Considering a Relational Model for Depression in Navy Recruits

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ABSTRACT   Objective: Key variables that have influenced depression in previous research were examined in this study including adult attachment, perceived social support, sense of belonging, conflict in relationships, and loneliness for their relationships in a relational model for depression with U.S. Navy recruits in basic training. Methods: This theory-testing analysis study was part of a larger cross-sectional cohort study that examined the factors associated with depression in Navy recruits. The sample for this study included 443 recruits. Structural equation modeling was used to test the fit of the theoretical model. Results: The proposed model explained 49% of the variance in depressive symptoms with loneliness and sense of belonging as the strongest indicators of depression. Conclusions: The Navy should consider interventions that increase sense of belonging in high risk for depression recruits to decrease loneliness and depression and circumvent recruits not completing basic training. The assumption that recruits are in close quarters and contact with other people and therefore are not lonely and receive adequate social support is not supported. This article contributes to advancing the science of mental health in relation to depression by considering predictors that are amenable to intervention.

INTRODUCTION

According to the Center for Disease Control, approximately one in ten U.S. adults met the criteria for current depression with 4.1% who reported symptoms consistent with major depressive disorder.[1] Predictors of depression may be extensive and influence adult attachment style and include family history of depression, loss of a parent before age 10, loss of a social support system, little perceived social support, conflict in relationships, persistent psychosocial stressors, perceived stress, abuse, and lack of a sense of belonging.[2–5] Stress and major life events are additional predictors noted to trigger depression with subpopulations in the United States that appear especially susceptible to developing psychiatric symptoms including postpartum women, immigrants, individuals with significant medical conditions, individuals who have been subjected to traumatic events, and military personnel.[6]

The prevalence rates of depression and post-traumatic stress disorder (with severe functional impairment) for military personnel postdeployment ranged from 8.3% to 16.0% and for those personnel with depression and some functional impairment ranged from 23.2% to 31.1%.[7] Gender appeared to have a moderating role between combat exposure and depression with female soldiers who reported higher severity of depressive symptoms compared to male soldiers postdeployment.[8]

Depression has a financial and resource impact on society and for the military. In a 2008 report, it was estimated that of the approximately 16.5 million people in the United States suffering from depression, the overall cost to society was as high as $83 billion in direct treatment and lost wages.[9] This cost also has a financial and resources impact for the military because recruits who have depression may necessitate a longer period of time to complete initial training or may leave the military all together, thus imposing a direct monetary cost.

Depression appears to be a complex and multifaceted mood disorder.[10] Attention to the internal and external relational factors associated with depression including perceived social support, sense of belonging, conflict in relationships, and loneliness was the focus of this study as others have demonstrated that 64% of the variance in depression was explained by the aforementioned four variables.[3] The purpose of this research study was to extend the Hagerty and Williams theory of depression to include adult attachment style (secure and insecure), perceived social support, sense of belonging, conflict, and loneliness for their associations in a relational model for depression with Navy recruits.

Model Variables

The literature review in this section examines the model presented in Figure 1. All of the direct pathways among the independent variables are examined in turn. Please refer to Figure 1.

Attachment, according to Bowlby, is "the propensity of human beings to make strong affectional bonds to particular others."[5(p. 367)] In general, there is a perception of high levels of social support with individuals who have secure attachments, whereas for insecurely attached individuals, there is often a perception of little social support or support is not sought in times of need.[11,12] Williams et al[13] explored the relationship between sense of belonging and attachment in

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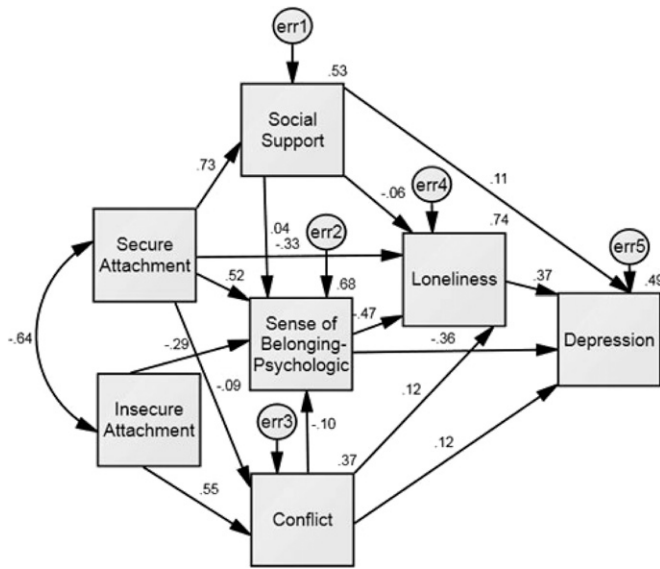
FIGURE 1. The theoretical model for depression in Navy recruits tested by using SEM with correlations (curved arrow), standardized regression coefficients (above straight arrows), error terms (err), and R^2 values (above endogenous variables, top right corner).

Navy recruits at high risk for depression and discovered a positive linear relationship between the two variables. Bowlby argues that "Since the goal of attachment behaviour is to maintain an affective bond, any situation that seems to be endangering the bond elicits action designed to preserve it…."[14(p. 42)] Therefore, conflict situations that jeopardize the attachment bond results in behaviors that attempt to regain this bond. An individual's working model of attachment (secure or insecure) will determine how a person reacts to a situation. Conflict will present a great hazard to the attachment bond for some individuals, whereas for others, conflict may provide an opportunity for relationship growth resulting in greater intimacy and perceived social support.[15]

The most widely accepted components of perceived social support include emotional, appraisal, informational, and instrumental support.[16] Emotional support includes trust, concern, love, and listening. Appraisal support is feedback that builds self-confidence and self-esteem. Informational support is advice, suggestions, and directions. Finally, instrumental support includes labor, money, time, services, and tangible aid. Positive, moderate correlations were noted between perceived social support and sense of belonging indicating that a greater sense of belonging resulted in greater perceived social support.[17,18] The relationship between social support and depression is well documented, and significant moderate to strong negative correlations were consistently demonstrated between depression and various types of perceived social support.[18,19]

Another model variable includes sense of belonging that is defined as "the experience of personal involvement in a system or environment so that persons feel themselves to be an integral part of that system or environment."[20(p. 172)]

The sentiments of being valued by a person, system, or environment and actually fitting in with other people, systems, and environments are essential concepts comprising sense of belonging. The relationship between sense of belonging and depression was examined with a depressed clinical sample and community college students, and sense of belonging was the strongest predictor of depression in those populations.[3]

Conflict is another variable that has a path to depression and is defined as "perceived discord or stress in relationships caused by behaviors of others or the absence of behaviors of others, such as the withholding of help."[21(p. 338)] Conflict and sense of belonging had a moderate and negative linear relationship.[4,17] The relationship between conflict and loneliness was reciprocal; higher levels of conflict resulted in greater levels of loneliness.[22] Conflict as a predictor for depression was noted in several studies in which higher conflict scores resulted in greater depressive symptoms.[3,4]

Loneliness is the "unpleasant experience that occurs when a person's network of social relations is deficient in some important way, either quantitatively or qualitatively" and occurs as an emotional response to a "discrepancy between desired and achieved levels of social contact."[23(pp. 4–5)] It appeared that individuals who had insecure attachments had increased loneliness, whereas individuals who had secure attachments experienced less loneliness.[22,24] Perceived social support and loneliness have an inverse relationship where low perceived social support resulted in increased feelings of loneliness and vice versa.[25] Attachment and loneliness were mediated by conflict behavior,[26] and people with altered mental well-being needed to work through conflict in relations to experience a sense of connectedness to people and communities to decrease loneliness.[27] Sense of belonging and loneliness had an inverse relationship; when sense of belonging is high, loneliness is low.[13,28] In various models of depression, loneliness has a range of correlations from 0.23 to 0.52 depending on populations assessed and measurement instruments utilized.[3,29]

These key variables of adult attachment style (secure and insecure), perceived social support, sense of belonging, conflict, and loneliness and their impact on depression have been examined in previous research. Yet, they have not been examined to date for their relational impact in structural equation modeling. Therefore, this study provided a unique opportunity to examine the complex nature of the interpersonal phenomenon with U.S. Navy recruits during basic training.

The specific aims for this study were to (1) determine baseline demographics of recruits including rates and degree of depressive symptoms as well as means and standard deviations for all model variables, (2) test whether there was a difference in mean total scale scores of model variables in relationship gender, (3) determine path estimates for differences of female and male recruits, and (4) test the relationships in the theoretical model for direct and indirect paths for depression.

The following hypotheses were tested in relation to Aim 4: (+ = positive effect, − = negative effect)

1. Secure attachment will have a direct effect on perceived social support (+), loneliness (−), sense of belonging (+), and conflict (−).
2. Insecure attachment will have an effect on sense of belonging (−) and conflict (+).
3. Perceived social support will have a direct effect on depression (−), loneliness (−), and sense of belonging (+).
4. Sense of belonging will have a direct effect on depression (−) and loneliness (−).
5. Conflict in relationships will have a direct effect on depression (+), loneliness (+), and sense of belonging (−).
6. Loneliness will have a direct effect on depression (+).

METHODS

Study Sample

This research study was part of a larger cross-sectional cohort study that examined the factors associated with depression in Navy recruits. The sample for this study included 443 recruits in basic training at the Navy Recruit Training Command located in Great Lakes, Illinois, who met the following criteria: (1) active in basic training or temporarily removed from training because of a medical injury or condition (2) displayed depressive symptoms and received treatment from an inpatient unit. Sample size was determined adequate by performing a power analysis according to Cohen and Kenny.[30,31]

Procedures and Measures

Approval for the original larger study was obtained from the Institutional Review Board from the University of the Primary Investigator and the U.S. Navy. Naval staff members were informed of the study and provided support in the recruitment of participants. Study procedures are described in detail elsewhere.[28] The race/ethnicity classification system used in this study was the same as that used by the U.S. Navy. There were no significant differences between the race and ethnicity of study participants versus the comparison to that of the overall Navy.

Attachment Style Questionnaire

The Attachment Style Questionnaire (ASQ) is a 40-item questionnaire that measures secure and insecure adult attachment and was based on adult attachment theory as conceptualized by Bowlby, Ainsworth, Hazan and Shaver, and Bartholomew.[26] The original instrument consisted of five subscales but the ASQ was reduced to secure and insecure attachment style. In this study, the confidence and insecure attachment scales had Cronbach α of 0.89 and 0.91 respectively.

Beck Depression Inventory, second edition

The Beck Depression Inventory, second edition (BDI-II) is a 21-item, self-report instrument that measures the symptoms and severity of depression and was based on criteria from the DSM-IV.[32] In this study, the Cronbach α was 0.92.

Interpersonal Relationships Inventory)

The Interpersonal Relationships Inventory is composed of three distinct scales that measure perceived social support, reciprocity, and conflict in relationships with each scale containing 13 items.[33] The Cronbach α was 0.91 for the social support scale and 0.88 for the conflict scale in this study.

Revised UCLA Loneliness Scale

The Revised UCLA Loneliness Scale (RULS) is a 20-item self-report scale that assessed individual loneliness and contains a 4-point Likert-type scale with a range of 1 = never and 4 = always. Scoring of the instrument involved summing the items with higher scores indicating greater amounts of loneliness. Convergent validity with other loneliness scales and construct validity have been noted.[29] The Cronbach α was 0.95 in this study.

Sense of Belonging Inventory

The Sense of Belonging Inventory (SOBI) is an 18-item self-report instrument used to measure the psychological state of sense of belonging in adults including whether individuals feel valued and fit within a system or environment. Construct validity was supported through testing of the instrument with contrasted groups and correlation was tested with similar construct measures.[34(p.9)] In this study, the Cronbach α was 0.97.

Statistical Analysis

An independent samples t test was utilized to examine any significant mean differences in designated groups (female versus male recruits). Structural equation modeling (SEM) analysis was conducted next to determine the best model to explain the model variables. SEM is based on principles related to regression and path analysis.[35] However, SEM allows one to test more complicated path models with intervening variables connecting the independent and dependent variables.[36] There is discrepancy among researchers as to the best indices to assess model fit with SEM; therefore, the most conventional indices and cutoffs were used in the SEM analysis.[37]

Direct and indirect effects in the path model were calculated. The bootstrap method was utilized to calculate the standard error, confidence intervals, and p values of the path coefficients (both direct and indirect). Stratified testing using the multigroup moderation test was conducted to determine whether the model fits equally well for both female and male Navy recruits and was performed by running two models (an unconstrained and constrained model). A χ^2 for each

TABLE I. Demographics by Depressive Symptoms Using BDI-II Cutoffs: χ^2 Test for Independence for Navy recruits ($N = 443$)

Characteristic	No DS (Cutoff 0–13) n (%)	Mild DS (Cutoff 14–19) n (%)	Moderate DS (Cutoff 20–28) n (%)	Severe DS (Cutoff 29–63) n (%)	Total N (%) 443 (100)	$\chi^2(3)$	p
Race/Ethnicity							
African Americans	35 (47.3)	14 (18.9)	16 (21.6)	9 (12.2)	74 (16.7)	3.40	0.34
American Indians	8 (42.1)	4 (21.1)	4 (21.1)	3 (15.8)	19 (4.3)	0.88	0.83
Asians	6 (50.0)	2 (16.7)	3 (25.0)	1 (8.3)	12 (2.7)	0.99	0.81
Caucasians	148 (49.5)	41 (13.7)	50 (16.7)	60 (20.1)	299 (67.5)	3.91	0.27
Hispanics	15 (57.7)	2 (7.7)	4 (15.4)	5 (19.2)	26 (5.9)	1.49	0.68
Other Race/Ethnicity	5 (38.5)	2 (15.4)	4 (30.8)	2 (15.4)	13 (2.9)	1.50	0.68
Marital Status							
Never Married	178 (50.0)	53 (14.9)	60 (16.9)	65 (18.3)	356 (80.4)	2.51	0.47
Engaged or Living with SO	22 (38.6)	9 (15.8)	13 (22.8)	13 (22.8)	57 (12.9)	3.05	0.39
Divorced	4 (80.0)	0 (0.0)	1 (20.0)	0 (0.0)	5 (1.1)	2.66	0.45
Teens (17–20)	158 (48.3)	52 (15.9)	55 (16.8)	62 (19.0)	327 (73.8)	3.43	0.33
Income ≤ $15,000	91 (40.8)	34 (15.2)	49 (22.0)	49 (22.0)	223 (50.3)	13.38	0.004
High School or Less	148 (48.2)	48 (15.6)	53 (17.3)	58 (18.9)	307 (69.6)	1.88	0.60
Living With Parents or Relative	148 (48.7)	48 (15.8)	51 (16.8)	57 (18.8)	304 (68.6)	2.30	0.51
Mean Age (SD)	19.7 (2.8)	19.6 (2.6)	20.3 (3.1)	19.7 (2.3)	19.8 (2.7)		

DS, depressive symptoms; SO, significant other; SD, standard deviation.

model was obtained and a difference test performed to determine if the model fits differently in relation to gender.[38]

A Stats Tool Package[39] was used to calculate group difference by taking into consideration the critical ratio for difference. The z-score for the differences of the parameters in the model was compared against both groups as well as the estimated regression weights for both groups.

RESULTS

The demographics of the program participants ($n = 443$) are discussed in relation to depression severity, the dependent variable (Table I). Program participants were rather homogeneous in terms of several factors (age: $M = 19.8$, SD = 2.7; never married = 80.4%; income < $15,000 = 50.3%; living with parents or a relative before Navy = 68.6%; education: high school or less = 69.6%). There was however heterogeneity noted among racial/ethnic groups.

Of these 433 recruits, 226 (51.0%) had cutoff scores of 14 or above indicating some degree of depressive symptoms with recruits experiencing mild 65 (14.7%), moderate 81 (18.3%), and severe 80 (18.1%) depressive symptoms, respectively. A χ^2 test for independence of the demographic variables indicated that recruits with annual incomes ≤$15,000 before the Navy experienced more depressive symptoms as compared with recruits who made more than $15,000.

Table II displays means with confidence intervals and standard deviations for all model variables. The dependent variable of depression was greater than the BDI-II cutoff of 13 and in terms of the independent variables, the recruits answered in the more neutral category for insecure attachment, had high secure attachment, social support, and sense of belonging scores, and had less loneliness and conflict.

Missing data appeared to be random with no patterns noted. This resulted in 20 single items in which data were imputed using individual participant mean scores for that survey instrument to replace the missing single item.

The correlation matrix (Table III) displays the significant relationships among the model variables with moderate to strong correlations noted between all model variables. The relationship between loneliness and sense of belonging resulted in the strongest correlation and the relationship between social support and BDI the weakest. All relationships were in the expected direction.

The SEM path model (Fig. 1) displays the paths in the proposed model with the path coefficients and R^2 results displayed using AMOS 19. Each endogenous variable in the model required one regression analysis to obtain the path coefficients. Paths were not trimmed in this SEM analysis as the original theoretical framework included the variables and paths represented in the figure. R^2 values, which are located

TABLE II. Descriptive Statistics and Distributions of the Model Variables for Navy Recruits ($N = 443$)

Variable	M	95% CI	SD	Theoretical Range	Observed Range
Attachment					
Secure	32.8	32.0–33.6	8.2	8–48	10–48
Insecure	109.1	107.0–111.2	22.3	32–192	50–169
Social Support	51.4	50.5–52.3	9.4	13–65	20–65
Conflict	36.5	35.7–37.3	8.7	13–65	13–63
Sense of Belonging	53.6	52.5–54.8	12.5	18–72	20–72
Loneliness	43.9	42.7–45.2	13.3	20–80	20–78
Depression	16.2	15.1–17.3	12.0	0–63	0–60

CI, confidence interval.

TABLE III.   Zero-Order Correlations for Study Variables in Navy Recruits ($N = 443$)

	Secure Attachment	Insecure Attachment	Social Support	Sense of Belonging	Conflict	Loneliness	BDI
Secure Attachment	–						
Insecure Attachment	−0.638**	–					
Social Support	0.731**	−0.483**	–				
Sense of Belonging	0.801**	−0.731**	0.597**	–			
Conflict	−0.441**	0.605**	−0.416**	−0.546**	–		
Loneliness	−0.788**	0.664**	−0.632**	−0.847**	0.531**	–	
BDI	−0.536**	0.538**	−0.388**	−0.684**	0.454**	0.659**	–

BDI, Beck Depression Inventory. **Correlation is significant at the 0.01 level (2-tailed).

near the upper right hand corner of each variable box, indicate 49% of the variance in depressive symptoms may be explained by the model variables with sense of belonging and loneliness explaining the most variance on depression.

Regarding model fit, the NFI = 0.99, RFI = 0.97, and CFI = 0.99 indicated respectable levels of model fit, whereas $\chi^2 = 15.8$, $df = 5$, $p = 0.01$, and RMSEA = 0.07 indicated less support of model fit. Finally, the SEM path coefficients were calculated, and Table IV includes the standardized direct and indirect path coefficients as well as standard errors and significant paths.

Model variables for female versus male Navy recruits were tested, and Table V displays the differences in model variables in relation to gender. The data reveal statistically significant differences according to gender with women reporting more secure attachment, social support, and sense of belonging as well as less loneliness when compared to men. According to guidelines presented by Cohen, the effect sizes of these differences were small.[30]

The hypothesized model (Fig. 1) was analyzed using SEM multigroup moderation with both male and female Navy recruits. The unconstrained model indicated a relatively good model fit as evidenced by: $\chi^2 = 27.369$, $df = 10$, $p = 0.002$; RMSEA = 0.063; NFI = 0.988; RFI = 0.948; and CFI = 0.992. Post hoc model modifications were completed in an effort to build a better fitting model; however, the original model resulted in the best model fit. The next step was to constrain the path model so differences in gender could be examined, resulting in $\chi^2 = 37.928$, $df = 12$, $p = 0.000$; RMSEA = 0.070; NFI = 0.983; RFI = 0.940; and CFI = 0.988. The difference between the 2 models resulted in a $\chi^2 = 10.559$, $df = 2$, $p = 0.005$, which indicated that the model explained depression differently in females versus males. Path estimates were compared to determine if the various paths in the model were different for female versus male Navy recruits (Table VI). A Stats Tool Package[39] using group differences was utilized for the calculations of the path differences. It appears from this table that there are several

TABLE IV.   SEM Effects of the Causal Variables on the Endogenous Variables in Navy Recruits

	Endogenous Variables											
	Insecure		Secure		Conflict		Social Support		Sense of Belonging		Loneliness	
Causal Variables	Std.	SE	Std.	SE	Std.	SE	Std.	SE	Std.	SE	Std.	SE
Conflict												
Direct Effect	0.55***	0.04	−0.09*	0.05	—	—	—	—	—	—	—	—
Indirect Effect	—	—	—	—	—	—	—	—	—	—	—	—
Total Effect	0.55***	0.04	−0.09*	0.05	—	—	—	—	—	—	—	—
Social Support												
Direct Effect	—	—	0.73***	0.02	—	—	—	—	—	—	—	—
Indirect Effect	—	—	—	—	—	—	—	—	—	—	—	—
Total Effect	—	—	0.73***	0.02	—	—	—	—	—	—	—	—
Sense of belonging												
Direct Effect	−0.29***	0.04	0.52***	0.04	−0.10**	0.04	0.04	0.04	—	—	—	—
Indirect Effect	−0.05**	0.02	0.04	0.03	—	—	—	—	—	—	—	—
Total Effect	−0.34***	0.06	0.56***	0.07	−0.10**	0.04	0.04	0.04	—	—	—	—
Loneliness												
Direct Effect	—	—	−0.33***	0.04	0.12***	0.03	−0.06*	0.04	−0.47***	0.04	—	—
Indirect Effect	0.22***	0.03	−0.32***	0.04	0.04**	0.02	−0.02	0.02	—	—	—	—
Total Effect	0.22***	0.03	−0.65***	0.08	0.16***	0.05	−0.08*	0.06	−0.47***	0.04	—	—
BDI												
Direct Effect	—	—	—	—	0.12**	0.04	0.11*	0.05	−0.36***	0.06	0.37***	0.06
Indirect Effect	0.27***	0.03	−0.37***	0.03	0.09***	0.02	−0.04*	0.03	−0.17***	0.03	—	—
Total Effect	0.27***	0.03	−0.37***	0.03	0.21***	0.06	0.07	0.08	−0.53***	0.09	0.37***	0.06

Std., standardized; SE, standard error; BDI, Beck Depression Inventory. *$p \leq 0.10$; **$p \leq 0.01$; ***$p \leq 0.001$.

TABLE V.   Model Variable Differences Between Female and Male Navy Recruits

Variable	Female		Male		df	t	p	Cohen's d	r
	M	SD	M	SD					
Attachment					441				
Secure	35.01	8.63	32.03	7.86	441	3.40	0.001*	0.36	0.18
Insecure	105.46	24.66	110.34	21.35	441	−1.88	0.062	0.21	0.11
Social Support	53.57	9.51	50.65	9.23	441	2.89	0.004*	0.31	0.15
Conflict	35.37	9.52	36.85	8.34	441	−1.48	0.141	0.17	0.08
Sense of Belonging	55.96	13.41	52.82	12.09	441	2.33	0.020*	0.25	0.12
Loneliness	40.11	12.73	45.22	13.24	441	−3.60	0.000*	0.39	0.19
Depression	15.39	10.36	16.50	12.46	441	−0.94	0.350	0.10	0.05

*$p < 0.05$.

significant differences between female and male recruits in terms of path coefficients. Female recruits who have less secure attachment relationships are noted to have higher levels of conflict in relationships and female recruits who have less perceived social support report feeling more lonely than their male counterparts. The male recruit path differences include the fact that males who report more conflict in relationships feel less of a sense of belonging as compared to female recruits. In addition, male recruits who have less secure attachment relationships report more feelings of loneliness as compared to women.

DISCUSSION

When recruits begin basic training, their clothing, hairstyle, even mannerisms are relinquished. They are issued uniforms, taught how to stand at attention, and how to drill. As their identities change, recruits start to grieve their former selves and relationships and the emotional support they received from those who comprised their personal and social network. They enter into what may be perceived as a scary, confusing, and vulnerable time in their lives.

Immediately upon arrival at basic training, recruits are assigned a shipmate with whom they are supposed to work as a team to accomplish assigned tasks. They then engage in rigorous mental and physical training designed to produce a high functioning sailor. Recruits who are able to adjust psychologically and socially, starting with their assigned shipmate and other recruits, develop relationships, become connected to their unit, and succeed. Recruits who are unable to adjust experience an impaired connection to their surrounding environment and personal sense of belonging. Anxiety and depression may ensue.

Given the inevitability of experiencing loneliness at one time or another during basic training, recruits succeed only if they are able to handle effectively troubling emotions and redress the loss of their former lives. They must also come to terms with the perceived loss of former emotional support systems and the loss of those who previously comprised their personal social networks as they gradually develop interconnectedness and a sense of belonging within their units.

This study was designed to better understand the impact of relational variables on depression. When examining the

TABLE VI.   Path Estimates With Z-Scores for Path Differences for Female and Male Recruits

			Females		Males		
			Estimate	p	Estimate	p	Z-Score
SS	<—	Secure	0.815	0	0.845	0	0.36
Conflict	<—	Insecure	0.191	0	0.222	0	0.75
Conflict	<—	Secure	−0.257	0.009	−0.029	0.638	1.957*
SOBP	<—	Conflict	0.02	0.821	−0.196	0	−2.028**
SOBP	<—	Secure	0.819	0	0.792	0	−0.178
SOBP	<—	Insecure	−0.173	0	−0.155	0	0.379
SOBP	<—	SS	0.198	0.046	0.014	0.824	−1.575
RULS	<—	SS	−0.315	0	−0.008	0.89	2.963***
RULS	<—	Secure	−0.264	0.034	−0.641	0	−2.47**
RULS	<—	SOBP	−0.469	0	−0.495	0	−0.289
RULS	<—	Conflict	0.123	0.069	0.207	0	0.972
BDI	<—	Conflict	0.099	0.24	0.187	0.007	0.806
BDI	<—	RULS	0.35	0.002	0.337	0	−0.098
BDI	<—	SOBP	−0.253	0.009	−0.371	0	−0.973
BDI	<—	SS	0.085	0.418	0.14	0.034	0.443

SS, social support; secure, secure attachment; conflict, conflict in relationships; secure, secure attachment; SOBP, sense of belonging- psychologic; RULS, loneliness; BDI, Beck Depression Inventory. ***p value < 0.01; **p value < 0.05; *p value < 0.10.

demographic data related to BDI scores, it was noted that the mean score for recruits was 16.2 indicating some degree of depressive symptoms. It is important to note that the primary investigators purposely recruited a depressed sample to test their original model. This notion is important to keep in mind when considering the study results.

The original path model contained 15 direct paths with only one direct path (the path from social support to sense of belonging) that was not significant (see Table IV). Therefore, the hypothesis related to social support was only partially supported. The idea that social support does not have a significant impact on sense of belonging is contrary to prior studies as noted previously.[17,18,40] If the recruit does not feel valued or feel that they do not fit with other recruits and the Navy system, then they will not experience a sense of belonging. Social support may continue to be an important variable to consider in future testing of the model, but there may need to be more dimensions of social support represented.

There were several paths within the proposed model that were significant and were directly linked to the increased depressive symptoms in the recruits. Loneliness was the strongest predictor of depressive symptoms in recruits (path coefficient = 0.37) in the context of other interpersonal phenomena, with sense of belonging (path coefficient = −0.36) as the next strongest predictor when examining the direct paths. When considering both the direct and indirect paths (through loneliness), sense of belonging had the greatest total effect on depression with a path coefficient of −0.53.

In terms of the model variables that were tested to examine the mean differences according to gender, it was noted that female Navy recruits had more secure attachment, social support, and sense of belonging as well as less loneliness as compared to male recruits. These results may indicate that the women in this study have more extensive social networks than the men and therefore would need less intervention to stay in the military because they are better suited than men in terms of above variables.

The model was further examined using SEM to determine if the model displayed path coefficient differences for female versus male participants, and there were slight differences noted. Insecurely attached women experienced twice as much conflict in relationships as opposed to securely attached women. Males with less secure attachment and more conflict in relationships reported more feelings of loneliness and less sense of belonging respectively. Females who perceived less social support reported more loneliness. Therefore, those recruits who have not developed attachment systems may not be able to engage in new, strange, and stressful environments and may not have developed the working model needed to develop new relationships with fellow shipmates. Therefore, training and/or workshops related to enhancing sense of belonging, decreasing loneliness, and teaching conflict management may be beneficial for these recruits.

Despite these findings, females experience depressive symptoms at prevalence rates that are higher as compared to males (8.0% [95% confidence interval = 7.6%–8.4%] and 10.2% [95% confidence interval = 9.8%–10.5%] respectively).[2] Therefore, there may be risk factors that are not included in this model that may counterbalance the protective factors found in this study. It is possible that the females in this study had support from their social support network members that influenced their attachment style, social support, sense of belonging, and loneliness, but how these factors would be maintained as the recruits became Navy sailors is unknown, which would suggest a line of inquiry.

One of the limitations of this study was that the focus included a very specific population, Navy recruits; therefore, the findings may not generalize to the nonmilitary population. Conflict could have been measured differently allowing for a more global measure of conflict. Social support could have been measured with a multidimensional measure with specific subscales for specific types of social support. Knowledge of what specific type of social support is lacking would be useful for practitioners to know how to help individuals decrease their depressive symptoms.

Despite the limitations, there were some major strengths of this research including a strong theoretical model to ground the analysis and a novel approach in using SEM with the proposed variables. This study provides evidence that the model proposed explains 49% of the variance of depressive symptoms in Navy recruits. There was also evidence that sense of belonging and loneliness are major predicators of depression with standardized regression weights of (−0.36) and (0.37).

CONCLUSION

Overall, the proposed model for depression gives insight into the key variables that influence this common mental health issue. The assumption that recruits are in close quarters and contact with other people and therefore are not lonely and receive adequate social support is not supported. This article contributes to advancing the science of mental health in relation to depression by considering predictors that are amenable to intervention. It would be prudent for future research to focus on sense of belonging and loneliness (the major influencing variables in this study) to determine if these variables are influencing variables in a nonmilitary population. In the U.S. Navy, understanding the influencing variables in the development of depression in recruits will assist in planning training that includes interventions, tools, or evolutions that serve to thwart loneliness and improve sense of belonging. These efforts will undoubtedly have a positive financial and resource management impact by increasing basic training completion rates and retention. In addition, future research should examine how the proposed model works with larger samples. Understanding the influence key variables have on depression is powerful as this knowledge allows practitioners to have insight into the phenomenon of depression and assists

with treatment making decisions as well as focusing on prevention efforts.

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