Counselling Psychology Quarterly
Vol. 24, No. 1, March 2011, 71–82

Routledge
Taylor & Francis Group

The mediating and moderating effects of differentiation of self on body mass index and depressive symptomatology among an American college sample

Lisa M. Hooper[a]* and Kirsten Doehler[b]

[a]*Department of Educational Studies in Psychology, Research Methodology, and Counseling, The University of Alabama, Box 870231, 315 B Graves Hall, Tuscaloosa, AL 35487-0231, USA;* [b]*Department of Mathematics and Statistics, Elon University, 2320 Campus Box, Elon, NC 27244, USA*

(*Received 16 May 2010; final version received 17 November 2010*)

Differentiation of self – a core construct of Bowen's (Bowen, M. (1978). *Family therapy in clinical practice*. New York: Jason Aronson) family systems theory – was examined as a possible predictor of psychological health and physical health and as a mediator and moderator of the relation between overall functioning and psychological health and physical health. A total of 818 American college students participated (mean age = 23.72, SD = 4.79) in this study. Differentiation of self was correlated and was predictive of psychological health, as measured by the Beck depression inventory, and physical health, as measured by body mass index (BMI). A multivariate multiple regression model revealed that differentiation of self partially mediated the effects of overall functioning on depressive symptomatology and on BMI. Results from a hierarchical regression model showed that differentiation of self moderated the relation between overall functioning and depressive symptomatology but did not moderate the relation between overall functioning and BMI. Taken together, these preliminary findings provide initial evidence of the importance of the associations between family systemic factors (differentiation of self) and psychological and physical health factors among American college populations.

Keywords: Bowenian theory; differentiation of self; college health; psychological health; physical health

Introduction

Bowen's family systems theory (Bowen, 1978) is based on the premises that the individual's primary purpose is to differentiate him or herself from the family of origin and that previous generations' behavior and level of functioning are associated with this process in the current and future generations. Theoretically, *differentiation of self* pertains to the ability to maintain emotional objectivity during high levels of anxiety in a system while concurrently relating to key people in the system (family members, peers, coaches, professors, etc.; Bowen, 1978; Kerr & Bowen, 1988). According to Bohlander (1995) and Skowron and Friedlander (1998), four concepts

*Corresponding author. Email: lhooper@bamaed.ua.edu

ISSN 0951–5070 print/ISSN 1469–3674 online

DOI: 10.1080/09515070.2011.559957
http://www.informaworld.com

undergird this construct: emotional reactivity (ER), emotional cutoff (EC), fusion with others (FO), and the ability to take an I position (IP). The differentiation process and the related four concepts are highly relevant to college students and the extent to which they function well (e.g., think, emote, self-direct, self-regulate, and make intelligent decisions) apart from their family of origin, often for the first time in their lives (Bohlander, 1995; Kerr & Bowen, 1988; Skowron, Stanley, & Shapiro, 2009).

Bowen's construct of differentiation of self explains possible health-related outcomes in the family system and among individual family members (Chung & Gale, 2006; Gushue & Constantine, 2003; Murray, Daniels & Murray, 2006). Bowen (1978) asserted that healthy functioning in general and healthy relational functioning in particular can be measured by the degree of self-differentiation. Many researchers (Diehl, Hastings, & Stanton, 2001; Hooper, Marotta, & Lanthier, 2008; Skowron, 2004) in addition to Kerr and Bowen (1988) and Papero (1990) have studied the predictive value in the level of differentiation and functioning across the lifespan. More specifically, investigators have tested empirically the assertion that the level of differentiation of self serves as a strong predictor of *psychological* health (Chung & Gale, 2006; Heath & Brown, 1999; Skowron et al., 2009; Tsaousis, Kikolalou, Serdaris, & Judge, 2007). However, little is known about the clinical utility and statistical significance of differentiation of self relative to *physical* health (Miller, Anderson & Keala, 2004; Murray et al., 2006).

This study addresses this issue by testing the statistical significance and predictive value of differentiation of self relative to *physical* health. It adds new information to the literature base in three ways. First, it explores the construct of differentiation of self in a theoretically and clinically relevant sample of American college students, a population for whom the differentiation process is most germane (Jenkins, Buboltz, Schwarts, & Johnson, 2005). Second, it is informed by research design and data analytic procedure of Skowron, Wester, and Azen (2004; i.e., mediation and moderation modeling) using a small sample of 126 undergraduate college students. This study attempts to add to their findings. Third, it considers an important family system and relational construct in conjunction with two significant public health concerns – weight status and depression – which, separately and together, have implications for individual functioning (Centers for Disease Control and Prevention, 2006; Kessler et al., 2005).

Objective and hypotheses

The primary objective of this study is to better understand the relations between differentiation of self, overall functioning, physical health, and psychological health in American college students. Because differentiation of self has long been considered a measure of healthy coping and related to psychological health at the individual level (Bohlander, 1995; Bowen, 1978; Witkin, Goodenoug, & Oltman, 1979), one can hypothesize that differentiation of self may play a key role in mediating or possibly even moderating (i.e., buffering) psychological and physical health outcomes.

In addition to exploring the bivariate relations among the study variables, four hypotheses relative to physical and psychological health outcomes (Figure 1) were tested in this study using recommendations and data analytic procedures for

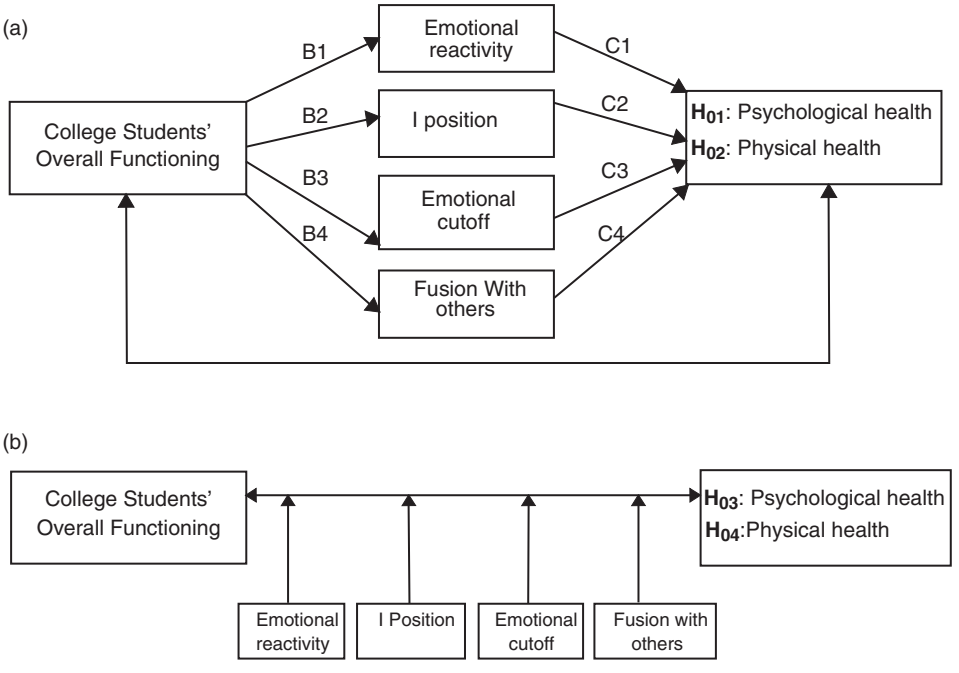

Figure 1. (a) Mediation (Hypotheses 1 and 2) and (b) moderation (Hypotheses 3 and 4) models: the relations between overall functioning, differentiation of self, and psychological and physical health. Adapted from Skowron et al. (2004).

mediation and moderation outlined by Aiken and West (1991), Baron and Kenny (1986), Frazier, Tix, and Barron (2004), and MacKinnon and Dwyer (1993):

- *Hypothesis 1*. Differentiation of self (operationalized as ER, IP, EC, and FO) mediates the effects of overall functioning (OVR-FUNC) on depressive symptomatology (DEP-SX).
- *Hypothesis 2*. Differentiation of self (operationalized as ER, IP, EC, and FO) mediates the effects of OVR-FUNC on body mass index (BMI).
- *Hypothesis 3*. Differentiation of self (operationalized as ER, IP, EC, and FO) moderates the effects of OVR-FUNC on DEP-SX.
- *Hypothesis 4*. Differentiation of self (operationalized as ER, IP, EC, and FO) moderates the effects of OVR-FUNC on BMI.

Method

Participants

An American college sample of 818 participants volunteered to participate in this study. The participants were primarily female ($n = 613$; 75%) and ranged in age from 19 to 49 (mean = 23.72, SD = 4.79; SD, standard deviation). The self-reported race of the participants was relatively homogenous: 80.93% ($n = 662$) of the participants were non-Hispanic White American; 13.81% ($n = 113$) were non-Hispanic Black American; 0.98% ($n = 8$) were Hispanic; 0.49% ($n = 4$) were American Indian; 0.49% ($n = 4$) were Asian American; 2.93% ($n = 24$) were Mixed Race; and 0.37% ($n = 3$)

did not report their race. Based on census data, the racial composition of the sample was representative of the racial makeup of the surrounding state and communities from which the sample was drawn. Almost 63% of the sample was in the ''normal'' BMI range, less than 5% were considered ''underweight,'' and over 30% were considered either ''overweight'' or ''obese,'' as categorized by the Centers for Disease Control and Prevention (2006).

Procedure

Following Institutional Review Board approval, the authors recruited participants to take part in a study investigating the link between family system factors and physical and psychological health. With the permission of university professors, the authors approached participants in undergraduate-level classrooms and then later by email. The authors administered the survey packet online using Survey Monkey, a web-based survey tool. Specifically, participants were sent an electronic invitation to participate in the study. The electronic invitation included a description of the study, a direct link to the electronic survey, and an informed consent form. The standardized instruments were in English. Extra course credit was provided as an incentive and compensation for participating in the study. Completion of the study took approximately 30–40 min.

Materials

Demographic information

A researcher-developed questionnaire created for this study asked participants for background information regarding current age, gender, marital status, race/ethnicity, religious background, and current height and weight.

Differentiation of self inventory–revised

The differentiation of self inventory (DSI; Skowron & Schmitt, 2003) is a 46-item self-report inventory used in the study to measure coping and psychological health. The DSI was designed to capture Bowen's (1978) construct of differentiation of self.

Participants responded using a six-point Likert scale ranging from 1 (not at all true of me) to 6 (very true of me). Full-scale and subscale scores range from 1 to 6, with higher scores reflecting a greater level of differentiation.

The four subscales include ER, IP, EC, and FO. The ER subscale includes 11 questions and reflects the extent to which one responds to anxiety-provoking situations with an increased emotion (e.g., ''People have remarked that I am overemotional''). The IP subscale includes 11 questions and refers to one's sense of self and one's ability to communicate and stand by his or her convictions (e.g., ''No matter what happens in my life I know that I will never lose my sense of who I am''). The EC subscale includes 12 questions and indicates how much one avoids or fears intimacy (e.g., ''I tend to distance myself when people get too close to me''). Finally, the FO subscale includes 12 questions and assesses the extent to which one is overinvolved with or overidentifies with others (e.g., ''I tend to feel pretty stable under stress''). Skowron and Schmitt (2003) have reported internal consistency among the DSI scores ranging from 0.81 to 0.92. Cronbach's alpha coefficients were

very good in this study, ranging IURP WR 0.71 to 0.85 (ER $\alpha = 0.85$; IP $\alpha = 0.71$; EC $\alpha = 0.85$; FO $\alpha = 0.70$).

SF-36 overall functioning survey

The SF-36 (Lehman, Azrin, & Goldberg, 2000) is one of the most widely used instruments measuring overall health and functioning. Self-report data from the SF-36 are combined to form eight scales measuring the following concepts: physical functioning, physical role functioning, bodily pain, general health, vitality (energy versus fatigue), social functioning, emotional role functioning, and mental health. Scores from this instrument have been shown to have good reliability and validity (Lehman et al., 2000). In this study, the SF-36 was used to measure overall functioning. Consistent with other studies, the obtained reliability in this study was adequate. The conventional standard for adequate reliability is that Cronbach's alpha is 0.70 or greater (Nunnally & Bernstein, 1994). In this study, Cronbach's alpha was 0.74.

Beck depression inventory

The Beck depression inventory (BDI; Beck, Steer, & Brown, 1996) is composed of 21 self-report questions that capture depressive symptomatology. Scores for each item range from 0 to 3. The maximum possible total score is 63, and higher scores reflect greater severity of depressive symptomatology and a greater likelihood of a diagnosis for major depressive disorder. If all BDI items are recorded, the BDI total score is calculated as the sum of all questions. The BDI is one of the most widely used instruments measuring depressive symptomatology, and scores from this instrument have been shown to have good reliability and validity (Beck et al., 1996). In this study, the BDI was used to screen for depressive symptomatology – in accordance with the *Diagnostic and Statistical Manual of Mental Disorders* 4th edition (American Psychiatric Association, 2004). The obtained reliability in this study was excellent; Cronbach's alpha was 0.92.

Body mass index

To ascertain BMI, all participants' height (in feet and inches) and weight (in pounds) were self-reported. BMI was then calculated using the following standardized formula: BMI = weight (in kilograms) divided by height squared (in meters) and then categorized as recommended by the Centers for Disease Control and Prevention (2006) in the following way: ''normal weight'' is described as 18.5–24.9 kg/m^2, ''overweight'' is described as 25.0–29.9 kg/m^2, and ''obese'' is described as 30.0 kg/m^2 or greater. The authors used calculated BMI continuous and categorical scores for study analyses so that the findings would be comparable to previous studies that used both approaches.

Data plans

The authors employed the following data analytic procedures to examine the data. First, descriptive data (means and SDs) for all study variables were examined. Second, scatter plots and Pearson product-moment correlation coefficients were used

to determine the strength of the relations between the study variables. Baron and Kenny (1986) state that significant correlations between predictors (in this case, OVR-FUNC), criterion variables (in this case, BMI and DEP-SX), and mediators (in this case, EC, ER, FO, and IP) must exist to test the mediating effects of the subscale variables on the relationship between predictors and criterion variables. The authors used Skowron et al.'s (2004) procedure to test mediation. This procedure uses the four conditions outlined by Baron and Kenny (1986) and Frazier et al. (2004). Finally, as recommended for moderation analyses (Aiken & West, 1991), all independent variables were centered at zero to reduce multicollinearity before they were included in the tested model. Thus, the independent variables – all continuous – were standardized (mean = 0, SD = 1). All analyses were conducted with Statistical Package for the Social Sciences software (version 15.0).

Results

Descriptive and bivariate results

Table 1 presents the means and SDs for the four DSI subscale scores, the OVR-FUNC, DEP-SX, and BMI, as well as intercorrelations between the study variables. Significant bivariate relations existed between all of the study variables except between BMI and IP and between BMI and EC. Although there are no clinical cutoff scores for the DSI subscale scores, the four mean scores, which range from 3.28 to 4.66, are consistent with other college and nonclinical sample subscale scores (Hooper et al., 2008; Skowron, 2004). The mean BMI score for the study sample approaches overweight as defined by the Centers for Disease Control and Prevention. Finally, the SF-36 scores (OVR-FUNC) and the BDI scores (DEP-SX) show high functioning and low levels of depressive symptomatology, respectively.

Table 1. Descriptive statistics for variables and bivariate correlations between study variables.

Variables	1	2	3	4	5	6	7
1. ER (DSI)	–						
2. IP (DSI)	0.31**	–					
3. EC (DSI)	0.32**	0.25**	–				
4. FO (DSI)	0.65**	0.19**	0.16**	–			
5. SF-36 (OVR-FUNC)	0.37**	0.42**	0.33**	0.15**	–		
6. BDI (DEP-SX)	−0.41**	−0.39**	−0.42**	−0.23**	−0.62**	–	
7. BMI	0.08*	0.02	−0.03	0.16**	−0.06	0.03	–
Mean	3.61	4.11	4.66	3.28	77.27	8.51	24.11
SD	0.95	0.79	0.85	0.73	24.21	8.51	5.08
Alpha	0.85	0.71	0.85	0.70	0.74	0.92	–

Notes: Predictor and mediator variables: I position (IP); emotional cutoff (EC); fused with others (FO); emotional reactivity (ER) measured by the Differentiation of Self Scale (DSI); and general health (OVR-FUNC).
Criterion variables: depressive symptomatology measured by the Beck depression inventory (DEP-SX) and body mass index (BMI) measured by the Center for Diseases Control and Prevention Guidelines.
*$p < 0.05$; **$p < 0.001$.

Hypotheses 1 and 2: Tests for mediation

Overall functioning, differentiation of self, and depressive symptomatology

To test Hypothesis 1 – that differentiation of self (EC, ER, FO, and IP) would mediate the relationship between OVR-FUNC and DEP-SX among American college students – three regression models were fit to the data to satisfy the conditions necessary for mediation put forward by Baron and Kenny (1986). First, a univariate regression of DEP-SX onto OVR-FUNC showed a significant relationship between OVR-FUNC and DEP-SX ($t(813) = \text{i}22.42$, $p < 0.0001$, $R^2 = 0.38$). Lower scores of OVR-FUNC were associated with higher scores of DEP-SX.

Second, in a test of paths B1 to B4 in Figure 1(a), a multivariate multiple regression on a single predictor (OVR-FUNC) and jointly on four (DSI subscale scores ER, IP, EC, and FO) showed significant relationships between all multivariate statistics (e.g., Wilks' lambda = 72), $F(4, 813) = 79.67$, $p < 0.0001$). Results indicated that OVR-FUNC predicted a significant amount of the variance in the collective mediators. As given in Table 2, in follow-up regression models of the DSI subscales, tests revealed that OVR-FUNC significantly predicted ER, IP, EC, and FO separately: ER, $t(810) = 11.51$, $p < 0.0001$; IP, $t(810) = 13.04$, $p < 0.0001$; EC, $t(810) = 10.20$, $p < 0.0001$; and FO, $t(810) = 4.27$, $p < 0.0001$.

Third, in a combined model, the predictive ability of OVR-FUNC on DEP-SX when adding the mediators was evaluated (Table 2). This larger model accounted for more of the variance in depression scores than that explained by overall functioning alone ($\ddot{F}(4, 809) = 30.9$, $p < 0.0001$, $\ddot{R}^2 = 0.08$), and all of the subscale scores except FO were individually significant in that model. Therefore, Hypothesis 1 was partially supported.

Overall functioning, differentiation of self, and BMI

To test Hypothesis 2 – that EC, ER, FO, and IP would mediate the relationship between SF-36 (OVR-FUNC) and weight status (BMI) among American college

Table 2. Mediation test: regression analysis summary for predictor variables and depression.

Analysis and predictor variable	*B*	SE	R^2	*t*	*F*	Criterion variable
Analysis 1			0.38		502.65**	
OVR-FUNC	−0.371	0.017		−22.42**		DEP-SX
Analysis 2			0.72		79.67**	
OVR-FUNC	0.025	0.002		11.51**		ER
	0.023	0.002		13.04**		IP
	0.020	0.002		10.20**		EC
	0.008	0.002		4.27**		FO
Analysis 3			0.47		142.44**	
OVR-FUNC	−0.278	0.018		−15.28**		DEP-SX
ER	−1.086	0.330		−3.29**		DEP-SX
IP	−1.152	0.310		−3.72**		DEP-SX
EC	−1.915	0.280		−6.84**		DEP-SX
FO	−0.391	0.396		−0.99		DEP-SX

Notes: In the case of multivariate regression in Analysis 2, *t* represents Wilks.
**$p < 0.001$.

Table 3. Mediation test: regression analysis summary for predictor variables and BMI.

Analysis and predictor variable	*B*	SE	R^2	*t*	*F*	Criterion variable
Analysis 1			0.10		4.27*	
OVR-FUNC	−0.026	0.013		−2.07		BMI
Analysis 2			0.72		79.67**	
OVR-FUNC	0.025	0.002		11.49**		ER
	0.023	0.002		13.02**		IP
	0.020	0.002		10.20**		EC
	0.008	0.002		4.23**		FO
Analysis 3			0.04		6.04**	
OVR-FUNC	−0.037	0.015		−2.53*		BMI
ER	0.068	0.268		0.25		BMI
IP	0.177	0.254		0.70		BMI
EC	−0.177	0.226		−0.78		BMI
FO	1.162	0.321		3.62**		BMI

Notes: In the case of multivariate regression in Analysis 2, *t* UHSUHVHQWV: LONV.
$^*p < 0.05$; $^{**}p < 0.001$.

students – three regression models were fit to the data to satisfy the initial conditions necessary for mediation.

First, in a test of Figure 1(a) path, a univariate regression of BMI scores onto OVR-FUNC scores showed a significant relationship ($t(806) = 12.07$, $p = 0.0392$, $R^2 = 0.10$), indicating that lower OVR-FUNC scores were associated with higher BMI scores.

Second, in a test of paths B1 to B4 in Figure 1, a multivariate multiple regression on a single predictor (OVR-FUNC) and jointly on four criteria (DSI subscale scores ER, IP, EC, and FO) showed a significant relationship between all multivariate fit statistics (e.g., Wilks' ODPEGD $F(4, 813) = 79.67$, $p < 0.0001$). Results indicated that the OVR-FUNC score predicted a significant amount of the variance in the collective mediators. As given in Table 3, in follow-up regression models of the DSI subscales, tests revealed that OVR-FUNC significantly predicted ER, IP, EC, and FO separately: ER, $t(810) = 11.49$, $p < 0.0001$; IP, $t(810) = 13.02$, $p < 0.0001$; EC, $t(810) = 10.20$, $p < 0.0001$; and FO, $t(810) = 4.23$, $p < 0.0001$.

Third, in a combined model, the predictive ability of OVR-FUNC on DEP-SX when adding the mediators was evaluated (Table 3). This larger model accounted for more of the variance in DEP-SX than that explained by OVR-FUNC alone (¨) S < 0.0001, ¨$5^2 = 0.08$). However, only one of the subscale scores was individually significant in this model (FO). Therefore, Hypothesis 2 was partially supported.

Hypotheses 3 and 4: Tests for moderation

Overall functioning, differentiation of self, and depressive symptomatology

Hypothesis 3 – that differentiation of self (EC, ER, FO, and IP) moderated the relation between OVR-FUNC and DEP-SX – was tested using a hierarchical multiple regression model. First, DEP-SX scores were regressed on OVR-FUNC

Table 4. Moderation test: regression analysis summary for predictor variables and depression.

Step and predictor variable	*B*	SE	R^2	åR^2	å*F*
Step 1			0.47		142.44**
OVR-FUNC	−0.278	0.018			
ER	−1.086	0.330			
IP	−1.152	0.310			
EC	−1.915	0.280			
FO	−0.391	0.396			
Step 2				0.02	7.21**
VR-FUNC × ER	0.047	0.023			
OVR-FUNC × IP	0.034	0.019			
OVR-FUNC × EC	0.041	0.019			
OVR-FUNC × FO	0.003	0.027			

Note: $^{**}p < 0.001$.

Table 5. Moderation test: regression analysis summary for predictor variables and BMI.

Step and predictor variable	*B*	SE	R^2	åR^2	å*F*
Step 1			0.04		6.04**
OVR-FUNC	−0.037	0.015			
ER	0.068	0.268			
IP	0.177	0.254			
EC	−0.177	0.226			
FO	1.162	0.321			
Step 2				0.00	−0.90
OVR-FUNC × ER	−0.008	0.019			
OVR-FUNC × IP	−0.005	0.016			
OVR-FUNC × EC	−0.021	0.016			
OVR-FUNC × FO	0.026	0.022			

Note: $^{**}p < 0.001$.

scores and differentiation of self subscale scores (EC, ER, FO, and IP), as given in Table 4. Next, the four interaction terms created between the predictor (OVR-FUNC) and the four DSI subscales were regressed on the residuals from the first model. As given in Table 4, the first portion showed significant main effects ($F = 142.44$, $p = 0.0004$, $R^2 = 0.47$), and the inclusion of the interaction terms significantly improved the model ($\ddot{}R^2 = 0.02$, $\ddot{}F = 0.7.21$, $p = < 0.0001$). Thus, Hypothesis 3 (moderation) was supported.

Overall functioning, differentiation of self, and BMI

Hypothesis 4 – that differentiation of self (EC, ER, FO, and IP) moderated the relation between OVR-FUNC and BMI – was tested using a hierarchical multiple regression model. First, BMI scores were regressed on OVR-FUNC scores and differentiation of self subscale scores (EC, ER, FO, and IP), as given in Table 5. Next, the four interaction terms created between the predictor (OVR-FUNC) and

the four DSI subscales were regressed on the residuals from the first model. As presented in Table 5, while the first portion showed significant main effects ($F = 6.04$, $p = 0.0004$, $R^2 = 0.04$), the inclusion of the interaction terms did not significantly improve the model ($\ddot{R}^2 = 0.00$, $\ddot{F} = 0.090$, $p = \text{ns}$). Therefore, Hypothesis 4 (moderation) was not supported.

Discussion

The purpose of this study was to examine the extent to which differentiation of self mediates or moderates the relation between OVR-FUNC and psychological and physical health outcomes in an American college student sample. The authors found at least partial support for three of the four hypotheses tested. In general, these results accord closely with theory-informed assertions given by Bowen (1978), Kerr and Bowen (1988) and Papero (1990) that higher levels of differentiation of self are associated with higher levels of OVR-FUNC. In this study, DSI subscale scores were associated with DEP-SX scores and BMI scores.

With regard to tests of mediation, DSI scores partially mediated the relation between OVR-FUNC and DEP-SX. Specifically, when the mediator (ER, EC, IP, and FO) was added to the model, the variance explained beyond OVR-FUNC was statistically significant. With regard to tests of moderation, the interaction between DSI scores and OVR-FUNC was significant in predicting psychological health. The interaction accounted for 7% of the variance in DEP-SX, and three of the four subscale scores (EC, ER, and IP) accounted for unique variance in DEP-SX. These findings suggest that differentiation of self may serve as a buffer of psychological distress for American college students.

Unique to this study was the consideration of physical health in addition to psychological health. Other research has tested the mediating and moderating effects of differentiation of self on psychological health, but few studies have considered the mediating and moderating effects of differentiation of self on physical health (Miller et al., 2004). The authors found support for mediation, but not for moderation. The mediation model revealed that DSI accounted for a small percentage of the variance in the outcome variable BMI, and the only DSI subscale that accounted for unique variance was FO. We found no support for the hypothesized moderation model, although this nonsignificant finding is consistent with the findings of Skowron et al. (2004) in a sample of American college students. Because few studies have examined the link between differentiation of self and medical conditions, the preliminary nature of these findings should be noted.

Limitations of the study

Limitations of the study should be considered to help extend and inform future research on American college student health. One limitation was that the outcome variables, BMI and DEP-SX, were self-reported. Future studies should aim to include more objective measures (e.g., clinical diagnostic interviews and direct measurement of weight and height) to capture BMI and DEP-SX. Another limitation is that the generalizability of the results is restricted by the study's convenience volunteer sample. Future researchers would benefit from using other samples that are more culturally diverse in terms of gender, age, race, and geographical region (Miller et al., 2004).

Conclusion

This study's results contribute to the literature on and theory testing of Bowen's concept of differentiation of self (Bowen, 1978). The results suggest that a focus on differentiation of self may be helpful in elucidating possible targets of prevention and intervention efforts related to psychological and physical health outcomes of American college students. Consistent with the literature base, the authors found strong support for the hypotheses examining models of association for differentiation of self and psychological health; the results of this study support both mediation and moderation models. However, the authors found less support for the models examining the relation between differentiation of self and physical health. Clearly, the associations and models explored in this study ought to be considered preliminary, and more studies are needed to fully understand and make meaning of this study's nonsignificant and significant findings.

Causality cannot be established in this study due to the lack of experimental design; nonetheless, the findings suggest that differentiation of self may afford American college students – and the college counselors and healthcare providers with whom they work – a viable means of coping with stress and anxiety (Bohlander, 1995; Gushue & Constantine, 2003; Murray et al., 2006). Given the prevalence rates of these two significant public health issues, the authors believe that ascertaining predictors of DEP-SX and increased BMI among college populations will continue to be an important area of study.

Notes on contributors

Lisa M. Hooper, PhD, is an associate professor in the Department of Educational Studies in Psychology, Research Methodology, and Counseling. She is a mental health therapist and researcher who has both clinical and research experience with underrepresented and underserved racially and ethnically diverse populations. She has studied the long-term aftereffects of family trauma and adversity in a range of populations.

Kirsten Doehler, PhD, is an assistant professor of statistics in the Department of Mathematics and Statistics at Elon University. She has been involved as a statistician in various consulting projects and also does research in biostatistics, nonparametric statistics, and statistics education.

References

Aiken, I., & West, S.G. (1991). *Multiple regression testing and interpreting interactions*. Newbury Park, CA: Sage.

American Psychiatric Association. (2004). *Diagnostic and statistical manual on mental disorders* (4th ed.). Washington, DC: APA.

Baron, R.M., & Kenny, D.A. (1986). Moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality & Social Psychology, 51*, 1173–1182.

Beck, A.T., Steer, R.A., & Brown, G.K. (1996). *Beck depression inventory manual* (2nd ed.). San Antonio, TX: Psychological Corporation.

Bohlander, J. (1995). Differentiation of self: An examination of the concept. *Issues in Mental Health Nursing, 16*, 165–184.

Bowen, M. (1978). *Family therapy in clinical practice*. New York: Jason Aronson.

Centers for Disease Control and Prevention. (2006). *Obesity still a major problem*. Retrieved from http://www.cdc.gov/nchs/pressroom/06facts/obesity03_04.htm

Chung, H., & Gale, J. (2006). Comparing self-differentiation and psychological well-being between Korean and European American students. *Contemporary Family Therapy, 28*, 367–381.

Diehl, M., Hastings, C.T., & Stanton, J.M. (2001). Self-concept differentiation across the adult life span. *Psychology and Aging, 16*, 643–654.

Frazier, P., Tix, A.P., & Barron, K.E. (2004). Testing moderator and mediator effects in counseling psychology research. *Journal of Counseling Psychology, 51*, 115–134.

Gushue, G.V., & Constantine, M.G. (2003). Examining individualism, collectivism, and self-differentiation in African American college women. *Journal of Mental Health Counseling, 23*, 1–15.

Heath, N.L., & Brown, A.E. (1999). Self-concept differentiation and depressive symptomatology in children. *International Journal of Psychology, 34*, 95–105.

Hooper, L.M., Marotta, S.A., & Lanthier, R.P. (2008). Predictors of growth and distress following parentification among college students. *The Journal of Child and Family Studies, 17*, 693–705.

Jenkins, S.M., Buboltz, W.C., Schwarts, J.P., & Johnson, P. (2005). Differentiation of self and psychosocial development. *Contemporary Family Therapy, 27*, 251–261.

Kerr, M.E., & Bowen, M. (1988). *Family evaluation*. New York: W.W. Norton.

Kessler, R.C., Demler, O., Frank, R.G., Olfson, M., Pincus, H.A., Walters, E.E., & Zaslavsky, A.M. (2005). Prevalence and treatment of mental disorders, 1990 to 2003. *New England Journal of Medicine, 352*, 2515–2523.

Lehman, A.F., Azrin, S.T., & Goldberg, R.W. (2000). General health status, functioning, and disabilities measures. In *Handbook of psychiatric measures* (Vol. 117–134). Washington, DC: American Psychiatric Association.

MacKinnon, D.P., & Dwyer, J.H. (1993). Estimated mediating effects in prevention studies. *Evaluation Review, 17*, 144–158.

Miller, R.B., Anderson, S., & Keala, D.K. (2004). Is Bowen theory valid? A review of basic research. *Journal of Marital and Family Therapy, 30*, 453–466.

Murray, T.L., Daniels, M.H., & Murray, C.E. (2006). Differentiation of self, perceived stress, and symptom severity among patients with Fibromyalgia Syndrome. *Families, Symptoms, & Health, 24*, 147–159.

Nunnally, J.C., & Bernstein, I.H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw Hill.

Papero, D.V. (1990). *Bowen family systems theory*. Boston, MA: Allyn & Bacon.

Skowron, E.A. (2004). Differentiation of self, personal adjustment, problem solving, and ethnic group belonging among persons of color. *Journal of Counseling and Development, 82*, 447–456.

Skowron, E.A., & Friedlander, M.L. (1998). The differentiation of self inventory: Development and initial validation. *Journal of Counseling Psychology, 45*, 235–246.

Skowron, E.A., & Schmitt, T.A. (2003). Assessing interpersonal fusion: Reliability and validity of a new DSI fusion with others scale. *Journal of Marital and Family Therapy, 29*, 209–222.

Skowron, E.A., Stanley, K.L., & Shapiro, M.D. (2009). A longitudinal perspective on differentiation of self, interpersonal, and psychological well-being in young adults. *Contemporary Family Therapy, 31*, 3–18.

Skowron, E.A., Wester, S.R., & Azen, R. (2004). Differentiation of self mediates college stress and adjustment. *Journal of Counseling and Development, 82*, 69–78.

Tsaousis, I., Kikolaou, I., Serdaris, N., & Judge, T.A. (2007). Do the core self-evaluations moderate the relationship between subjective well-being and physical and psychological health? *Personality and Individual Differences, 42*, 1441–1452.

Witkin, H.A., Goodenoug, D.R., & Oltman, P.K. (1979). Psychological differentiation: Current study. *Journal of Personality and Social Psychology, 37*, 1127–1145.