

# Anxiety, Depression and Hopelessness in Adolescents: A Structural Equation Model

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## Abstract

**Objective:** This study tested a structural model, examining the relationship between a latent variable termed demoralization and measured variables (anxiety, depression and hopelessness) in a community sample of Canadian youth. **Methods:** The combined sample consisted of data collected from four independent studies from 2001 to 2005. Nine hundred and seventy one (n=971) participants were high school students (grades 10-12) from three geographic locations: Calgary, Saskatchewan and Lethbridge. Participants completed the Beck Anxiety Inventory (BAI), Beck Depression Inventory-Revised (BDI-II), Beck Hopelessness Scale (BHS), and demographic survey. Structural equation modeling was used for statistical analysis. **Results:** The analysis revealed that the final model, including depression, anxiety and hopelessness and one latent variable demoralization, fit the data (chi-square value,  $\chi^2(2) = 7.25$ ,  $p < .001$ , goodness of fit indices (CFI=0.99, NFI=0.98) and standardized error (0.05). Overall, the findings suggest that close relationships exist among depression, anxiety, hopelessness and demoralization that is stable across demographic variables. Further, the model explains the relationship between sub-clinical anxiety, depression and hopelessness. **Conclusion:** These findings contribute to a theoretical framework, which has implications for educational and clinical intervention. The present findings will help guide further preventative research on examining demoralization as a precursor to sub-clinical anxiety and depression.

**Key words:** adolescents, sub-clinical, anxiety, depression, demoralization

## Résumé

**Objectif:** Tester un modèle d'équation structurelle illustrant la relation entre une variable latente (la démoralisation), et des variables mesurées (l'anxiété, la dépression et le désespoir) dans un échantillon de jeunes Canadiens. **Méthodologie:** L'échantillon combiné consistait en données recueillies dans quatre études indépendantes effectuées entre 2001 et 2005. Les neuf cent soixante et onze (n=971) étudiants du secondaire (de 10<sup>e</sup>, 11<sup>e</sup> et 12<sup>e</sup> années) qui ont participé à l'étude venaient de Calgary, de Saskatchewan et de Lethbridge. Les sujets ont rempli l'Inventaire d'anxiété de Beck (*Beck Anxiety Inventory - BAI*), l'Inventaire de dépression de Beck révisé (*Depression Inventory-Revised - BDI-II*), l'Échelle de désespoir de Beck (*Beck Hopelessness Scale - BHS*), et un questionnaire sur les renseignements personnels. L'analyse statistique a été effectuée par modélisation de l'équation structurelle. **Résultats:** Le modèle final, qui inclut la dépression, l'anxiété, le désespoir et une variable latente, la démoralisation, s'accorde avec les données (chi carré  $\chi^2(2) = 7,25$ ,  $p < .001$ , indices de concordance CFI=0,99 et NFI=0,98) et l'erreur standardisée (0,05). Dans l'ensemble, les résultats montrent qu'il existe un lien étroit entre la dépression, l'anxiété, le désespoir et la démoralisation, qui est stable quel que soit l'âge du sujet. En outre, le modèle explique la relation entre l'anxiété, le désespoir et la dépression sous-clinique. **Conclusion:** Ces résultats permettent d'établir un cadre théorique qui a des implications sur l'intervention scolaire et clinique. Ils permettront d'orienter la recherche vers la prévention en considérant la démoralisation comme un signe annonciateur de l'anxiété et de la dépression sous-cliniques.

**Mots clés:** adolescents, sous-clinique, anxiété, dépression, démoralisation

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Anxiety, depression, and hopelessness are often dismissed as developmentally normal components of a teenager's life (Price & Ingram, 2001). This perception may explain the lack of existing research on sub-clinical emotional difficulties in adolescence. For example, if an adolescent reports four out of five targeted symptoms they would not be diagnosed with clinical anxiety or depression. Rather, they may represent an intermediate anxiety or depressed mood state in which symptoms are present but do not meet clinical criteria. Therefore, a conceptualization of sub-clinical maladjustment and psychopathology is also

necessary to understand the difference between natural emotional variation in adolescents and the role of sub-clinical symptoms in the etiology of clinical anxiety and depression (Price & Ingram, 2001).

Anxiety disorders are among the most prevalent diagnoses within the United States and they are the most common type of mental disorder found in adolescents (Kashani & Orvaschel, 1988). Prevalence rates for anxiety in a community sample of adolescents vary considerably. Depending on the specifics of methods, stringency of diagnostic criteria, and other particularities of a study, clinical anxiety

disorders have been estimated to occur in 5.7% to 28.8% of community adolescents (Costello & Angold, 1995; Essau, Conradt & Petermann, 2000; Kashani & Orvascal, 1988; Lewinsohn et al. 1993; Verhulst, van der Ende, Ferninand & Kasius, 1997; Woodward & Fergusson, 2001).

Similar to anxiety disorders, lifetime prevalence rates for Major Depressive Disorder have been estimated to range between 15 to 22%, while point prevalence rates range from 0.4 to 8.3% (Birmaher et al., 1996). In a Canadian sample, 6.3% of a sample of adolescents and young adults (age 14 to 24) met the criteria for MDD (Statistics Canada, 2002). Prevalence rates of self-reported depression in adolescents as measured by the Beck Depression Inventory have ranged from 22% to 33% (Roberts, Andrews, Lewinsohn & Hops, 1990).

Recent evidence supports a temporal relationship between anxiety and depression in clinical, community and college settings (Brown, Campbell, et al., 2001; Cole, Peeke, Martin, Truglio & Seroczynski, 1998; Wetherell, Gatz & Pederson, 2001). Anxiety disorders appear to precede the onset of depression by approximately two years. This temporal relationship suggests that anxiety disorders predispose adolescents to development of depression (Regier, Rae, Narrow, Kaelber & Schatzberg, 1998; Goodwin, 2002; Wittchen, 2003; Ferninand, Nijs, van Lier, Verhulst, 2005).

Aside from the observation that anxiety is a risk factor for depression, there is no explanation of the specific reasons why correlations between anxiety and depression are so high. Perhaps these two disorders share similar etiologic origins including several overlapping mechanisms (Mineka, Pury & Luten, 1995; Marien & Bell, 2004). Further exploration is needed to identify and understand the relationship between anxiety and depression to clarify etiological concerns (Brozina, 2007; Brozina & Abela, 2006).

Understanding the association between sub-clinical anxiety and depression in adolescents is important for several reasons. First, to confirm whether or not associations between anxiety and depression are present in sub-clinical populations. Second, to provide information about sub-clinical populations that may help formulate and evaluate prevention strate-

gies (Brozina & Abela, 2006).

Demoralization is a phenomenological term coined by Jerome Frank (1974) in an attempt to capture the essence of an individual's inability to cope and the relationship between feelings of helplessness, hopelessness, meaninglessness, incompetence and low self-esteem. Frank (1974) saw demoralization as a non-specific emotional distress that was not linked to any one disorder. In recent years, researchers have examined demoralization and demonstrated this concept is not simply a non-specific emotion. In a narrative review, Clarke and Kissane (2002) examined demoralization and related concepts, drawing on a range of empirically-based literature. One finding is that the phenomenon of demoralization may play an important role in its relationship to specific disorders (Clarke & Kissane, 2002).

The phenomenon of demoralization has been largely applied to clinical populations to explain a developmental spectrum of psychopathology. Frank (1974) observed both anxiety and depressive symptomology as direct expressions of demoralization. Research demonstrates that if an individual endures internal or external stressors that are perceived as severe, then anxiety levels increase (Clarke & Kissane, 2002). When anxiety levels increase, an individual may feel the situation is uncontrollable, leading to helplessness. If the feeling of helplessness is not attended to, then hopelessness and the inability to cope will develop (Clarke & Kissane, 2002).

Clarke and Kissane (2002) demonstrated the prevalence of the demoralized individual within psychiatric and medical populations. In addition, clarification was provided to define the difference between the constructs of demoralization and depression. Although the two share symptoms, Clarke and Kissane (2002) state that demoralization is characterized by incompetence and depression by anhedonia (the inability to feel pleasure). Interestingly, as with depression, the narrative review reported hopelessness (including suicidal ideation) as the hallmark of demoralization.

The model of demoralization posits a temporal relationship between anxiety, depression and hopelessness where demoralization is the outcome of depression and hopelessness that has not been treated (Clarke & Kissane, 2002).

Conversely, Rickelman (2002) suggest that demoralization may be a precursor to anxiety, substance abuse, depression and suicide. Unfortunately, few studies have examined the construct of demoralization in sub-clinical populations. In addition, literature examining demoralization is sparse and definitive criteria unclear (Rickelman, 2002).

In terms of the present study model, demoralization is a defined latent variable common in anxiety, depression and hopelessness, measured in a normal population of adolescents. The model represents important groundwork from which a prospective examination of vulnerabilities to the later development of clinical anxiety, depression and related disorders can be drawn.

This study will also extend the model from the triple vulnerability theory and model of demoralization by focusing on sub-clinical levels of anxiety, depression and hopelessness. Given the triple vulnerability model and model of demoralization are models that focus on clinical populations, it is important to extend existing models by testing sub-clinical populations.

The specific research questions (RQ) related to this model are as follows: RQ1: Does the proposed model account for the relationship between anxiety, depression, hopelessness and the postulated latent variable demoralization, across age, sex and geographic location? RQ2: Will the proposed model remain stable across sub-clinical levels of anxiety, depression and hopelessness?

## Methods

### Study Population

The combined sample consists of data collected from four independent studies from 2001 to 2005. All studies used identical sampling methods, procedure and measures. Nine hundred and seventy one (n=971) participants were high school students (grades 10-12) from three geographic locations: Calgary, Saskatchewan and Lethbridge. Participants were distinguished in terms of being from urban or rural locations in Western Canada. A summary of the measured variables by sample location is presented in Table 1.

The combined population of each from each study ranged from 4000 to 6000 people. Given the total sample of 971 consisted of approximately 27% response rate of the combined student body population the sampling error in a sample of this size was calculated to be 2.8%.

Students were recruited using school administrators and staff. The project was initially proposed to the head administrators of each school at which time they declared their desire to participate or not. Of all the schools approached only one school declined participation, presumably because of a very small student population in Lethbridge. Once administrators permitted that the study be conducted in their school, recruitment announcements were given to all teachers to be read to each class. Combined parent/guardian/participant consent forms were also given to all teachers, which were distributed to interested students.

**Table 1: Summary of mean scores of depression (BDI-II), anxiety (BAI), and hopelessness (BHS) by sample location**

	Location	N	Mean	Std. Deviation
BDI-II	Calgary	498	14.15	9.96
	Rural Lethbridge	232	12.39	10.39
	Rural Saskatchewan	241	12.01	10.57
	Total	971	12.85	10.31
BAI	Calgary	498	13.58	10.07
	Rural Lethbridge	232	13.35	10.48
	Rural Saskatchewan	241	10.93	10.01
	Total	971	12.62	10.19
BHS	Calgary	498	5.06	4.29
	Rural Lethbridge	232	4.66	3.92
	Rural Saskatchewan	241	4.80	4.21
	Total	971	4.84	4.14

In order to participate, students were required to return the signed consent form to their teacher by the date of the study. Dates for participation in the study were considered to ensure that the winter break and final exams did not interfere with the emotional state of the participants.

Males and females were equally represented in samples developed for the exploratory and confirmatory analyses. Grade was utilized in the study as a proxy to age, with grades 10 ( $n=301$ ), 11 ( $n=296$ ) and 12 ( $n=374$ ) representing ages ranging from 14-15 years, 15-16 years and 17-18 years of age, respectively. Four hundred and sixty three participants (47.68%) came from rural dwellings, with the remainder coming from urban dwellings. All participants attended school in Canada.

### *Instruments*

The test materials consisted of three self-rating questionnaires that have been used with adolescent community samples in other studies: the Beck Anxiety Inventory (BAI; Beck & Steer, 1993a), the Beck Depression Inventory—Revised (BDI-II; Beck, Steer, & Brown, 1996), and the Beck Hopelessness Scale (BHS; Beck & Steer, 1993b). These questionnaires are used as screening instruments and are not used independently to diagnose anxiety or depression. The three scales were thought to be suitable for the present study because they are continuous measures that allow for the quantitative assessment of emotional difficulties. Furthermore, the BAI, BDI-II, and BHS provide four categories of severity scores labeled as “minimal”, “mild”, “moderate”, or “severe”, and these ratings are useful for the estimation of symptom severity and risk in the development of the present model. In addition, given that these instruments are used as screening tools and not for diagnostic purposes, they were appropriate in measuring sub-clinical levels of anxiety, depression and hopelessness. Mild to moderate ranges were used as criteria to identify sub-clinical levels within the current sample population.

### *Statistical Analysis*

The present study utilized quantitative techniques that included descriptive statistics, such as means and standard deviations. In

developing the proposed multivariable model, a description of each study variable was necessary for theoretical formation and conceptualization. Means with 90% confidence intervals and frequencies were used in generating descriptive statistics for continuous and categorical variables respectively.

Structural equation modeling (SEM) is used in this study as an analytical tool to describe the commonality between the three measured variables involved in the current study: anxiety, depression and hopelessness. SEM was selected as the statistical technique for data analysis of this study because it is effective in reducing data and testing models in behavioural and social sciences (Hox & Bechger, 1998). The combination of factor analysis (exploratory and confirmatory), correlation matrices, and graphical path diagrams to depict the model are used and tested in this study. The analytic strength behind structural equation modeling resides in the theoretical underpinnings that explain the relationship between the observed or measured variables and the latent variables (factors).

Maximum-likelihood estimation was utilized using covariance matrices extracted from EQS outputs (Bentler, 1993). The model was analyzed based on its goodness of fit, residual error and chi-square values within each subsample. Goodness of fit is measured on the basis of the Bentler-Bonett normed fit index, Comparative Fit Index and the standardized residual error estimate (Bentler & Bonett, 1980). Fit index values range from zero to one with values greater than .90, standardized residual error equal to or less than 0.05, and a non-significant chi-square, being acceptable fit to the data (Bentler & Bonett, 1980). Confirmatory analysis was then conducted on the remainder of the sample using the same coefficient values as the exploratory analysis.

### **Results**

The sample was comprised of 971 participants, of whom 51.29% were female. Males and females were equally represented in samples developed for the exploratory and confirmatory analyses. As previously stated, grade is utilized in the present study as a proxy for age; specifically, grades 10 ( $n=301$ ), 11 ( $n=296$ ) and 12 ( $n=374$ ). Four hundred and

sixty three participants (47.68%) came from rural dwellings, with the remainder coming from urban dwellings. The correlations found among the measured variables for the entire sample are presented in Table 2.

The first independent sample (n=314), used in the phase I of exploratory factor analysis, revealed one latent factor (eigenvalue=1.54) related to the three measured variables. Analysis of sex, location and grade as main effects or interaction terms revealed that these variables were not associated with the one latent factor that emerged from this analysis. As a result of this finding, the categorical demographic variables were not included in subsequent analyses. Table 3 summarizes the factor loadings and eigenvalues that emerged from phase I, II and III of factor analysis.

Correlations, sample sizes, and standard deviations from each independent sample were employed to construct three parallel structural equation models. Each independent sample and set of results were used to develop, explore and confirm the main hypothesis of this study that a final confirmatory model consisting of one latent variable explained the relationship between measured variables representing depression, anxiety and hopelessness. In build-

ing the equations to run in EQS for model II, the coefficients were fixed using the standardized solution values simulated from Model I analysis in building and modifying the model.

For Model I (see Table 4), the coefficients between anxiety, depression, hopelessness and latent variable ran freely for the analysis. The chi-square value,  $X^2 (2) = 27.14$ ,  $p < .001$ , and the goodness of fit indices (CFI=0.92, NFI=0.91) and residual error at 0.11.

Model II, as shown in Table 5, produced a non-significant chi-square value,  $X^2 (2) = 9.32$ ,  $p < .001$ , with goodness of fit indices (CFI=0.976, NFI=0.970) and lowered standardized error (0.057) indicating that the aforementioned modifications significantly decreased the chi-square value, suggesting that the model's fit was improving. The correlation coefficients then from Model II were used as fixed values in the Model III analysis. The factor and error coefficients for the BAI, BDI and BHS were used in constructing the final confirmatory model in order to assess the residual error and goodness of fit.

**Model III: Confirmatory Factor Analysis Structural Equation Model**

Confirmatory analysis was used to examine Model III (shown in Table 6). This was the final model being tested as a result of modifications resulting from the previous analyses. The coefficients were fixed using the standardized solution values simulated from Model II analysis in building and modifying the model.

The final model produced a non-significant chi-square value,  $X^2 (2) = 7.24$ ,  $p < .001$ , with goodness of fit indices (CFI=0.99, NFI=0.98)

**Table 2. Correlation Matrix of Measured Variables**

N = 971	BAI	BDI	BHS
BAI	1		
BDI	0.66	1	
BHS	0.42	0.58	1

**Table 3. Factor Loadings of all 3 Variables and Eigenvalue of the Latent Factor**

	Phase I	Phase II	Phase III
BAI	0.72	0.61	0.68
BDI	0.81	0.81	0.84
BHS	0.60	0.61	0.68
Factor Eigenvalue	1.54	1.52	1.70

**Table 4. Model I Standardized Solution**

N = 314	Coefficient	Error
BAI	0.76	0.65
BDI	0.81	0.58
BHS	0.70	0.72

**Table 5. Model II Standardized Solution**

N = 338	Coefficient	Error
BAI	0.75	0.66
BDI	0.84	0.54
BHS	0.67	0.74

**Table 6. Model III Standardized Solution**

N = 319	Coefficient	Error
BAI	0.76	0.65
BDI	0.91	0.42
BHS	0.70	0.71

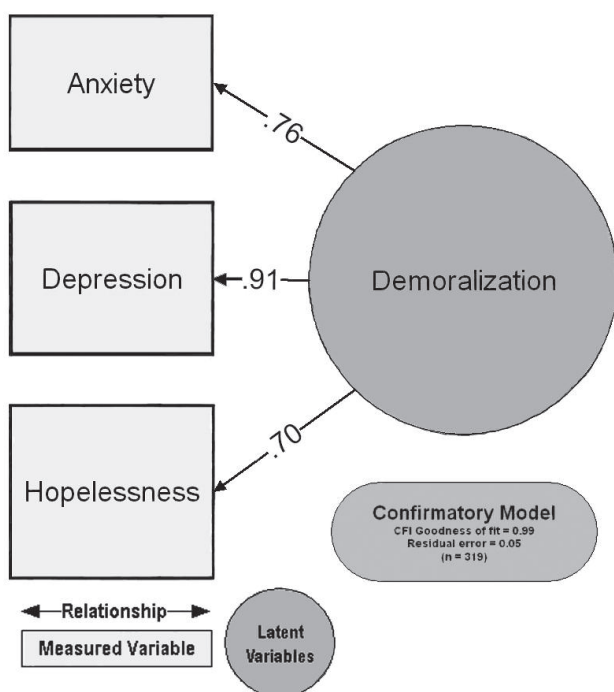
and lowered standardized error (0.05). This indicates that modifications that were made significantly decreased the chi-square value and suggests that the final model was the best fit to the data.

The three standardized solutions emerging from the structural equation models, based on confirmatory factor analysis, revealed one latent variable to explain the relationship between the three measured variables (BAI, BDI and BHS), representing respectively, anxiety, depression and hopelessness. For the purposes of subsequent discussion, the latent variable will be labeled as “demoralization” (Frank, 1974; Clarke & Kissane, 2002).

## Discussion

Previous studies have demonstrated a distinction between anxiety and depression, with many studies focusing on differences (e.g., Lewinsohn et al., 1993). The results of this study provide preliminary evidence to suggest that it is also valuable to focus on the alternative theoretical perspective. Consistent with the recent studies (Bronzina & Abela, 2006) the results of this study indicate that there are coherent statistical commonalities between anxiety and depression that are here labeled “demoralization”.

**Figure 1. Confirmatory structural equation model**



It was important to consider age, sex and location as possible confounds in the relationship between the measured variables and the latent factor. This was examined in the developmental factor analysis. In developing the initial model, the categorical variables were considered in model developmental factor analysis to examine if they contributed to the model in preparation for the subsequent exploratory and confirmatory analyses.

Differences between sex, age, and location in relation to anxiety, depression and hopelessness have been documented in the literature (Cicchetti et al., 1998, Lewinsohn et al., 1993, Lewinsohn et al., 1997a, Peterson, Sarigiani, & Kennedy, 1991, Mazza & Reynolds, 1998, Nolan-Hoeksema, 1990). The differences were considered in this analysis and although small differences were noted, they did not contribute to the final model. While differences between anxiety, depression and hopelessness are generally related to sex, grade, and location (e.g., Lewinsohn, Gotlib, Lewinsohn, Seeley, & Allen, 1998), these variables were excluded from the model because results indicated their inclusion would not improve the model.

The correlation between anxiety and depression (.66) was quite consistent with prior findings (e.g., Dobson, 1985; Price & Ingram, 2001; Barlow, 2000), indicating that the relationship between these constructs is relatively stable across samples, instruments and the statistical techniques used. Given that there is no current explanation for such high correlations between anxiety and depression, our results support the suggestion posed by Mineka, Pury and Luten (1995), that these two disorders share one similar etiologic origin: demoralization.

The findings presented above, in combination with previous research (Barlow, 2000, 2002; Chorpita, 2002, Clarke & Kissane, 2002; Rickelson, 2002; Lewinsohn et al., 2000, Chorpita & Barlow, 1998; Brown et al., 1998; Brozina & Abela, 2006; Ferninand et al., 2005) provide strong support for the hypothesized relationship between sub-clinical anxiety, depression, hopelessness and the latent variable (i.e., demoralization).

These findings contribute to a theoretical framework that has implications for educational and clinical interventions. The present findings

will help guide further preventative research. The theoretical framework, specifying this model, is simple and derived from the basis of the reduction of factors that contribute to a better understanding of the relationship between variables and hypothesized one precursor of anxiety and depression.

Viewing demoralization as a precursor of anxiety and depression brings forward the idea that we can examine which disorder will emerge as a function of development or environmental factors (Rickelson, 2002; Cannon & Weems, 2006). Past research has focused on identifying risk factors rather than fully understanding the development of structures over time (Price & Ingram, 2001; Cicchetti & Toth, 1998; Rickelson, 2002). This study moves beyond identifying isolated risk factors in specific domains (e.g., cognitive) to examining the relationship between constructs.

One of the core differences between demoralization and depression noted in the literature (Clarke & Kissane, 2002) is that demoralization is based on feelings of incompetence while depression is based on "anhedonia". Furthermore, when focusing on preventative programs, attention to focusing on developmental incompetencies (e.g., peer relationships, academic achievement) is likely to benefit a demoralized adolescent and decrease risk of further development of sub-clinical anxiety and depression (Cicchetti & Toth, 1998, Rickelson, 2002).

Based on information from this study, it is now possible to develop strategies to measure the impact of programs on the sensitivity and specificity of early identification instruments. In addition, psycho-education is needed within the community and education system to increase awareness of the effects of not treating sub-clinical symptoms of anxiety and depression; identifying precursor and risk factors; and educating others regarding appropriate resources available. In addition, screening mechanisms need to be put in place in the school system to detect demoralization.

Further research is needed in examining the psychometric properties in measuring highly comorbid constructs. In addition, identifying specific measures of demoralization to screen for anxiety, depression and hopelessness would be beneficial. Future research

could focus more precisely on examining the strength of the observed relations between the particular variables and factors described in this study. Research should be conducted to examine possible causal relationships between the measured and latent variables using more specific methods and measures. Finally, as noted earlier, structural research of longitudinal data would be of considerable value in verification of demoralization as a common etiologic factor exerting strong influence on the pathogenesis, course, and treatment of anxiety, depression and hopelessness.

Caution should be taken when interpreting some results from the present study. First, there are necessary limitations to a cross-sectional, brief quantitative pen-paper survey that each study utilized to collect data. There is no evidence from previous studies that indicates causation. Rather, the data suggests that at this point, when the battery was completed, anxiety and depression were observed. Using longitudinal methodology would help in further understanding developmental implications.

Finally, this data set did not include inventory items. Having all the items within this data set may have identified a more refined and precisely described latent variable as a function of the sub-clinical sample study. Item analysis would also identify more precisely the contents required to ameliorate sub-clinical symptoms related to demoralization in prevention and promotion programs.

Although feelings of anxiety, depression, and hopelessness are prevalent in high school students, not much is known yet about the etiological origin of internalizing disorders in this population. There is a particular lack of research on demoralization as a precursor to sub-clinical anxiety and depression. More research is needed in the area to continue to explore the overlapping etiology and development of anxiety and depression (Cannon & Weems, 2006).

#### **Acknowledgements/Conflict of Interest**

The authors have no financial relationships to disclose.

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