alpha = .05$.

Although delimited to a single university, the current study provides preliminary support for the research hypothesis that Professors exhibit higher than normative levels of self-efficacy in autonomous learning. In addition, limited descriptive evidence suggests that their levels may exceed those who hold graduate degrees in general. In order to support external validity, this study should be replicated using larger samples across multiple institutions; generalizing the current findings should be done with caution.

The reasons for this stronger efficacy can be due to the following possibilities (cf. Ponton & Carr, 2016, p. 20):

1. Those who are more efficacious in autonomous learning choose to attend terminal degree programs or choose to enter the professoriate;
2. Those who are more efficacious in autonomous learning develop achievements that provide stronger applications for acceptance into terminal degree programs or selection into the professoriate;
3. Terminal degree programs or the work of the professoriate strengthen self-efficacy in autonomous learning; or
4. Those who are more efficacious in autonomous learning are more likely to succeed in terminal degree programs or in the professoriate.

Regardless of the reason, the findings support the notion that self-efficacy in autonomous learning is a characteristic of a Professor and, by assumed inference, a scholar. Thus, graduate teaching faculty charged with developing scholars should intentionally incorporate strategies that focus on strengthening their students' efficacy in this domain of human functioning. Ponton, Derrick, Confessore, and Rhea (2005, 2016) and Ponton, Carr, and Wiggers (2014, 2016) suggested theoretically-based instructional approaches to strengthen self-efficacy consistent with Bandura's (1997) discussion of the sources of efficacy information (i.e, mastery experiences, verbal persuasion, vicarious experiences, and physiological/emotive arousals); using this same theoretical framework, Ginnings and Ponton (2017) provided a method and empirical

evidence that self-efficacy in autonomous learning can be strengthened in doctoral students. A review of these works would provide a good start for developing efficacy-building instruction.

For this study, it was assumed that graduate teaching faculty who have earned the rank of Professor (i.e., full professor) are representative of the population of scholars due to the requirements of both their terminal degree and promotion. Self-efficacy in autonomous learning—one theorized attribute of a scholar—was shown to be an extant characteristic (i.e., greater than normative levels). The body of self-efficacy literature and theorizing is extensive; thus, a great opportunity exists for graduate teaching faculty to develop efficacy-strengthening methods that effect their charge to develop future generations of scholars.

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Appendix

Appraisal of Learner Autonomy

In responding to the items below, insert any score (0-100) using the following scale:

| | | | | | | | | | | |
|-----------|----|----|----|----------------|----|----|----|----|----|---------|
| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| Cannot | | | | Moderately | | | | | | Certain |
| do at all | | | | certain can do | | | | | | can do |

In each of the following situations, please rate how sure you are that you can get yourself to participate in a learning activity when nobody else requires you to do so. Note that a learning activity is any activity that you believe will help you to learn something that you want to learn.

- | | |
|---|---------|
| | (0-100) |
| 1. When I am feeling tired | _____ |
| 2. When I am feeling under pressure from work | _____ |
| 3. After recovering from an injury that interrupted my learning | _____ |
| 4. When I am experiencing personal problems | _____ |
| 5. When I am feeling depressed | _____ |
| 6. When visitors are present | _____ |
| 7. When there are other interesting things to do | _____ |
| 8. When I am not getting near my learning goals | _____ |
| 9. When I have other time commitments | _____ |

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