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THE CONFUSING PROBLEM OF OVERLAPPING INTERNALIZING AND EXTERNALIZING DIMENSIONS: WHAT SHOULD WE DO?

A thesis submitted in partial fulfillment
of the requirements for the degree of

MASTER OF ARTS

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at

ST. JOHN'S UNIVERSITY
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by

Aubrey Faber

Date Submitted: _____ Date Approved: _____

_____ _____

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ABSTRACT

THE CONFUSING PROBLEM OF OVERLAPPING INTERNALIZING AND EXTERNALIZING DIMENSIONS: WHAT SHOULD WE DO?

Aubrey Faber

The structure of psychopathology contributes to understanding the etiology and treatment of mental health disorders. Comorbidity is common, and the high correlation between dimensions may limit the research findings associated with a single dimension. The purpose of this study was to (1) evaluate different models of internalizing and externalizing in child psychopathology and (2) evaluate the relationships between other variables and dimensions of internalizing and externalizing across models that did and did not account for the correlation between dimensions. The first hypothesis was that a bifactor model, including a general psychopathology (P) factor and internalizing and externalizing factors, would provide the best model fit. The second hypothesis was that the relationships between variables and dimensions would differ across analyses. Baseline data from the parents of 294 clients ages 3 to 17 at a university associated community-based training clinic were used to test these hypotheses. The Youth Outcomes Questionnaire (Y-OQ) was used to indicate latent internalizing, externalizing, and general psychopathology (P) factors and Confirmatory Factor Analysis was used to evaluate a one-factor model, two-factor correlated model, and bifactor model. Age and gender variables from a demographic questionnaire and four scales (i.e., parenting efficacy, child difficulty, parenting consistency, and parental involvement in treatment)

from the clinic's Bimonthly Longitudinal Youth Questionnaire (BIL-Y) were used to test the second hypothesis.

The first hypothesis was supported, as the bifactor model provided the best fit; however, the internalizing items loaded more on the P factor than the internalizing dimension. The comparison of relationships between variables and internalizing and externalizing across regressions, a correlated two-factor model, and the bifactor model indicated that findings do differ across methods for all variables except parental involvement in treatment. These findings indicate that the interpretations one makes about variables and their relationship with internalizing and externalizing are dependent on if and how the correlation between internalizing and externalizing is addressed in the analysis. In conclusion, researchers must account for the correlation between internalizing and externalizing when studying the predictors and treatment of one dimension with either a bifactor model or a regression model that covaries for the other dimension.

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Introduction

The structure of psychopathology has been widely studied in children and adolescents for decades. There are innumerable articles attempting to understand the etiology and treatment of different DSM diagnoses. If the medical model provided a perfect fit for psychopathology, one set of symptoms should explain one diagnosis and when another disorder co-occurs, it should have its own valid symptomology and treatment (Angold, Costello, & Erkanli, 1999). Comorbidity is not only a common experience, but a correlational phenomenon as the experience of one disorder makes it significantly more likely that someone will experience another (Krueger & Markon, 2006). This dilemma indicates that a categorical classification system may not be appropriate. To address this, many researchers have moved towards a dimensional approach to understanding psychopathology. Externalizing and internalizing dimensions were established that account for the co-occurrence between disorders within broader dimensions (Cosgrove et al., 2011; Kim & Eaton, 2015).

Two of the most well researched dimensions of psychopathology are internalizing and externalizing psychopathology. Childhood internalizing and externalizing disorders have been associated with a developmental cascade of future psychopathological problems (Fanti & Henrich, 2010; Masten & Cicchetti, 2010). Research has focused on comparing the two dimensions as well as investigating the etiology of each dimension and developing transdiagnostic treatments. If comorbidity only commonly existed between diagnoses that fell within one dimension (e.g., internalizing or externalizing), the dimensional approach would allow for researchers to study the different dimensions independently. However, even within these broader constructs, comorbidity between

dimensions is common. Angold et al. (1999) found that the odds ratio for the comorbidity of two disorders from externalizing and internalizing dimensions ranged from 3 to 10.7. The correlation between internalizing and externalizing symptomology in adolescents in the United States is approximately .40 (Merikangas et al., 2010). Due to the high correlation, findings about the relationship between different factors and a single dimension cannot truly be attributed to that dimension unless the researchers have accounted for the correlation between internalizing and externalizing disorders. The first purpose of this research was to evaluate a variety structural models of a measure of internalizing and externalizing symptoms in data gathered from the parents of children at a mental health training clinic. The second was to study how the relationships between factors differ based on whether the correlation between internalizing and externalizing is accounted for in the model.

Addressing Comorbidity and Co-occurrence

There are many potential explanations for comorbidity between internalizing and externalizing. One potential explanation is methodology, suggesting that comorbidity is due to the overlap in diagnostic criteria or a statistical phenomenon such as a suppressor effect (Beyers & Loeber, 2003; Lilienfeld, 2003; Youngstrom et al., 2003). Some research suggest that there may be a causal relationship between internalizing and externalizing disorders (Beyers & Loeber, 2003; Frick, Lilienfeld, Ellis, Loney, & Silverthorn,1999; Keiley et al., 2003; Lilienfeld, 2003) or a hierarchical factor that causes both internalizing and externalizing (Keiley et al., 2003; Lilienfeld, 2003; Weiss, Susser, & Catron, 1998). To address this, different methods have been used to try and isolate

internalizing and externalizing; however, there does not appear to be a clear "best practice" approach to address this issue in research.

One option is to investigate populations that experience one versus multiple disorders. Fanti and Henrich (2010) examined predictors of pure versus co-occurring internalizing and externalizing disorders in children by comparing children who presented with either pure or co-occurring disorders. The researchers found consistent patterns of risky behaviors, peer rejection, and association with deviant peers for those experiencing externalizing and co-occurring internalizing and externalizing. All three groups were associated with asocial behavior in early adolescence. This method allowed for an increased understanding of co-occurring disorders, but it did not disentangle the correlation between internalizing and externalizing. Statistical models can be used to provide insight into the correlation between internalizing and externalizing disorders. Oldehinkel, Hartman, De Winter, Veenstra, and Ormel (2004) isolated externalizing only, internalizing only, and comorbid cases to study the relationship between pre-adolescent psychopathology and temperament. Based on a large sample of 2,230 pre-adolescents the investigators were able to establish temperament profiles associated with internalizing and externalizing disorders as well as children with no disorders or comorbid disorders. As pure internalizing or externalizing are rare, this approach requires a very large sample which is not always feasible leading researchers to statistical methods to isolate pure internalizing and externalizing.

Regression Models

Regression models can be used to isolate externalizing and internalizing by covarying for the other dimension and thereby partialling out the overlapping variance.

This strategy ensures that the findings associated with one dimension are not due to the correlation between dimensions.

For example, Ormel et al. (2005) studied the relationship between internalizing/externalizing dimensions and parental psychopathology and preadolescent temperament. Their analyses partialed out the shared variance between the dimensions to draw conclusions about the relationships to internalizing versus externalizing. Parental psychopathology was predictive of externalizing, but not internalizing. Frustration was a general risk factor for overall maladjustment, but the researchers also identified dimension specific factors such as shyness, high-intensity pleasure, and affiliation. Although this strategy allowed for inferences about externalizing and internalizing, it does not explain the comorbidity that exists between the two dimensions or provide much information about the structure of psychopathology.

Structural Equation Modeling

Comorbidity can be modeled as bivariate (including only two disorders) and multivariate (including more than two disorders) models (Krueger & Markon, 2006). Multivariate models are more comprehensive and align with a dimensional approach to psychopathology. They have been used to assess comorbidity of more than just two disorders. Structural equation modeling allows for multivariate models with measures of specific disorders or symptom level data to create latent variables that can be used to create different models such as hierarchical models and bifactor models.

Hierarchical models may be used to elucidate the sources of comorbidity between disorders and identify the factors that help to discriminate between disorders. Lilienfeld (2003) suggested that hierarchical models allow those who want to explain comorbidity

by grouping disorders together and those who want to break psychopathology into smaller disorders to coexist. Much of this literature has settled on hierarchical models with latent internalizing, externalizing, and antisocial dimensions (Krueger & Markon, 2006). Although a higher-order model helps to explain comorbidity between disorders that fall within the same dimension, it does not shed light on the comorbidity that occurs between different dimensions. In children and adolescents, research typically focuses on only internalizing and externalizing dimensions. When considering a two-dimensional model, a hierarchical model with a general factor above internalizing and externalizing cannot be statistically estimated or evaluated. The closest equivalent possible is a correlated two-factor model.

The bifactor model is an alternative structural model to address these issues by removing the comorbidity between internalizing and externalizing by including a third general psychopathology factor (P) that accounts for the comorbidity between the two dimensions. The bifactor model is used to try and clarify the conceptualization and classification of mental disorders (Kim & Eaton, 2015). The bifactor proposes that P accounts for the correlation between internalizing and externalizing dimensions. The P factor theoretically consists of nonspecific causal factors that lead to an elevated risk for every dimension of psychopathology (Lahey et al., 2018). By removing the general risk from the internalizing and externalizing dimensions, research can better identify specific and non-specific etiologies of psychopathology (Bonifay, Lane, & Reise, 2017).

In a study of 2,934 children and adolescents seeking treatment who were administered the Achenbach measures (i.e. Child Behavior Checklist and Youth Self-Report), the bifactor model provided the best fit compared to any models without the P

factor (Haltigan et al., 2018). Afzali, Sunderland, Carragher, and Conrod (2017) fit the bifactor model to a sample of 12-year-old adolescents and found that it provided better fit than models without P. The bifactor model has also been fit with the BASC-2 teacher report (Wiesner & Schanding, 2013) and The Preschool Age Psychiatric Assessment (Olino, Dougherty, Bufferd, Carlson, & Klein, 2014).

Some researchers have been critical of the bifactor model and argued that P may be a statistical artifact and thus uninterpretable, but the existence of the P factor was supported in both general and clinical populations of adults, adolescents, and children (Snyder, Young, & Hankin, 2017). Many studies have supported P as a psychological construct across many criteria including criterion and predictive validity, temporal stability (Greene & Eaton, 2017), heritability, environment, transdiagnostic distress, personality, prediction of future risk of emotional problems, behavioral problems, academic performance, suicide attempts, hospitalization, time spent on welfare, and criminal convictions for violent crime (Caspi et al., 2014; Patalay et al., 2015). Although much of the recent work on the bifactor model has supported P, findings regarding the specific pathways associated with P have not been widely replicated (Hyland et al., 2018; Snyder, Young, & Hankin, 2017).

Predictors of Internalizing and Externalizing in Children and Adolescents

Age

Early onset disorders are often externalizing disorders, whereas adolescent onset disorders are often internalizing disorders (Zahn-Waxler, Shirtcliff, & Marceau, 2008). Over the general course of development, externalizing behaviors tend to decrease, and internalizing symptoms tend to increase as children age (Achenbach, Howell, Quay, &

Conners, 1991; Bongers, Koot, Van der Ende, & Verhulst, 2003; Fanti & Henrich, 2010; Gillom & Shaw, 2004). The relationship between internalizing disorders and age was found to be curvilinear overtime (Bongers, Koot, Van der Ende, & Verhulst, 2003). The research on age and psychopathology is well-established, but as the field grows and changes these findings should be replicated and confirmed with methods that account for comorbidity.

Gender

Gender differences across dimensions and diagnoses have been found by researchers for decades. Research has shown that girls experience more internalizing problems than boys and boys experience more externalizing problems than their female counterparts (Afzali et al., 2017; Bongers, Koot, Van der Ende, & Verhulst, 2003; Zahn-Waxler, Shirtcliff, & Marceau, 2008). For example, boys are three to seven times more likely to meet diagnostic criteria for ADHD (Hudziak, Achenbach, Althoff, & Pine, 2007; Kessler et al., 2006). Gender is another construct, similar to age, that has been widely studied and warrants further investigation.

Parenting

Researchers have been investigating the relationship between different parenting styles, practices, and behaviors for decades. However, many researchers focus on one domain of psychopathology, either externalizing or internalizing. This either-or approach to studying psychopathology ignores the co-occurrence of internalizing and externalizing disorders, which leaves us with gaps in our knowledge.

Many researchers have found that positive parenting during infancy and early childhood was predictive of lower rates of externalizing behaviors later in childhood

(Boeldt et al., 2012; Chronis et al., 2007). Pinquart (2017) conducted a meta-analysis on parenting styles and internalizing and found small negative associations between internalizing and parental warmth, behavioral control, autonomy granting, and authoritative parenting. Alternatively, higher internalizing symptoms were associated with harsh control, psychological control, authoritarian, and neglectful parenting (Pinquart, 2017).

Parenting stress has been related to child difficulty and parenting styles and abilities which are associated with child and adolescent psychopathology (Morgan, Robinson, & Aldridge, 2002). Stone, Mares, Otten, Engels, and Janssens, (2016) found that parenting stress was related to both internalizing and externalizing such that higher stress was associated with higher rates of psychopathology across dimensions. However, the researchers also found that over time decreases in parenting stress were accompanied by decreases in externalizing, whereas internalizing remained stable. The relationship between externalizing and parenting stress appeared to be bidirectional. However, the correlation between internalizing and externalizing was not incorporated into the analysis. Research on parenting stress has indicated that parents of children with externalizing problems have lower parenting efficacy and believe they are less knowledgeable and competent regarding parenting (Mash & Johnston 1990).

Purpose

The purpose of this study was to compare different models of psychopathology in children and adolescents and evaluate how these different conceptualizations change the association between each dimension and a variety of other variables. First, a one-factor model, two-factor correlated model, and a bifactor model were compared. I hypothesized

that the bifactor model would provide the best model fit providing further support that the P factor is a real construct and not a statistical artifact. The second purpose of this study was to evaluate the association between internalizing and externalizing and factors such as age, gender, and parenting factors in regression models and structural equation modeling. I hypothesized that the statistical relationship between these factors and internalizing/externalizing dimensions would differ between methods that do or do not account for the comorbidity between dimensions.

Methods

Participants

The data used for this study were gathered at a university associated community-based training clinic. The sample was taken from a large and diverse metropolitan city in the northeast United States. Participants were screened for suicidality and substance abuse before being accepted for services at the center.

The measures included in this study were completed at the first appointment by the parents of 294 clients ages 3 to 17. A subset of this sample (*N*=95) was used to further assess the relationships between internalizing, externalizing, and variables of interest. The demographic information for both samples is presented in Tables 1 and 2.

Table 1

Gender

Gender	**Male**	**Female**	**Missing**
N=294	109	100	85
N=95	47	48	0

Table 2

Age

	Frequency	
Age	*N=294*	*N=95*
3	1	0
4	5	1
5	17	7
6	23	6
7	23	9
8	35	17
9	41	16
10	23	7
11	18	6
12	17	4
13	16	6
14	24	6
15	20	3
16	17	4
17	14	3

Measures

Demographics. Demographic information was gathered from caregivers at the start of the first session via a paper and pencil questionnaire.

The Youth Outcome Questionnaire (Y-OQ) 30.1 Parent-Report. The Y-OQ is a 30-item measure used to assess the behaviors and symptoms of child psychopathology at the start of treatment and for progress monitoring. The YO-Q demonstrated excellent internal consistency for the measure (α>.91; Dunn, Burlingame, Walbridge, Smith, & Crum, 2005). However, of the six subscales; Somatic, Social Isolation, Aggression, Conduct Problems, Hyperactivity/Distractibility, and Depression/Anxiety, only one demonstrated adequate internal consistency (Depression/Anxiety; α=.85). All the subscales were correlated at the $p \leq .01$ level. The Y-OQ has good discriminant validity and was a statistically significant predictor of youth classifications as clinical or not.

The Y-OQ was administered to participants parents at the first appointment prior to receiving services. The following items were used in the analyses: 1, 2, 3, 5, 6, 7, 8, 11, 12, 13, 14, 16, 17, 18, 19, 21, 22, 24, 25, 26, 28, 29, 30 which were previously identified as items consistent with externalizing and internalizing dimensions as demonstrated through principal axis factor analysis (Winarick, 2019). The items listed by scale can be found in Appendix A. The internal consistency for both scales was good (Internalizing α=.889 and Externalizing α=.854).

The Bimonthly Longitudinal Youth (BIL-Y) Questionnaire. The BIL-Y is a caregiver report completed at baseline to assess the parent's view of their parenting experience, their perception of their child's therapy, the home environment, and the parent's goals. It includes items from the following validated measures: The Parenting

Stress Index, Parent Motivation Inventory, and the Family Environment Scale, to provide information on parenting stress, parenting competence, and parental motivation. Four subscales from the BIL-Y (see Appendix A) were used in this study: Parenting Efficacy (α=.711), Parenting Consistency (α=.789), Parental Involvement in Therapy (α=.737), and Child Difficulty (α=.744). The internal consistency for each scale used was acceptable.

Procedure

At the first appointment, the client's caregivers were administered a packet that included a demographic survey, the Y-OQ, and the BIL-Y that was completed by hand. The measures were administered by front-desk staff prior to meeting with a therapist. The data were double entered by doctoral clinic fellows and all discrepancies were reconciled before database entry.

Statistical Analysis

Descriptive statistics for all variables included in the study were calculated using SPSS (v 21). The internal consistency for the child difficulty, parenting efficacy, parental involvement in therapy, parental enjoyment, parenting consistency, family support, and family structure variables from the BIL-Y were analyzed in SPSS (v 21). There were little missing data in the data sets and any missing items responses were imputed from the available responses using maximum likelihood (Expectation Maximization Algorithm; Dempster, Laird, & Rubin, 1977).

Internalizing and Externalizing variables were evaluated in relation to other variables in a series of regressions run in SPSS (v 21) to assess if these variables were related to psychopathology. Gender, Age, and Parenting variables were regressed on

Internalizing and Externalizing independently to represent the common issue of analyzing data without accounting for the correlation between dimensions. Each regression was also conducted with externalizing or internalizing covaried to partial out the correlation between the two dimensions.

Confirmatory factor analysis was used to compare five different models of child and adolescent psychopathology in R version 3.5.3 (2019-07-05; Action of the Toes) using Lavaan software. The first model was a one factor model of psychopathology, with a latent general psychopathology factor predicting all items associated with internalizing and externalizing disorders. The second model was a two-factor correlated model with internalizing and externalizing latent factors that the items loaded onto. The third model was a bifactor model that used the items to create three latent factors; internalizing, externalizing, and general psychopathology which was rotated orthogonally to eliminate the correlation between any of the three factors. The fourth model, internalizing, consisted solely of the internalizing items and a latent internalizing factor. The fifth model, externalizing, consisted solely of the externalizing items and a latent externalizing factor. After fitting the models, structural equation modeling was used to assess how age, gender, and latent parenting from the BIL-Y were related to internalizing and externalizing in the correlated two-factor model, the bifactor model, the internalizing model, and the externalizing model.

Results

Descriptive statistics for the variables measured at baseline are presented in Table 3.

Table 3

Descriptive Statistics

Variable	N	Mean	Standard Deviation	Minimum	Maximum
Internalizing	294	10.701	7.645	0	45
Externalizing	294	12.568	8.384	0	44
Age of Child	294	10.35	3.595	3	17
Parenting Efficacy	95	12.04	2.458	4	16
Child Difficulty	95	8.19	3.735	1	16
Parenting Consistency	95	3.716	2.249	0	8
Parent Involvement	95	21.71	2.612	14	25

Regressions

Each of the variables of interest was evaluated in a regression equation, first with internalizing alone, then with externalizing covaried, and vice versa. The results are presented in Table 4.

Table 4

Regressions

	INT		EXT		INT (EXT)		EXT (INT)	
Variable	β	p	β	p	β	p	β	p
Gender	0.004	0.972	-0.248	0.015	0.104	0.336	-0.284	0.01
Age of Child	0.125	0.229	-0.413	<.001	0.309	0.002	-0.522	<.001
Parenting Efficacy	-0.212	0.039	-0.288	.005	-0.133	0.208	-0.245	0.021
Child Difficulty	0.329	0.001	0.474	<.001	0.185	0.058	0.409	<.001
Parenting Consistency	-0.070	0.503	-0.217	0.035	0.001	0.991	-0.217	0.046
Parent Involvement	0.032	0.758	0.216	0.035	-0.051	0.642	0.234	0.034

Confirmatory Factor Analyses

Five measurement models were analyzed through confirmatory factor analysis. The model fit for each model is represented in Table 5 and the path coefficients for each measurement model are presented in Figures 1 through 5.

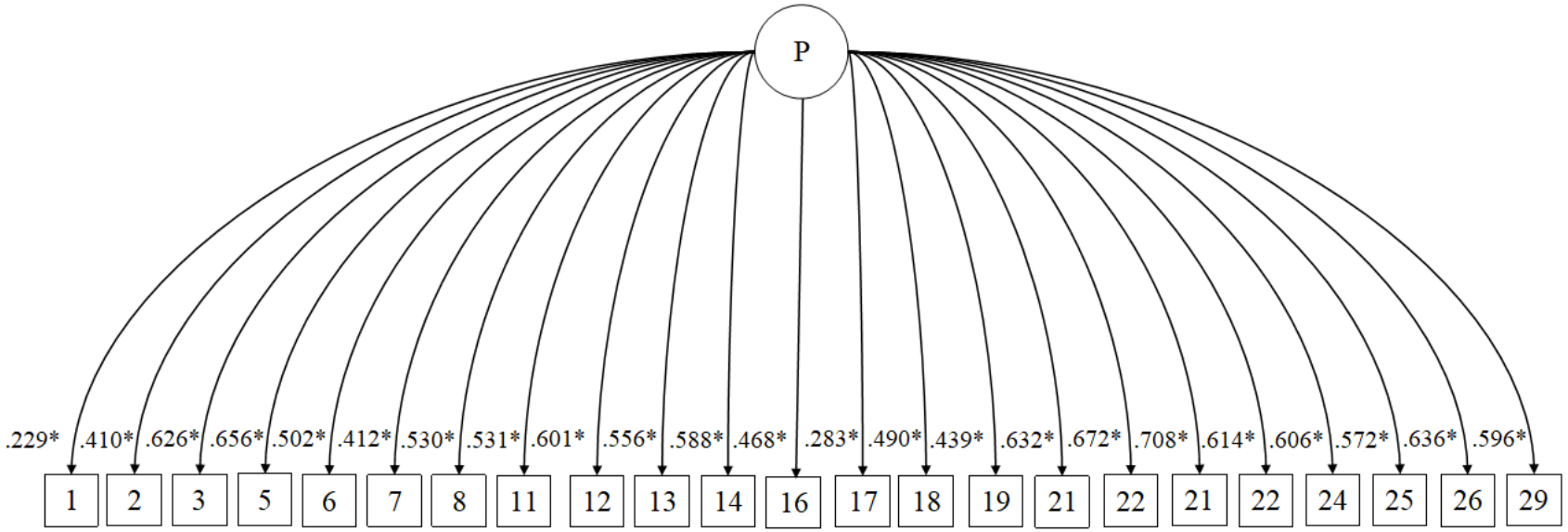
Table 5

Model Fit

Model	CFI	X^2	RMSEA	SRMR	AIC
One-Factor	.675	P<.001	.112	.096	18125.762
Two-Factor	.835	P<.001	.080	.064	17706.747
Bifactor	.868	P<.001	.076	.053	17642.068
Internalizing	.839	P<.001	.106	.066	9215.124
Externalizing	.889	P<.001	.106	.058	8583.424

Figure 1

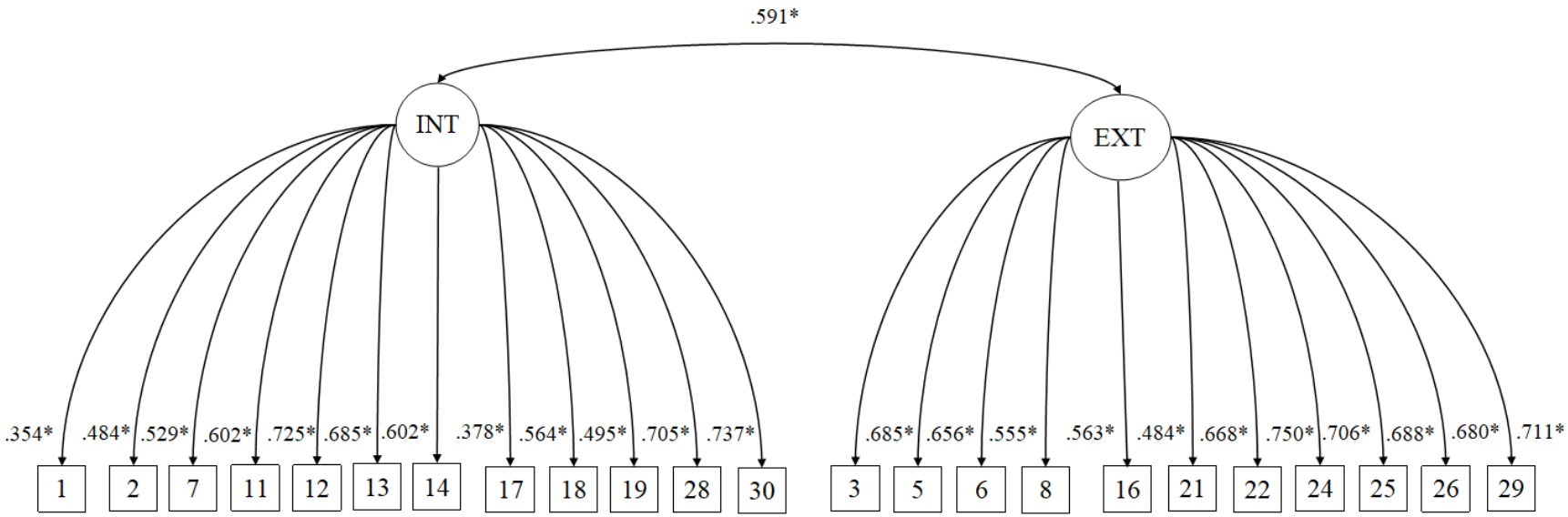
One-Factor Model



Note. *p < .05

Figure 2

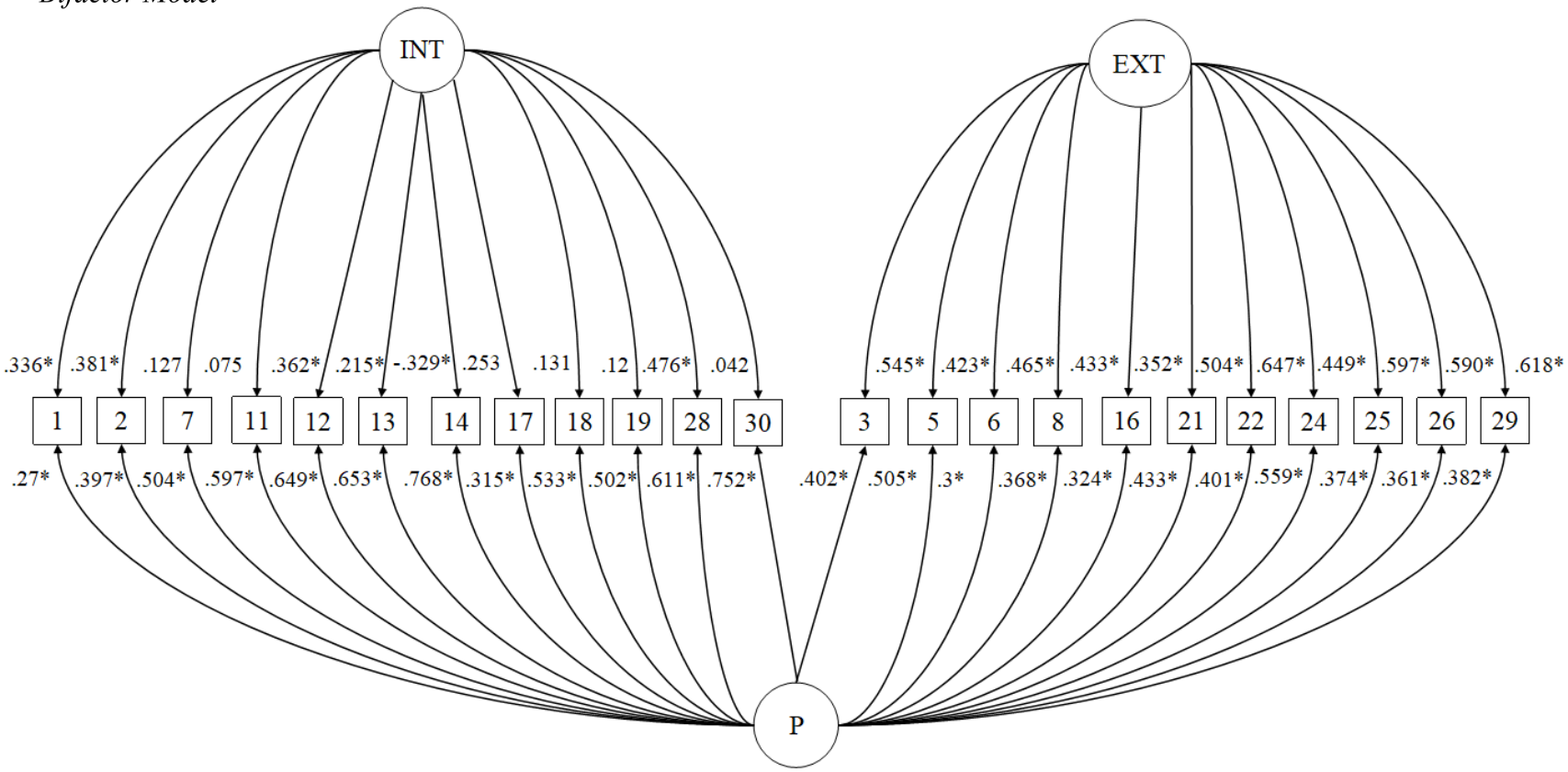
Two-Factor Correlated Model



Note. *p < .05

Figure 3

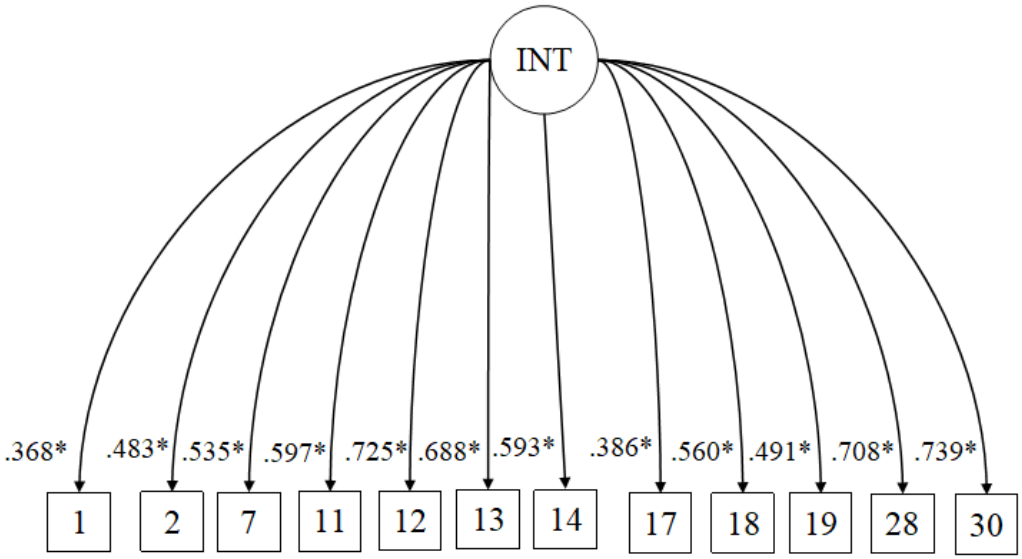
Bifactor Model



Note. *p < .05

Figure 4.

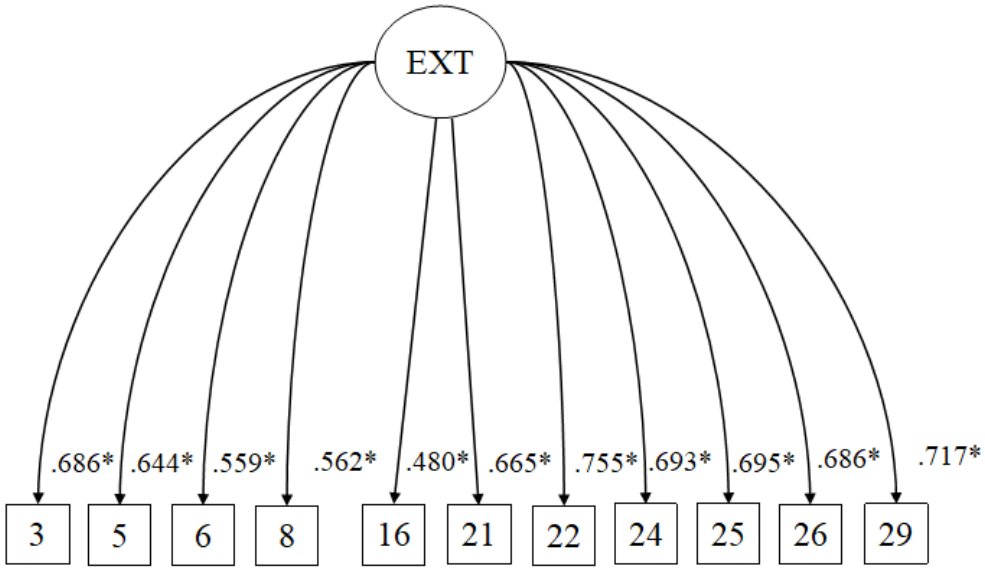
Internalizing Model



Note. *p < .05.

Figure 5

Externalizing Model



Note. *p < .05.

Structural Equation Modeling

Both the two-factor and bifactor model provided similar levels of model fit and considerably better fit than the one-factor model based on lower AIC values and RMSEA

and SRMR values less than .08. Given these findings, both models were used to evaluate the relation between internalizing/externalizing and gender, age, and parenting variables. The models with internalizing alone and externalizing alone were also related to the gender, age, and parenting variables to provide a more direct comparison to the regressions. The model fit for each model is reported in Table 6.

Table 6

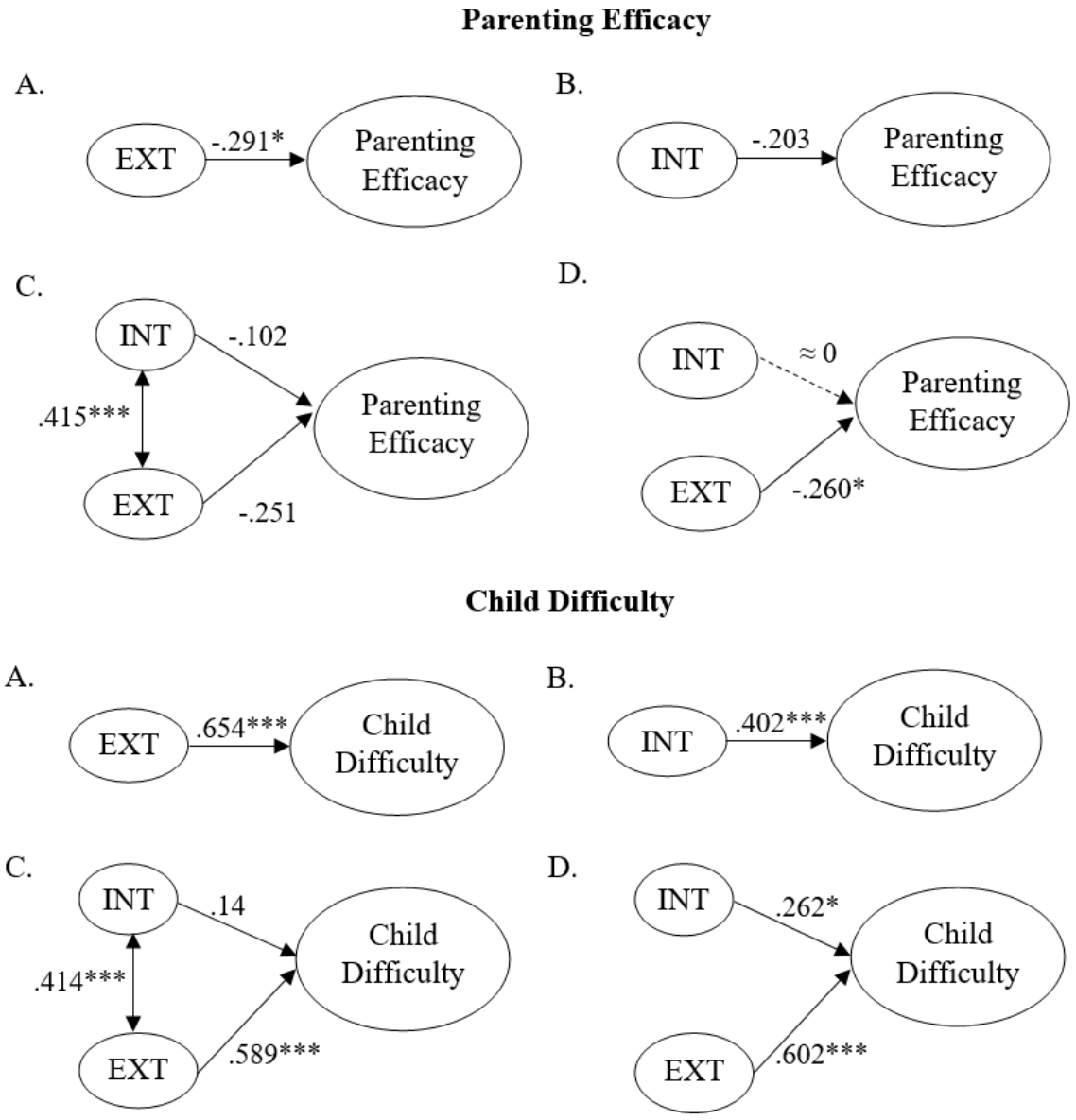
Model Fit with Parenting, Age, and Gender Variables

Model	CFI	X^2	RMSEA	SRMR	AIC
Child Difficulty					
Two-factor	.811	<.001	.074	.086	6767.037
Bifactor	.843	<.001	.069	.096	6760.687
Internalizing	.833	<.001	.081	.083	4059.996
Externalizing	.859	<.001	.091	.091	3597.300
Parenting Consistency					
Two-factor	.795	<.001	.079	.087	6042.143
Bifactor	.826	<.001	.076	.084	6039.249
Internalizing	.789	<.001	.099	.089	3396.293
Externalizing	.883	<.001	.094	.076	3213.345
Parental Involvement					
Two-factor	.799	<.001	.071	.088	6609.953
Bifactor	.829	<.001	.068	.083	6604.176
Internalizing	.779	<.001	.088	.092	3884.494
Externalizing	.903	.001	.068	.079	3709.096
Parenting Efficacy					
Two-factor	.769	<.001	.081	.093	6499.174
Bifactor	.800	<.001	.078	.099	6494.294
Internalizing	.784	<.001	.091	.096	3772.277
Externalizing	.845	<.001	.090	.093	3880.324
Gender					
Two-factor	.823	<.001	.077	.068	12841.859
Bifactor	.864	<.001	.071	.057	12792.098
Internalizing	.802	<.001	.101	.074	6899.839
Externalizing	.878	<.001	.101	.062	6312.704
Age					
Two-factor	.816	<.001	.083	.068	19247.675
Bifactor	.863	<.001	.075	.056	19139.408
Internalizing	.809	<.001	.108	.074	10792.996
Externalizing	.872	<.001	.105	.062	10162.461

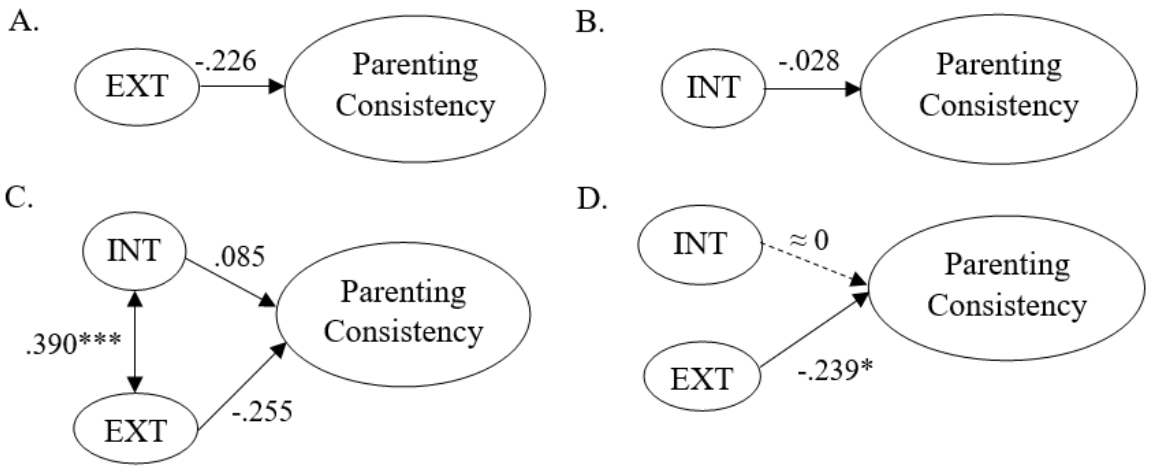
Given that the path coefficients were previously presented in Figures 2-5, and changed very little between models. Figure 6 displays the portion of each model that demonstrates the relationship between internalizing, externalizing, and the factor of interest.

Figure 6

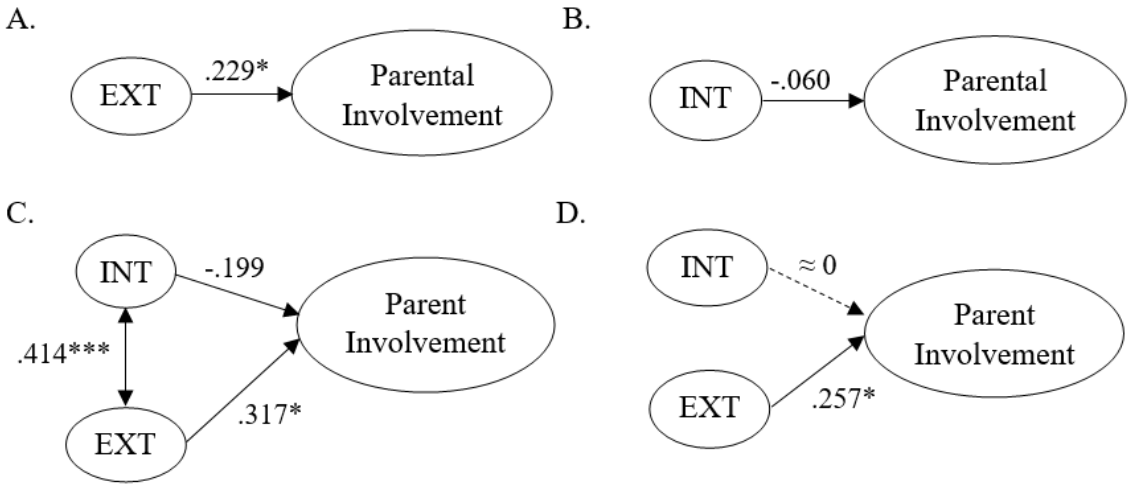
Comparison of Relationships Between Variables and Dimensions Across Models



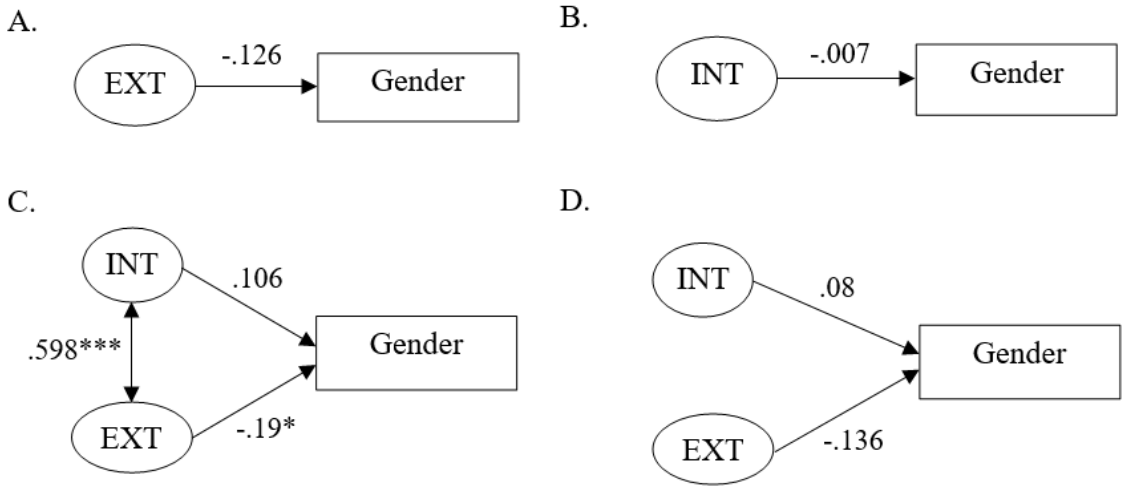
Parenting Consistency

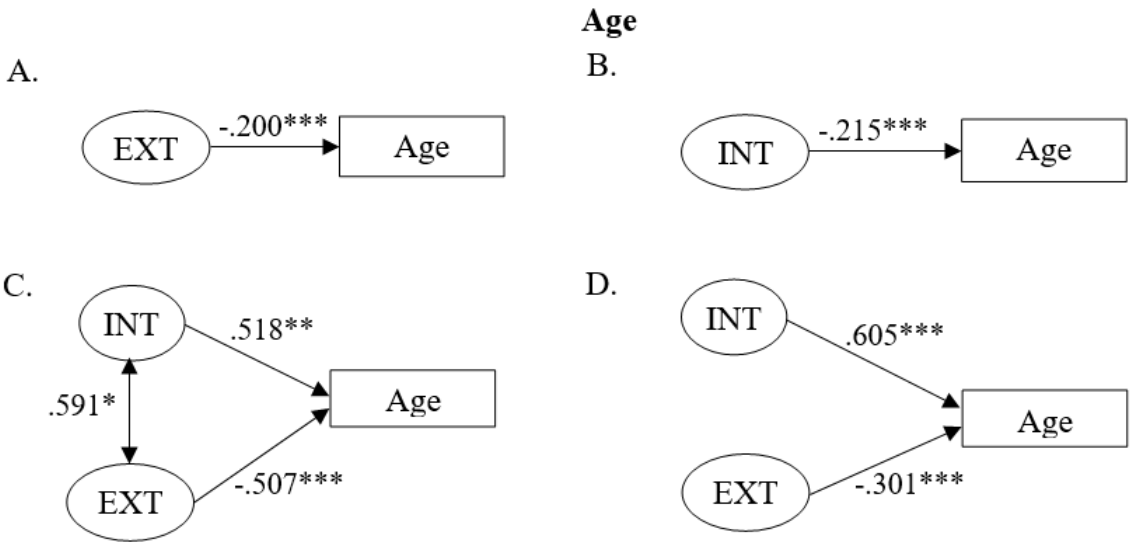


Parental Involvement



Gender





Note. A. Externalizing Model, B. Internalizing Model, C. Two-Factor Model, and D. Bifactor Model

*p < .05. **p < .01. ***p < .001.

Discussion

This study concerned the confusing problem of the substantial overlap between measures of internalizing and externalizing disorders. Without understanding and accounting for the overlap of internalizing and externalizing disorders, researchers and clinicians must question what they know or think they know about internalizing and externalizing. Additional factors and their associations with internalizing and externalizing dimensions were further analyzed to demonstrate how the findings of the present study may have been influenced by the statistical methods approach and the extent to which the model accounted for the overlap.

Hypothesis One: Model Comparison

The first hypothesis that a bifactor model would provide the best model fit in comparison to the one-factor and two-correlated factor models, was supported. Whereas, the factor loadings for all Y-OQ items were significant in the one factor model, this model did not provide good model fit. The two-factor and bifactor models demonstrated better fit than the one-factor model. In the two-factor model, the factor loadings were significant for all items in the model and the two variables were highly correlated. Among these models, the bifactor model provided the best fit. Interestingly, the factor loadings for the externalizing factor remained significant in the bifactor model, but approximately half of the factor loadings for internalizing items were no longer significant in this model. Eight items loaded on the internalizing factor in the bifactor model (i.e., items assessing somatic symptoms and depression) and items assessing common anxiety symptoms no longer loaded on internalizing, suggesting that anxiety and fear symptoms are more closely tied to the P-factor. Although the bifactor model did not

meet standard criteria for a good fit it appears that the bifactor model is a reasonable model to consider when conceptualizing psychopathology.

Internalizing and General Psychopathology. The changes in the internalizing factor in the bifactor model suggests that the general psychopathology factor explains more of the variance in childhood internalizing disorders than externalizing disorders. One possible explanation for this finding is that internalizing symptoms are indicators of psychopathology and externalizing symptoms are explained by behavioral factors (Keiley et al., 2003; Lilienfeld, 2003).

Futhermore, the treatment and conceptualization of behavior problems and externalizing are closely tied to parenting variables and skills (Boeldt et al., 2012; Chronis et al., 2007; Morgan et al., 2002; Stone et al., 2016), whereas internalizing symptoms cannot always be observed by parents. This finding is consistent with literature that suggests that parents are better at reporting on externalizing symptoms and children are better reporters of their own internalizing symptoms (Loeber, Green, & Lahey, 1990). Parenting variables may explain why the externalizing variable remained consistent even when the overlap between internalizing and externalizing accounted for by the P-factor. Stone et al. (2016) found that decreases in parenting stress led to decreases in externalizing problems whereas internalizing symptoms remained stable. Together the findings from this study and Stone et al. (2016) suggest that parenting may be the differentiating piece that seperates the externalizing dimension together independent of general psychopathology.

Another interpretation of these findings may lend support to researchers who have considered a causal relationship with internalizing causing externalizing (Angold et al.,

1999; Krueger & Markon, 2006; Lee & Bukowski, 2012). If internalizing is an indication of general psychopathology and the P factor is an amalgamation of risk factors for externalizing problems, it would explain why the internalizing dimension did not remain independent after controlling for general psychopathology. Whether internalizing causes externalizing is an interesting question that warrants further investigation.

Hypothesis Two: Relationships between Variables

The second hypothesis was that the relationships between internalizing/externalizing dimensions and age, gender, and parenting variables would differ depending on whether the comorbidity between internalizing and externalizing was accounted for in the model. The results of the analyses for age, gender, parenting efficacy, child difficulty, and parenting consistency support this hypothesis.

Age. Internalizing was not related to age when in the regression alone, but when externalizing was controlled internalizing was significantly related to age. Externalizing was a significant predictor of age regardless of whether internalizing was also in the model. Age was also significantly related to both internalizing and externalizing in the two-factor and bifactor models. The relationship between externalizing and age was negative, indicating that the parents of younger children reported more externalizing symptoms. In the models that included both internalizing and externalizing, the relationship between internalizing and age was positive indicating that parents reported more internalizing symptoms in older children and adolescents. These findings demonstrate that considering internalizing without considering externalizing may lead to a different interpretation than when the two dimensions are included in the analyses.

Gender. Gender was not associated with internalizing in the regression, but it was related to externalizing both alone and when internalizing was covaried. In the two-factor model the relationship between gender and externalizing was also significant. These findings indicate that boys were more likely to experience externalizing symptoms. However, this finding was not supported by the bifactor model. In the bifactor model the relationship between gender and both internalizing and externalizing became weaker and gender was no longer significantly associated with externalizing. These findings contradict previous research by Afzali et al. (2017) that identified gender differences in a bifactor model of psychopathology in 12-year-old adolescents. However, this may be because their sample size was much larger and the age range in their sample was limited.

Parenting Efficacy. When parenting efficacy was related to internalizing without controlling for externalizing, it appeared to be a significant predictor. However; when externalizing was covaried, internalizing was no longer a significant predictor of parenting efficacy whereas externalizing significantly predicted parenting efficacy. When externalizing was evaluated as a predictor without controlling for internalizing it remained a strong predictor of parenting efficacy. The bifactor model further supported these findings suggesting that higher parenting efficacy was associated with fewer externalizing symptoms. However, the two-factor model did not show a significant relationship between parenting efficacy and either dimension. This difference reiterates the importance of considering statistical methods and the overlap between dimensions when drawing conclusions about internalizing and externalizing disorders. Specifically, the relation between internalizing and parenting efficacy appears to be an artifact of the overlap of externalizing with internalizing.

Child Difficulty. In the regression models, child difficulty was predicted by internalizing and externalizing in both models that did not partial out the correlation between the two dimensions. The bifactor model also demonstrated that child difficulty was significantly related to both externalizing and internalizing. Taken together these findings suggest that internalizing and externalizing are associated with child difficulty regardless of whether one accounts for the correlation between the two dimensions. Externalizing remained significant when the correlation between them was partialed out. However, when externalizing was covaried, internalizing was no longer a significant predictor of child difficulty. This suggests that the initial finding that internalizing was related to child difficulty was due to the correlation between internalizing and externalizing. To further complicate the interpretation of this factor, in the two-factor correlated model, child difficulty was significantly related to externalizing but not internalizing. Each of these findings lends itself to different interpretations of psychopathology and child difficulty further highlighting the problem of comorbidity.

Parenting Consistency. Parenting consistency was predicted by externalizing regardless of whether internalizing was covaried for in the regression. However, externalizing appeared to be more predictive when internalizing was not included in the model and became less predictive when internalizing was included. The effect of comorbidity was also evident when considering internalizing as a predictor without covarying for externalizing. Once externalizing was added to the model, the association between internalizing and parenting consistency decreased, indicating that the correlation between internalizing and externalizing was responsible for a considerable portion of internalizing's predictive power. In the bifactor model, the relationship between parenting

consistency and externalizing was significant. These findings indicate that higher scores on parenting consistency were associated with lower scores on externalizing. Alternatively, the two-factor model did not show a significant relationship between parenting consistency and either internalizing or externalizing.

Parental Involvement in Treatment. Externalizing was a significant predictor of parental involvement in treatment and did not change when internalizing was added to the regression. In the bifactor model and two-factor model the relationship between externalizing and parental involvement in treatment was significant. The findings across all models suggested that parents of children with externalizing symptoms reported higher expectations for their own involvement in therapy. This was the only factor evaluated in this study that demonstrated consistent findings across methods.

Limitations and Future Directions

One limitation of this study was that the internalizing factor became poorly defined in the bifactor model, which impacted the ability to look at the relationship between internalizing and other factors through the lens of a bifactor model. Another limitation of this study was the different sample size available depending on factors included in the analysis. With a larger sample the bifactor model may have converged which would have allowed for an evaluation of the relationship between the parenting variables (efficacy, consistency, and involvement in treatment) and the internalizing dimension.

Future research should focus on the replication of findings commonly associated with internalizing and externalizing while accounting for the correlation between dimensions. Additionally research should further investigate the P-factor, externalizing,

and parenting in children and adolescents as an explanation for how the externalizing dimension differentiates itself from the internalizing dimension and general pathology. There is still much work to be done on understanding the P factor and what comprises general psychopathology. Understanding the P factor as both a statistical and theoretical construct will help to inform the choice of statistical methods used to evaluate internalizing and externalizing dimensions. The implication of findings regarding internalizing, externalizing, and comorbidity will have an impact on how researchers think about both the etiology of psychopathology and transdiagnostic treatments for children.

Conclusion

The bifactor model provided the best fit across all models, which supported the first hypothesis. However, implications about the internalizing dimension need to be made with caution due to the greatly decreased internalizing item factor loadings in the bifactor model. Additional analyses of the relationships between common factors associated with internalizing and externalizing dimensions supported the second hypothesis that the associations between dimensions and factors would change depending on how the overlap between dimensions was or was not accounted for in the model. The P-factor allowed for inferences about each dimension, despite comorbidity, and when considering other variables all but one revealed different interpretation based on the inclusion of strategies accounting for the correlation between dimensions. Together these findings indicate that researchers wishing to study variables in relation to internalizing and externalizing must consider this correlation and account for it by either covarying for the other variables in a regression model or by utilizing the bifactor model.

Appendix A:

BIL-Y Subscales

CHILD DIFFICULTY:

2. My child and I don't get along very well
3. We argue a lot about rules and expectations
11. I often feel stressed as a parent
12. My child seems to be much harder to care for than most

PARENTING CONSISTANCY:

6. I am not consistent in following through on the warnings I give to my child (REVERSE SCORE)
9. I am not always consistent in how I discipline my child (REVERSE SCORE)

PARENTING EFFICACY:

5. I give a fair warning to my child before disciplining misbehavior

7. My child knows my expectations for his or her behavior

13. I am successful most of the time when I try to get my child to do something

14. When I think about myself as a parent, I believe I can handle most things pretty well.

PARENTAL INVOLVMENT IN THERAPY:

4. I am ready to learn new parenting skills

16. I would like my child's problems to improve

17. I want to be involved in my child's therapy

18. For my child's therapy to be successful, I must also change

19. I am capable of learning the skills needed to help my child

20. My child's problems cannot improve without my involvement in treatment

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