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DISORDER-SPECIFIC AND TRANSDIAGNOSTIC FUNCTIONAL IMPAIRMENTS
ACROSS YOUTH INTERNALIZING DISORDERS

By

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ABSTRACT OF THE THESIS

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Lifetime prevalence rates suggest that up to 32% of youth (aged 13 to 18) meet criteria for an anxiety disorder and up to 14% meet for a mood disorder before the age of 18 (Merikangas et al., 2010). In addition to meeting symptom criteria, the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013) requires that youth experience significant functional impairments across multiple domains, including, occupational/school, social, family, and role impairment. Despite the inclusion of functional impairment in the diagnostic criteria, the emphasis of most clinical trials designed to demonstrate intervention efficacy focus on symptom reduction. In order to address this need, the current study used a transdiagnostic framework to investigate a 2-step process for how functional impairments might help discriminate between youth diagnoses of generalized anxiety disorder (GAD), social phobia (SP), and depression disorders (DD). Step-1 examined differences between “pure” diagnoses of each disorder. Step-2 explored how comorbidity might affect the relationship between diagnoses and functional impairments. A total of 146 youth (ages 7-17) and their parents participated in the study. Predictor variables of clinical diagnoses were determined by a

semi-structured interview and parent self-reports were used to measure outcome variables of functional impairments. Results from the multivariate analysis of variance showed that impairments in social functioning were disorder-specific for DD ($F(8,92)=3.18$, Pillai's Trace=.43, $p=.003$, $\eta_p^2=.21$) and impairments in school functioning were transdiagnostic for SP and DD ($F(8,92)=2.28$, Pillai's Trace=.325, $p=.03$, $\eta_p^2=.16$). Results did not indicate any augmentative effects (increased impairment) of comorbidity. The study suggests that functional impairments might provide unique information about differential diagnosis beyond symptoms and symptom severity.

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Anxiety and depression disorders are two of the most prevalent and impairing psychological disorders in children and adolescents (henceforth referred to as “youth; Costello, Egger, Copeland, Erkanli, & Angold, 2011; Kendall, Aschenbrand, & Hudson, 2003; Weisz, Southam-Gerow, Gordis, & Connor-Smith, 2003). Lifetime prevalence rates suggest that up to 32% of youth (aged 13 to 18) meet criteria for an anxiety disorder and up to 14% meet for a mood disorder before the age of 18 (Merikangas et al., 2010). In addition to meeting symptom criteria, the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013) requires that youth experience significant functional impairments across multiple domains, including, occupational/school (e.g., poor attendance; poor performance), social (e.g., quantity and quality of friendships), family (conflict, independence), self-care (age-appropriate chores, hygiene), and participation in society as measured by the World Health Organization Disability Assessment Schedule 2.0 (WHODAS 2.0; World Health Organization, 2011), to meet criteria for a psychological disorder.

Despite the inclusion of functional impairment in the diagnostic criteria, the emphasis of most clinical trials designed to demonstrate intervention efficacy focus on symptom reduction. This prioritization of symptom change may overestimate the efficacy of psychological treatments in some cases (Becker, Chorpita, & Daleiden, 2011). With hundreds (and counting) of treatments designated as evidence-based because of empirical support for symptom reduction (Chorpita et al., 2011), additional criteria for treatments to be labeled evidence-based might be necessary in order to increase the utility of the term. Functional impairment, often the impetus for treatment-seeking and the metric by which consumers assess treatment success (Chorpita et al., 2011), shows great promise as an

additional evaluative criterion. One review article has gone so far as to suggest that treatment success should be determined by the youth's return to prior functioning, not just reduction of symptoms or remission from a diagnosis (Winters, Collett, & Myers, 2005, p. 311).

Potentially contributing to the limited number of investigations of functional impairments in youth psychopathology is the confusion between functional impairment and the related constructs of symptoms, distress, and quality of life. *Symptoms* are the primary cognitive, behavioral, and somatic indicators used by the DSM-5 to determine the presence or absence of a psychological disorder; symptoms are not necessarily accompanied by distress, lower quality of life, or impairment. *Distress* is used to describe a more personal and subjective sense of negativity. *Quality of life* refers to a more global, subjective construct expressing positivity (Rapee, Bögels, van der Sluis, Craske, & Ollendick, 2012). *Functional impairment* refers to the impact that psychopathology has on a youth's ability to perform routine and age-appropriate acts in school, family, peer relationships, and work/extracurricular activities (Rapee et al., 2012). For example, a youth diagnosed with social phobia (SP) is asked to answer a question in class. His or her concern about being embarrassed by speaking in front of the class would be a symptom; his or her distress would be reflected by subjective discomfort (e.g., from increased heart rate), and lowered grades (from refusing to answer the question) would reflect functional impairment. The youth's overall perception of his or her life, including his or her symptoms, distress, and impairment from SP, would reflect the youth's quality of life.

The growing body of literature on functional impairments in youth has begun to identify both specific and common impairments for youth anxiety and depression

disorders. Significant social impairment has been found in youth with SP. These youth are less liked by classmates (Strauss, Frame, & Forehand, 1987; Strauss, Lahey, Frick, Frame, & Hynd, 1988), more likely to have a lower level of companionship and intimacy in friendships (Vernberg, Abwender, Ewell, & Beery, 1992), be less socially accepted, have a greater number of negative interactions with peers, and report less assertive and responsible social skills (Ginsburg, La Greca, & Silverman, 1998). A recent study also suggested that SP was distinguished from generalized anxiety disorder (GAD) in that youth with SP were less socially competent, had fewer friends, and had more difficulty making friends when compared to healthy controls while youth with GAD only had fewer friends compared to controls (Scharfstein, Alfano, Beidel, & Wong, 2011).

GAD has also been distinguished from SP on impairments related to somatic complaints. In a study of 448 youth (ages 7-17), researchers found that youth with GAD and separation anxiety disorder (SAD) reported more somatic complaints than youth with SP (Crawley et al., 2013). Studies from the adult literature have also suggested that GAD is associated with significant work, social, and role impairment (Kessler, DuPont, Berglund, & Wittchen, 1999; Kroenke, Spitzer, Williams, Monahan, & Löwe, 2007) suggesting that impairment from GAD might be pervasive. More research examining the extent to which GAD might be differentiated from SP and depressive disorders on functional impairments in youth is needed.

Depressive disorders (DD) have also been associated with significant and pervasive impairment in adults and youth (Masi, Favilla, Mucci, & Millepiedi, 2000; Wittchen, 2002). In a study of 185 German youth (ages 12-17) who met for a DD, 98% reported impairment in everyday or occupational activities (work, homework, studies),

leisure activities, or social contacts with family, friends, and classmates during the worst part of the depressive episode (Essau, Conradt, & Petermann, 2000). The study also recorded typical impairment during the past four weeks: 41.1% reported severe impairment at school or work, 38.3% reported severe impairment during leisure time, and 33.3% reported severe impairment during social activities (Essau et al., 2000). DDs have also been associated with family functioning, health, and role impairment. A study of 100 adolescents (52 with major depressive disorder; MDD) found that youth with MDD had worse relationships with their mothers, fathers, siblings, peers, and worse school performance than healthy controls (Puig-Antich et al., 1993). A study of 3,471 youth aged 13-21 in a primary medical setting found that screening positive for a potential DD was associated with a greater number of physical health problems, productivity/role impairments, and decreased educational attainment when compared to healthy controls (Asarnow et al., 2005). Finally, in studies of multiple youth and adult diagnoses, comorbid depression tends to contribute unique levels of functional impairment above the principal diagnosis (Crawley et al., 2013; Kessler et al., 1999; Masi, Favilla, Mucci, & Millepiedi, 2000; Wittchen, 2002).

Building on the important findings of these studies, the next step is to examine the effect of comorbidity on youth functional impairments. Research suggests that between 5% and 55% of youth with a principal anxiety disorder have a comorbid mood disorder and that 20% to 75% of youth with a principal mood disorder meet diagnostic criteria for an anxiety disorder (Anderson & Hope, 2008). A number of possible explanations for the high rate of comorbid anxiety and depression have been posited (see Garber & Weersing, 2010 for a review). One frequently cited explanation is that anxiety and depression

disorders have significant symptom overlap. For example, social avoidance can be a symptom of both SP and DD and, until DSM-5, fatigue, difficulty concentrating, irritability, and sleep disturbance were symptoms for both GAD and DD (Garber & Weersing, 2010). However, studies have found that the relationship between anxiety and depression disorders remains significant after all overlapping symptoms have been removed from self-report measures, suggesting that this is not a sufficient explanation for the comorbidity rates between anxiety and depression (Stark & Laurent, 2001). Other proposed explanations have included genetic similarity between anxiety and depressive disorders, similar information-processing biases, and similar neural markers (Garber & Weersing, 2010). These explanations, too, cannot fully account for the complexity of the relationship between anxiety and depression.

Research on interventions for anxiety and depression also illuminate the complexity of the relationship between diagnoses of anxiety and depression. If it was simply the similarity between the disorders that explained their comorbidity, it could be assumed that treatments focused on anxiety should reduce depression by a similar factor and vice versa, but this is not always the case (Berman, Weems, Silverman, & Kurtines, 2000; Curry et al., 2006). The prognosis for untreated youth with comorbid anxiety and mood disorders is much worse than either diagnosis alone – greater risk of recurrence, increased duration, more suicide attempts, greater impairment, and decreased response to treatment (Ezpeleta, Domenech, & Angold, 2006). In response to the frequency and complexity of comorbidity, the field is considering a shift from a disorder-specific to a transdiagnostic framework (Ehrenreich-May & Chu, 2013). Studies designed to examine disorder-specific and transdiagnostic mechanisms of youth anxiety and depression hold

great promise for improving the understanding of “pure” and comorbid presentations of anxiety and depression in youth, as well as enhancing treatments for complex presentations.

Three studies have laid the initial groundwork for the study of functional impairment and comorbid youth anxiety and DD. The first of these studies compared impairment in children (ages 6-11) who were undiagnosed ($n=20$), diagnosed with GAD only ($n=17$), or diagnosed with GAD and at least one comorbid disorder ($n=24$) (Alfano, 2012). The most common co-occurring diagnoses were SP ($n=9$), ADHD ($n=9$) SAD ($n=4$), DD ($n=4$), and specific phobia ($n=3$). Children in both GAD groups reported significantly lower adaptive functioning in family relationships compared to the control group. Children in the GAD-comorbid group also reported greater impairment in home duties/self-care than the GAD-only and control groups. C-GAS (Shaffer et al., 1983) scores for children in the two clinical conditions showed that youth in the GAD-comorbid group had significantly greater global impairment than youth in the GAD-only group.

The second study integrating comorbidity and impairment examined school impairment in youth (ages 7-14) who were either undiagnosed (ND) or diagnosed with SP, GAD, SAD, or a comorbid diagnosis (Mychailyszyn, Méndez, & Kendall, 2010). Overall results from the study found that youth diagnosed with an anxiety disorder had greater school impairment (measured by the school competence scale of the CBCL and teacher ratings of the child’s work ethic, appropriate behavior, and academic performance) than ND with no differences between the individual anxiety disorders. However, secondary analyses found significant differences among the anxiety disorders depending on reporter. Fathers reported greater impairment in youth with SP and teachers

reported that youth with SP seemed significantly unhappier than youth with GAD or SAD. Investigations of how comorbidity impacted impairment (where “A” denotes another anxiety disorder and “O” denotes any comorbid disorder) found that teachers reported that youth with no diagnosis (ND) or GAD-only worked harder than youth diagnosed with SAD+O, SP+O, and GAD+O. Youth diagnosed with GAD+A were also rated as working harder than youth diagnosed with SP+O and GAD+O. Teachers rated ND and GAD+A groups as better learners than youth with SP+O and GAD+O and that youth with GAD+A or SP+A had academic performance similar to youth with ND, who were better than youth with all other diagnoses. The authors concluded that increasing comorbidity was associated with the greatest school impairments. Further, non-anxiety comorbidity tended to predict the greatest classroom impairment, at least by teacher report. These findings suggest future research should investigate the unique contributions of specific comorbid diagnoses (e.g., does the interaction between impairment from GAD and depression differ from that of GAD and SP).

A third study examined more broadly the relationship between comorbid youth psychopathology and functional impairments. The study included measures of functional interference (CBCL activities, social, and school competency scales) in an assessment of 329 youth (mean age=10.04 years) who met diagnostic criteria for only one anxiety disorder (“pure” anxiety, $n=77$), two anxiety disorders (ANX-ANX, $n=136$), a primary anxiety disorder plus an externalizing disorder (ANX-EXT, $n=93$), or a primary anxiety disorder plus a depressive disorder (ANX-DEP, $n=23$; Franco, Saavedra, & Silverman, 2007). Results found that youth diagnosed with any of the three comorbid disorders participated in fewer activities than youth in the “pure” anxiety group. Youth diagnosed

with ANX-DEP and ANX-EXT were also significantly more impaired than the “pure” anxiety group on the social and school competency scales; no differences were found between the “pure” anxiety group and the ANX-ANX group on these two scales (Franco et al., 2007). Needed now is a study that expands on the identified differences between comorbid and “pure” diagnoses by contributing possible explanations as to how additional diagnoses affect functional impairment and which impairments might be unique to a single diagnosis or transdiagnostic. Past studies also tended to rely on a single measure (CBCL), so a multi-measure and multi-source approach would enhance confidence in findings.

The present study aims to continue the important work started by these three studies by applying a transdiagnostic framework to understanding the functional impairments experienced by youth diagnosed with complex comorbid profiles. A transdiagnostic framework might have multiple advantages over disorder-specific frameworks in examining functional impairment across complex comorbidities (Mansell, Harvey, Watkins, & Shafran, 2008). First, transdiagnostic research helps identify the unique and common behavioral outcomes of related diagnoses. Second, a transdiagnostic framework might help improve the understanding of psychopathology by generalizing knowledge from well-studied diagnoses to understudied diagnoses. Finally, a transdiagnostic framework might lead to the development of treatment components that are effective across a variety of diagnoses. This focus on understanding shared behavioral outcomes of related diagnoses makes a transdiagnostic framework well suited to study comorbidity. The study of functional impairment fits well into a transdiagnostic

framework as findings will lead us to be better able to detect and target shared presenting and maintaining impairments across diagnoses.

The current study uses a transdiagnostic framework to examine which impairments are *disorder-specific* (i.e., significantly greater impairment in only one of the diagnoses compared to the others) or *transdiagnostic* (i.e., elevated impairment across multiple diagnoses). Further, the study will be able to evaluate how different levels and types of comorbidity affect functional impairment. No single research paradigm has been identified as the “gold standard” of transdiagnostic research, but most recommend comparing multiple processes across multiple disorders (Compas, Watson, Reising, & Dunbar, 2013; Ehrenreich-May & Chu, 2013; Mansell, Harvey, Watkins, & Shafran, 2009; Nolen-Hoeksema & Watkins, 2011). In this way, an investigator can directly compare the relative impact of processes across disorders. The current study follows these recommendations by examining the nature and level of functional impairment across single “pure” disorder categories (SP, GAD, DD) and across multiple categories of comorbidity (SP+GAD, SP+DD, GAD+DD, SP+GAD+DD). In this way, a functional impairment profile can be developed across disorder classes and complex comorbidity groupings, all controlling for clinical severity level.

Based on the extant literature, we predict that family functioning and somatic complaints will be transdiagnostic for youth with GAD and DD (Alfano, 2012; Asarnow et al., 2005; Crawley et al., 2013; Klein, Dougherty, & Olino, 2005) with both significantly greater than youth diagnosed with SP. We also hypothesize that school and social impairments will be transdiagnostic across youth diagnosed with SP and DD (Mychailyszyn et al., 2010; Scharfstein et al., 2011) with both reporting greater

impairment than youth diagnosed with GAD. Because this approach to examining comorbidity is novel and few consistent findings were identified in the literature, analyses regarding effects of comorbidity were considered exploratory. However, we expect that additional comorbidity will have an exacerbating effect in most cases, reflecting the likelihood that the presence of multiple disorders will intensify the severity of functional impairments. Potential confounding effects of symptom severity and number of diagnoses will be examined and controlled for in all analyses.

Methods

Participants

Participants were 146 youth between the ages of 7 and 17 ($M=11.91$; $SD=2.62$) and their parents who attended clinical intake interviews at a university-based specialty clinic. Youth with a “pure” diagnosis of SP ($n=23$), GAD ($n=20$), or DD ($n=10$), and the absence of one of the other major diagnoses¹, or comorbid diagnoses of SP+GAD ($n=37$), SP+DD ($n=3$), GAD+DD ($n=18$), or SP+GAD+DD ($n=35$) were included in the study. Exclusion criteria were minimized to maximize external validity and included parent report of mental retardation, autism, psychotic disorder, or bipolar disorder. The study sample was diverse with 47.2% girls (69/146), 78.1% Caucasian (114/146), 6.2% African American (9/146), 9.0% Asian American (13/146), 11.0% Latino (16/146), 3.4% identified as a racial background not listed (5/146), and 7.5% identified as multiracial (11/146). Family composition information indicated that 70.5% of youth lived with both parents (103/146), and 73.8% (104/141) of mothers and 87.9% (116/132) of fathers reported at least part time employment. The median income level was \$80,001 -

\$100,000. Approximately 50.7% (74/146) of youth reported taking medication. All youth assented to study participation and all parents provided written and verbal consent.

Measures

Table 1 describes the multi-dimensional approach used to assess the five domains of functional impairment.

Anxiety Disorders Interview Schedule for Children Parent Interview (ADIS-P). The ADIS-P (Silverman & Albano, 2000) is a semi-structured interview that assesses the presence and severity of childhood disorders outlined by the revised fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; American Psychiatric Association, 2000). Diagnostic profiles include parent, youth, and consensus diagnosis. Interference (Clinician's Severity Rating; CSR) is rated per disorder on a 0 (not at all) to 8 (debilitating) scale, where 4 represents clinical threshold. Interviewers were considered reliable when they matched expert ratings of diagnoses and CSRs (Cohen's $\kappa \geq 0.80$). Actual mean interrater reliability was $\kappa=0.94$ (range=0.85–0.99). Thirty percent of study interviews were randomly selected and coded for study adherence. Reliability remained strong (mean $\kappa=0.91$, range=0.78–1.00).

State-Trait Anxiety Inventory for Children–Trait–Parent Version (STAIC-T-P). . The STAIC-T-P (Strauss, 1987) is a 26-item parent report version. Items are rated on a 1 (hardly ever) to 3 (often) scale (youth range=20–60; parent range=26–78). Strong psychometric properties have been reported (Southam-Gerow & Chorpita, 2007). In the current sample, internal consistencies were strong for both the child and parent scales (alpha=0.89).

Revised Child Anxiety and Depression Scales–Child/Parent Versions

(RCADS-P). The RCADS-P (Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000) is a 47-item parent report questionnaire of youth symptoms consistent with DSM–IV anxiety and mood disorders. Items are rated on a 0 (never) to 3 (always) scale. RCADS has demonstrated good internal consistency and strong convergent and discriminant validity. The 10-item Major Depression Disorder (MDD) subscale (range=0–30) was used. The current sample had acceptable internal consistency ($\alpha=0.77$).

Functional Impairment Measures

Interpersonal module for the ADIS-P. During administration of the ADIS-P, parents respond to 9 items about the youth’s interpersonal behavior including: the number of friends the youth has in relation to other youth his or her age (Less, More, Same), common activities in which the youth engages with his or her friends, whether the youth has a best friend (Yes/No), how long the youth has been friends with the best friend, if the youth uses the telephone (Yes/No) and if the youth gets along with all family members (Yes/No). The module has been shown to be helpful in distinguishing SP from GAD (Scharfstein et al., 2011). The item measuring if the child gets along with all family members was analyzed separately as an indicator of the family functioning impairment domain.

School refusal module for the ADIS-P. Two items from the school refusal module of the ADIS-IV-P related to school attendance or disruption in the school schedule were used. These items included: whether the youth has difficulty in attending school (Yes/No) and the number of times the youth has sought help from the school nurse

or counselor due to anxiety or depression. Parents were also asked to report the number of school absences for the current and previous school year.

Child Behavior Checklist. The Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001) measures relative youth competence in activity, social, and school domains. The *activities competence scale* assesses youth participation in sports, hobbies, and jobs/chores. For each area, parents first list up to three activities in which their youth participates and then rates the amount of time spent in each activity relative to same-aged peers (4-point scale from “less than average” to “more than average” with “don’t know” as the fourth option). Parents then rate youth performance relative to same-aged peers (4-point scale from “below average” to “above average” with “don’t know” as the fourth). The raw scores on the activities competency scale can be summed (range=0.0-15.0) and then translated into age and sex normed *T* scores based on a representative sample (Achenbach & Rescorla, 2001). *T* scores on the activities competency scale range from 20 to 65 ($M=50$, $SD=10$) with scores lower than 30 representing clinical cases (2nd percentile) and scores between 31 and 35 are borderline clinical (3rd-7th percentile).

The *social competence scale* measures the youth’s engagement in clubs and organizations, number of friends and time spent with friends, and behavior with others. Parents first list up to three social organizations in which their youth participates and then rates the youth’s participation level relative to same-aged peers (4-point scale from “less active” to “more active” with “don’t know” as the fourth option). Items measuring peer relations were assessed by parent response to the questions “about how many close friends does your child have?” (response options of “None,” “1,” “2 or 3,” or “4 or more”) and “about how many times a week does your child do things with any friends

outside of regular school hours? (do not include brothers and sisters)” (response options of “less than 1,” “1 or 2,” or “3 or more”). Behavior with others was measured by asking parents how well their youth gets along with family members and peers and how well the youth plays or works alone compared to other kids of the same age (response options are “worse,” “average,” or “better” with fourth option of “has no brothers or sisters” for the question about behavior with siblings). The raw scores on social competency scale range from 0.0-14.0 and can be translated into age and sex normed *T* scores which are interpreted like the activities competency subscale. Items measuring how well the child gets along with his or her parents and how well the child gets along with his or her siblings were also analyzed separately as an indicator of the family functioning impairment domain.

The *school competence scale* is measured with four items assessing the youth’s academic performance, existence of special education or remedial service (Yes/No), whether the child has repeated a grade (Yes/No), and if the youth has had any academic or other problems in school (Yes/No). The academic performance item asks parents to list each subject the youth studies and then to rate the youth’s performance in each subject (4-point scale with response options of “failing,” “below average,” “average,” and “above average”). The raw scores on the school competency scale are summed (range=0.0-6.0) and then are translated into age and sex normed *T* scores and interpreted like the other CBCL competency subscales.

A *total competence scale* can be summed for a total raw score (range=0.0-35.0) and then converted to *T* scores ranging from 10 to 80 ($M=50$, $SD=10$). The same cutoff scores for clinical (≤ 30) and borderline clinical cases (31-35) are used.

CBCL Symptom Profile: Parents also rated 120 symptom items on a 0-2 scale (where “0” equals “not true [about my child]” and “2” equals “very true or often true [about my child]”). One of the possible eight syndrome scales was included in this study. The *social problems* subscale is comprised of 11 items including: “complains of loneliness” and “not liked by other kids.” *T* scores for syndrome scales range from 50 to 100 ($M=50$, $SD=10$) with scores between 65 and 69 representing the borderline clinical cases (3rd to 7th percentile) and scores of 70 and above representing clinical cases (2nd percentile).

Target problems. Parents provided up to three target problems as an idiographic measure of problems in the youth’s life. Target problems were coded using the system described in previous research (Hoffman & Chu, n.d.). Problems were initially grouped into 25 specific target areas, which were then further grouped into 8 broader domains. The broad domains included in this study were problems related to school (e.g., not going to school, frequent visits to the nurse), family problems (e.g., sibling fighting, difficulty dealing with family conflict), somatic complaints (e.g., headaches, stomachaches), peer relation problems (e.g., no friends, trouble making friends), conduct problems (e.g., irritates others, breaking rules), and physical activity/engagement problems (e.g., difficulty getting out of bed). Problems were rated on a 9-point Likert scale ranging from 0 (not a problem) to 8 (very serious problem).

Procedures

Treatment-seeking families called a university specialty clinic and completed a phone screen. Potential participants then attended a no-cost diagnostic interview (ADIS-P Silverman & Albano, 2000) and parents completed pretreatment questionnaires. ADIS-

C/P interviews were conducted by psychology doctoral students trained to criterion (see ADIS-IV reliabilities above). All procedures were approved by the institution's Institutional Review Board.

Statistical Analysis

Prior to analysis, data was screened for univariate and multivariate outliers. Any datum that was three or more standard deviations above the mean was brought to the fence. Data were also screened for normality. Violations were addressed with logarithmic transformations (Glantz, 2005). Missing data pattern analysis was conducted in SPSS 21 (SPSS IBM, New York, U.S.A.). Little's Missing Completely at Random (MCAR) test was conducted to ensure data was not missing systematically and then expectation maximization (EM) was used to impute missing values. EM is a two-step, iterative process (Schlomer, Bauman, & Card, 2010). The first step, expectation, is similar to other regression-based imputation methods using parameters (e.g., means, covariances) to estimate the missing data. In the second step, maximization, parameter estimates are recalculated with the newly imputed data. The process repeats until little difference is seen between parameter estimates from subsequent iterations (Allison, 2000). EM has been suggested to produce "unbiased and efficient" estimates (Graham, Cumsille, & Elek-Fisk, 2003, p. 94).

In order to account for the multiple continuous dependent variables, the current study used a multivariate analysis of variance (MANOVA). This approach has a number of advantages over running multiple one-way analysis of variance (Grimm & Yarnold, 1995). First, MANOVA controls for Type I error (Huberty & Morris, 1989). Second, the MANOVA takes into account information from all dependent variables to create a vector

of means, which reduces redundancy from intercorrelated measures and provides results that reflect the effect of the independent variables across all of the dependent variables (Grimm & Yarnold, 1995). In the case of a significant omnibus MANOVA, multivariate contrasts were conducted to compare the different diagnostic categories across the vector of dependent variables (Huberty & Morris, 1989).

Figure 1 outlines the multi-step approach used to investigating the impact of comorbidity within a transdiagnostic framework. In Step 1, “pure” diagnostic categories were compared to each other using a one-way MANOVA with planned multivariate contrasts. Functional impairments (e.g., social impairment) were labeled *disorder-specific* (Path A of Figure 1) if contrasts indicated that the impairment was significantly elevated in one disorder group (SP, GAD, DD) compared to others. *Transdiagnostic* functional impairments (Path B of Figure 1) were identified when contrasts indicated that impairment levels in two diagnostic groups were significantly greater than the third and not significantly different from each other. Step 2 investigated how comorbidity might affect the level of functional impairment. For disorder-specific impairments identified in Step 1, the principal disorder in which the impairment was elevated was compared to all other comorbid categories using the principal disorder as a comparison group in a one-way MANOVA. Step 2A of Figure 1 provides an example of how the analysis would be conducted if DD were identified to have disorder-specific impairment. A primary DD group would be compared to youth diagnosed with DD+SP, DD+GAD, and DD+SP+GAD. Figure 2 provides graphical depictions of possible outcomes from the analyses conducted at each step of the flowchart. Figure 2-1 provides a graphical depiction of the outcome where DD is identified to have disorder-specific outcome.

Figure 2-2 and 2-3 depict two possible results of the follow-up analysis (Step 2A) to determine the impact of comorbidity. Figure 2-2 reflects an augmentative effect (i.e., comorbidity contributes to greater impairment) and figure 2-3 reflects no effect of comorbidity.

For transdiagnostic impairments identified in Step 1, principal disorders identified were compared to all other comorbid categories using the principal disorder diagnostic groups as a comparison. Step 2B of Figure 1 reflects the analysis conducted if SP and GAD were identified to have transdiagnostic functional impairment. Primary groups of principal SP and principal GAD would be compared to youth diagnosed with SP+GAD, SP+DD, GAD+DD, and SP+GAD+DD. Figure 3 provides a graphical depiction of each step of the flowchart. Figure 3-1 illustrates the outcome where a comparison of SP and GAD provide evidence for transdiagnostic impairment. Figure 3-2 reflects an augmentative effect and Figure 3-3 reflects no effect of comorbidity after Step 2B.

Results

Data Cleaning

Data were examined for normality violations using standard practice (Field, 2009). Variables who violated skew or kurtosis were identified as greater than ± 1.96 using the formula $Z = [(0 - \text{skew}) / SE_{\text{Skew}}]$ and $Z = [(0 - \text{kurtosis}) / SE_{\text{Kurtosis}}]$. The following variables were significantly skewed or kurtotic (and underwent the listed transformation): current school attendance (logarithmic), previous school attendance (logarithmic), visits to school nurse (logarithmic), CBCL activities competency scale (brought to fence), and RCADS (brought to fence). Each transformation corrected the variables to be sufficiently normal for analysis.

The target problems measure was removed at this stage because a limited number of youth endorsed any of the functional domains as target problems. A total of 22.6% of parents (33/146) reported any target problem related to academic functioning, 3.4% reported target problems related to family functioning (5/146), 36.3% (53/146) reported target problems related to social functioning, and 3.4% (5/146) reported any target problem related to somatic complaints or health behavior. The removal of target problems also meant that the somatic complaints functional domain would only be assessed by one measure and would, therefore, be inappropriate for a MANOVA framework. Thus, somatic problems were not assessed as potential domains of functional impairment.

Step 1: Functional Impairment across Pure Diagnoses

Three separate MANOVAs were conducted in order to determine differences between pure diagnostic groups on aggregated measures representing the functional impairments in school, social, and family domains (Step 1 of Figure 1). All analyses controlled for anxiety and depression symptom severity using the STAIC-T-P and RCADS-P, respectively. Results from the omnibus MANOVAs found significant differences between youth diagnosed with pure GAD, SP, or DD for school domains ($F(8,92)=2.28$, Pillai's Trace=.325, $p=.03$, $\eta_p^2=.16$), and pairwise comparisons identified youth with SP (Mean difference=1.06, $SE=.33$, $p=.01$) and DD (Mean difference=1.24, $SE=.39$, $p=.01$) as significantly more impaired than youth diagnosed with GAD. Omnibus MANOVA for social domains also found significant differences between the groups ($F(8,92)=3.18$, Pillai's Trace=.43, $p=.003$, $\eta_p^2=.22$), and pairwise comparisons found that youth diagnosed with DD were significantly more impaired than youth diagnosed with

GAD (Mean difference=1.80, $SE=.39$, $p<.001$) and SP (Mean difference=1.68, $SE=.41$, $p<.001$). Youth diagnosis of pure GAD, SP, or DD did not show differences in impairments in family functioning ($F(4, 96)=.88$, Pillai's Trace=.07, $\eta_p^2=.04$, $p=.48$).

Specific Functional Impairment within Domains

Pairwise contrasts were conducted to identify on which specific dependent measures youth diagnosed with GAD, SP, and DD differed. As seen in Table 2, youth diagnosed with DD missed significantly more school days than youth diagnosed with GAD ($p=.05$). Parents of youth with DD rated their child as having more social problems than youth diagnosed with GAD ($p=.04$) and less competent in age-appropriate activities than youth diagnosed with either GAD ($p<.01$) or SP ($p=.02$). Youth with GAD were rated more socially competent via parent report on the ADIS interpersonal module than youth diagnosed with SP ($p=.03$). No follow-up analyses were conducted on family functioning, as the omnibus MANOVA was nonsignificant.

Step 2: The Augmentative Effect of Comorbidity

For functional domains that were identified as significantly different, we conducted additional analyses according to Step 2 of the decision flowchart presented earlier (Figure 1).

As indicated in the results of the Step 1 analyses, youth diagnosed with DD were found to be significantly more impaired than youth diagnosed with GAD or SP in social functioning. Therefore, we conducted *disorder-specific* Step 2 analyses for DD (i.e., DD vs. DD+GAD vs. DD+SP vs. DD+GAD+SP). The results of the disorder-specific analyses found no significant differences among the diagnostic groups ($F(12,177)=.64$, Pillai's Trace=.13, $p=.81$, $\eta_p^2=.04$). Results from the Step 1 analysis found that youth

diagnosed with SP or DD were significantly more impaired than youth diagnosed with GAD in school functioning. Therefore, we conducted a *transdiagnostic* Step 2 analysis for youth diagnosed with SP or DD (i.e., SP vs. DD vs. SP+DD vs. SP+GAD vs. DD+GAD vs. SP+DD+GAD). Results from this analysis also found no differences among the groups ($F(20,472)=.85$, Pillai's Trace=.11, $p=.85$, $\eta_p^2=.03$).

Discussion

The current study utilized a novel model to examine *disorder-specific* and *transdiagnostic* functional impairments in youth internalizing disorders. The results of the study provide three key findings. First, pure diagnoses of GAD, SP, and DD in youth were discriminated by differences on clusters of dependent measures representing social and school, but not family, functioning domains. Second, follow-up analyses revealed that differences between DD and GAD/SP on social functioning were largely determined by depressed youth's lower competency in activities and higher number of social problems. The differences between GAD and SP/DD on school functioning were largely identified by number of school absences during the current academic year. Finally, the results did not provide evidence of increased impairment (no augmentative effects) with the addition of comorbid diagnoses of GAD, SP, and DD.

The finding that school impairments were transdiagnostic across SP and DD was consistent with our hypotheses. While youth diagnosed with either disorder were found to function at similar levels, both diagnoses were related to worse school functioning than youth diagnosed with GAD. The finding is consistent with previous literature that found youth diagnosed with SP were more significantly impaired in school settings than youth diagnosed with GAD or separation anxiety disorder (Bernstein, Bernat, Davis, & Layne,

2008; Crawley, Beidas, Benjamin, Martin, & Kendall, 2008; Mychailyszyn et al., 2010). Similarly, youth diagnosed with DD most frequently reported impairment in school domains compared to leisure or social domains in previous research (Essau et al., 2000). The higher school functioning for youth with GAD is also consistent with the increased performance anxiety, perfectionism, and worry commonly observed in youth with GAD (Perrin & Last, 1997; Weems, Silverman, & La Greca, 2000). Research on cognitive attention mechanisms provides another link. Recent research has suggested that youth diagnosed with SP or DD tend to *avoid* threat stimuli whereas youth with GAD show a bias *toward* threatening stimuli (Harrison & Gibb, 2014; Waters, Bradley, & Mogg, 2014). The increased attention in youth with GAD might help youth obtain more information than youth diagnosed with SP or DD. It is important to note that without a control group, these results do not mean that youth with GAD are not impaired in academic settings – only that they might be less impaired than youth diagnosed with either SP or DD.

The finding that impaired social functioning was disorder-specific for youth diagnosed with DD partially supported our hypotheses. Youth with depression might have increased social impairment compared to youth diagnosed with an anxiety disorder because depressed youth have a tendency to withdrawal from social interactions and are more likely to have aggressive interactions (Altmann & Gotlib, 1988) whereas youth with anxiety disorders are often rated as neglected (Beidel, Turner, & Morris, 1999). The more overt nature of negative social interactions for depressed youth might lead parents to report greater social impairment for youth with DD. In order to investigate this possibility, future research should obtain reports from multiple informants (e.g., peer

nominations). Another possible explanation might be that the items used to assess social impairment might have also tapped the construct of activity engagement. Previous research has suggested that youth with anxiety have the paradoxical stance of wanting to engage in social activity but end up avoiding because of their fears (Gazelle & Rudolph, 2004) while other studies have suggested that youth with depression have the tendency to avoid participating in activities (Chu, Skriner, & Staples, 2013). However, the number of activities might not be a useful marker of social interaction as many parents listed solitary activities (e.g., video games, TV) and activity-type was not examined in the current study. Finally, previous research has suggested that SP might not be distinguished from GAD on social anxiety and that worries about physical safety might help discriminate the disorders (Whitmore, Kim-Spoon, & Ollendick, 2014). Again, the results from this study only suggest that youth with DD experience more social impairment than youth diagnosed with GAD or SP, not that youth with GAD or SP do not experience social impairment. This speaks to the necessity to include a control group in future research.

We found it interesting that family functioning was transdiagnostic across GAD, SP, and DD. While previous research has suggested that family functioning might be most vulnerable for youth diagnosed with GAD (Alfano, 2012) and youth diagnosed with DDs have worse relationships with parents and siblings (Puig-Antich et al., 1993), the nature of these findings cannot be interpreted without a control group. It is possible that all or none of the diagnostic groups were related to significant family impairments in this study. Future research should aim to include a nonclinical sample or use benchmarking techniques in order to help unpack findings that do not discriminate between the disorders.

The results from the step-down analyses suggest the importance of selecting measures to help discriminate among youth diagnoses of SP, GAD, and DD. For example, the current study found that youth with SP or GAD were not significantly differentiated by the omnibus MANOVA for social functioning but the two groups were distinguished by scores on the ADIS-P Interpersonal Module (Table 2). This finding has also been supported by previous research where youth with SP were just as engaged in social activities as their peers with GAD (measured by CBCL social competence scale) but were more likely to experience difficulty making and keeping friends (measured by ADIS-P) (Scharfstein et al., 2011). Additionally, intervention research has suggested that treatments for youth SP are mediated by social skills training (Greco & Morris, 2005) and that youth who received social skills training in addition to fluoxetine displayed significantly improved social functioning than youth who received fluoxetine alone (Beidel et al., 2007; Scharfstein, Beidel, Rendon Finnell, Distler, & Carter, 2011). Taken together, these findings suggest that youth with SP and GAD be distinguished best by a unique subset of social functioning items that include social skills, quality of friendships, and ease of social interaction.

The step-down analyses also suggested that current school absenteeism might be a useful measure for discriminating youth diagnosed with GAD from DD. Indeed, previous research has suggested that DD diagnoses are prevalent in youth who school refusal behavior (see Kearney 2008 for a review) and an empirical study have listed depression as the most common diagnosis for youth with anxiety-based school refusal (e.g., Egger, Costell, & Angold, 2003). Future research should explore depression's unique contribution to a child's school functioning and consider examining how role

impairments and disordered sleep might contribute to or explain the relationship between depression and school functioning.

We also found it interesting that the results did not support the hypothesized augmentative effect comorbidity would have on functional impairments. In the three previous studies that examined comorbidity and impairment, comorbid diagnoses tended to be related to greater impairment than pure diagnoses (Alfano, 2012; Franco et al., 2007; Mychailyszyn et al., 2010). However, there also exists a body of literature suggesting that comorbidity is not related to treatment outcomes (e.g., Webster-Stratton, Reid, & Hammond, 2001) and has also been found not to increase chances of relapse over 12-month follow-up for depressed youth (Emslie et al., 1997). Furthermore, experts have suggested that some studies might have confounded the effects of severity with those of comorbidity (Jensen-Doss & Weisz, 2006). Indeed, previous investigations have found that the effects of comorbidity disappear after controlling for initial symptom severity (Abramowitz & Foa, 2000; Brent et al., 1998). This critique does not apply to the current study, though, where symptom severity was controlled for in all analyses. The limited sample sizes for some of the comorbid groups and the mild to moderate clinical severity of the sample, typical of a self-referred outpatient population, might have contributed to the lack of augmentative effects of comorbidity. Had the sample included a greater number of comorbid cases and examined more varied comorbid cases (e.g., externalizing disorders) different results might have been found.

Limitations

The current study had a number of key limitations. First, the current study did not use a single measure of functional impairment. Instead, multiple subscales and items

were coalesced into vector means through a MANOVA framework to create functional domains. The fact that (1) GAD was distinguished from DD and SP on school domains and (2) DD was distinguished from GAD and SP on social domains suggests that these measures were nonetheless valuable and results might have been even stronger with measures that are more precise. A number of empirically supported assessments of functional interference exist and should be used in future studies (e.g., Child And Adolescent Functional Assessment Scale; Hodges, 1990). Second, the lack of a control group made it difficult to unpack the disorder-specific and transdiagnostic effects of the functional domains. Third, the current study only used parent-report to assess child functioning. The child's subjective experience of his or her functioning might provide unique information that helps discriminate different diagnostic groups and should be included in future investigations. Fourth, the current project only includes a select number of the functional domains highlighted by the WHO (World Health Organization, 2011). However, the study still showed preliminary evidence for the potential utility of functional domains as discriminatory variables for youth psychopathology using a novel transdiagnostic framework. Finally, the sample reflected mild-to-moderate clinical severity with a moderate representation of comorbidity profiles. Greater diversity or range of comorbidity may have produced different results.

Future Directions and Conclusion

The results of this study provide several interesting directions for future research. First, the model of examining disorder-specific and transdiagnostic mechanisms can be applied to a multitude of topics ranging from functional impairments to symptoms to contextual factors. Second, future investigations should use a psychometrically-sound

measure of functional impairment. Third, researchers should obtain reports from multiple sources (i.e., parents, youth, teachers, peers) as previous research has suggested that some impairments might be highlighted by different reporters (Mychailyszyn et al., 2010). Finally, the addition of a control group and youth diagnosed with externalizing disorders would provide valuable information in a single study about how youth diagnosed with common mental problems might experience functional interference.

The findings also suggest that the specific measures of functional impairment used might influence results. For example, one index of school functioning (school attendance) was differentially related to youth with GAD, SP, or DD. Similarly, three indices of social functioning (activities competency, social problems, and the ADIS interpersonal module) were differentially related to the pure diagnostic groups. Future research would be wise to examine a wide battery of measures with a larger sample to identify which indices best assess and discriminate youth GAD, SP, and DD.

The current study presents a novel model for examining disorder-specific and transdiagnostic mechanisms. Following the model resulted in identification of school interference as transdiagnostic between SP and DD in youth and social interference as disorder-specific for youth diagnosed with DD. Use of the model might help elucidate procedures for examining unique and common processes of youth mental problems.

References

- Abramowitz, J. S., & Foa, E. B. (2000). Does comorbid major depressive disorder influence outcome of exposure and response prevention for OCD? *Behavior Therapy, 31*(4), 795–800.
- Achenbach, T. M., & Rescorla, L. A. (2001). *Manual for the ASEBA School-Age Forms & Profiles*. Burlington, VT: University of Vermont, Research Center for Children, Youth, and Families.
- Alfano, C. A. (2012). Are children with “pure” generalized anxiety disorder impaired? A comparison with comorbid and healthy children. *Journal of Clinical Child and Adolescent Psychology, 41*(6), 739–745. doi:10.1080/15374416.2012.715367
- Allison, P. D. (2000). *Missing data*. Sage Thousand Oaks, CA. Retrieved from <http://www.statisticalhorizons.com/wp-content/uploads/2012/01/Milsap-Allison.pdf>
- Altmann, E. O., & Gotlib, I. H. (1988). The social behavior of depressed children: An observational study. *Journal of Abnormal Child Psychology, 16*(1), 29–44.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders: DSM-IV-TR®*. Arlington, VA: American Psychiatric Publishing.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.
- Anderson, E. R., & Hope, D. A. (2008). A review of the tripartite model for understanding the link between anxiety and depression in youth. *Clinical Psychology Review, 28*(2), 275–287. doi:10.1016/j.cpr.2007.05.004

- Asarnow, J. R., Jaycox, L. H., Duan, N., LaBorde, A. P., Rea, M. M., Tang, L., ... Wells, K. B. (2005). Depression and role impairment among adolescents in primary care clinics. *Journal of Adolescent Health, 37*(6), 477–483.
doi:10.1016/j.jadohealth.2004.11.123
- Becker, K. D., Chorpita, B. F., & Daleiden, E. L. (2011). Improvement in symptoms versus functioning: How do our best treatments measure up? *Administration and Policy in Mental Health and Mental Health Services Research, 38*(6), 440–458.
- Beidel, D. C., Turner, S. M., & Morris, T. L. (1999). Psychopathology of childhood social phobia. *Journal of the American Academy of Child & Adolescent Psychiatry, 38*(6), 643–650.
- Beidel, D. C., Turner, S. M., Sallee, F. R., Ammerman, R. T., Crosby, L. A., & Pathak, S. (2007). SET-C vs. fluoxetine in the treatment of childhood social phobia. *Journal of the American Academy of Child and Adolescent Psychiatry, 46*(12), 1622-1632.
- Berman, S. L., Weems, C. F., Silverman, W. K., & Kurtines, W. M. (2000). Predictors of outcome in exposure-based cognitive and behavioral treatments for phobic and anxiety disorders in children. *Behavior Therapy, 31*(4), 713–731.
- Bernstein, G. A., Bernat, D. H., Davis, A. A., & Layne, A. E. (2008). Symptom presentation and classroom functioning in a nonclinical sample of children with social phobia. *Depression and Anxiety, 25*(9), 752–760.
- Brent, D. A., Kolko, D. J., Birmaher, B., Baugher, M., Bridge, J., Roth, C., & Holder, D. (1998). Predictors of treatment efficacy in a clinical trial of three psychosocial

treatments for adolescent depression. *Journal of the American Academy of Child & Adolescent Psychiatry*, 37(9), 906–914.

Chorpita, B. F., Daleiden, E. L., Ebesutani, C., Young, J., Becker, K. D., Nakamura, B.

J., ... Trent, L. (2011). Evidence-based treatments for children and adolescents: An updated review of indicators of efficacy and effectiveness. *Clinical Psychology: Science and Practice*, 18(2), 154–172.

Chu, B. C., Skriner, L. C., & Staples, A. M. (2013). Behavioral Avoidance across Child and Adolescent Pathology. In J. Ehrenreich-May & B. C. Chu (Eds.), *Transdiagnostic treatments for children and adolescents: principles and practice*. Guilford Press.

Compas, B. E., Watson, K. H., Reising, M. M., & Dunbar, J. (2013). Stress and Coping: Transdiagnostic Processes in Child and Adolescent Psychopathology. In J. Ehrenreich-May & B. C. Chu (Eds.), *Transdiagnostic treatments for children and adolescents: principles and practice*. Guilford Press.

Costello, E. J., Egger, H. L., Copeland, W., Erkanli, A., & Angold, A. (2011). The developmental epidemiology of anxiety disorders: Phenomenology, prevalence, and comorbidity. *Anxiety Disorders in Children and Adolescents: Research, Assessment and Intervention*, 56–75.

Crawley, S. A., Beidas, R. S., Benjamin, C. L., Martin, E., & Kendall, P. C. (2008).

Treating Socially Phobic Youth with CBT: Differential Outcomes and Treatment Considerations. *Behavioural and Cognitive Psychotherapy*, 36(04).

doi:10.1017/S1352465808004542

- Crawley, S. A., Caporino, N. E., Birmaher, B., Ginsburg, G., Piacentini, J., Albano, A. M., ... Kendall, P. C. (2013). Somatic Complaints in Anxious Youth. *Child Psychiatry & Human Development*. doi:10.1007/s10578-013-0410-x
- Curry, J., Rohde, P., Simons, A., Silva, S., Vitiello, B., Kratochvil, C., ... Pathak, S. (2006). Predictors and moderators of acute outcome in the Treatment for Adolescents with Depression Study (TADS). *Journal of the American Academy of Child & Adolescent Psychiatry*, 45(12), 1427–1439.
- Egger, H. L., Costello, E. J., & Angold, A. (2003). School refusal and psychiatric disorders: A community study. *Journal of the American Academy of Child and Adolescent Psychiatry*, 42, 797–807.
- Ehrenreich-May, J., & Chu, B. C. (2013). *Transdiagnostic treatments for children and adolescents: Principles and practice*. Guilford Press.
- Emslie, G. J., Rush, A., Weinberg, W. A., Gullion, C. M., Rintelmann, J., & Hughes, C. W. (1997). Recurrence of major depressive disorder in hospitalized children and adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry*, 36(6), 785–792.
- Essau, C. A., Conradt, J., & Petermann, F. (2000). Frequency, comorbidity, and psychosocial impairment of depressive disorders in adolescents. *Journal of Adolescent Research*, 15(4), 470–481. doi:10.1177/0743558400154003
- Ezpeleta, L., Domenech, J. M., & Angold, A. (2006). A comparison of pure and comorbid CD/ODD and depression. *Journal of Child Psychology and Psychiatry*, 47(7), 704–712.

- Field, A. (2009). *Discovering statistics using SPSS*. Sage publications. Retrieved from http://books.google.com/books?hl=en&lr=&id=a6FLF1YOqtsC&oi=fnd&pg=PR5&dq=andy+field+spss+book&ots=99bF2YAPEP&sig=ez0LJ_Hq4lnMZN-lenvxr8CHzMs
- Franco, X., Saavedra, L. M., & Silverman, W. K. (2007). External validation of comorbid patterns of anxiety disorders in children and adolescents. *Journal of Anxiety Disorders, 21*(5), 717–729. doi:10.1016/j.janxdis.2006.10.002
- Garber, J., & Weersing, V. R. (2010). Comorbidity of Anxiety and Depression in Youth: Implications for Treatment and Prevention. *Clinical Psychology : A Publication of the Division of Clinical Psychology of the American Psychological Association, 17*(4), 293–306. doi:10.1111/j.1468-2850.2010.01221.x
- Gazelle, H., & Rudolph, K. D. (2004). Moving toward and away from the world: Social approach and avoidance trajectories in anxious solitary youth. *Child Development, 75*(3), 829–849.
- Ginsburg, G. S., La Greca, A. M., & Silverman, W. K. (1998). Social anxiety in children with anxiety disorders: Relation with social and emotional functioning. *Journal of Abnormal Child Psychology, 26*(3), 175–185.
- Glantz, S. A. (2005). *Primer of biostatistics*. New York: McGraw-Hill Medical Pub.
- Graham, J. W., Cumsille, P. E., & Elek-Fisk, E. (2003). Methods for handling missing data. *Handbook of Psychology*. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1002/0471264385.wei0204/full>

Greco, L. A. & Morris, T. L. (2005). Factors influencing the link between social anxiety and peer acceptance: Contributions of social skills and close friendships during middle childhood. *Behavior Therapy*, *36*, 197-205.

Harrison, A. J., & Gibb, B. E. (2014). Attentional Biases in Currently Depressed Children: An Eye-Tracking Study of Biases in Sustained Attention to Emotional Stimuli. *Journal of Clinical Child & Adolescent Psychology*, *0*(0), 1–7.
doi:10.1080/15374416.2014.930688

Hodges, K. (1990). *Child and adolescent functional assessment scale (CAFAS)*.

Retrieved from

<http://books.google.com/books?hl=en&lr=&id=nDvtKj0CIIYC&oi=fnd&pg=PA405&dq=Child+And+Adolescent+Functional+Assessment+Scale&ots=xrmAwqcWyE&sig=8tzP4bmrxCc-6RcwPnqN6CeFOA>

Jensen-Doss, A., & Weisz, J. R. (2006). Syndrome co-occurrence and treatment outcomes in youth mental health clinics. *Journal of Consulting and Clinical Psychology*, *74*(3), 416.

Joiner, T., Coyne, J. C., & Blalock, J. (1999). On the interpersonal nature of depression: Overview and synthesis. Retrieved from

<http://psycnet.apa.org/index.cfm?fa=main.doiLanding&uid=1999-02131-013>

Kearney, C. A. (2008). School absenteeism and school refusal behavior in youth: A contemporary review. *Clinical psychology review*, *28*(3), 451-471.

Kendall, P. C., Aschenbrand, S. G., & Hudson, J. L. (2003). Child-focused treatment of anxiety. In A. E. Kazdin & J. R. Weisz (Eds.), *Evidence-based psychotherapies for children and adolescents* (pp. 81–100). New York, NY, US: Guilford Press.

- Kessler, R. C., DuPont, R. L., Berglund, P., & Wittchen, H.-U. (1999). Impairment in Pure and Comorbid Generalized Anxiety Disorder and Major Depression at 12 Months in Two National Surveys. *American Journal of Psychiatry*, *156*(12), 1915–1923.
- Klein, D. N., Dougherty, L. R., & Olino, T. M. (2005). Toward Guidelines for Evidence-Based Assessment of Depression in Children and Adolescents. *Journal of Clinical Child & Adolescent Psychology*, *34*(3), 412–432.
doi:10.1207/s15374424jccp3403_3
- Kroenke, K., Spitzer, R. L., Williams, J. B. W., Monahan, P. O., & Löwe, B. (2007). Anxiety Disorders in Primary Care: Prevalence, Impairment, Comorbidity, and Detection. *Annals of Internal Medicine*, *146*(5), 317–325. doi:10.7326/0003-4819-146-5-200703060-00004
- Mansell, W., Harvey, A., Watkins, E. R., & Shafran, R. (2008). Cognitive behavioral processes across psychological disorders: A review of the utility and validity of the transdiagnostic approach, *I*(3), 181–191.
- Mansell, W., Harvey, A., Watkins, E., & Shafran, R. (2009). Conceptual foundations of the transdiagnostic approach to CBT. *Journal of Cognitive Psychotherapy*, *23*(1), 6–19.
- Masi, G., Favilla, L., Mucci, M., & Millepiedi, S. (2000). Depressive comorbidity in children and adolescents with generalized anxiety disorder. *Child Psychiatry and Human Development*, *30*(3), 205–215.
- Merikangas, K. R., He, J., Burstein, M., Swanson, S. A., Avenevoli, S., Cui, L., ... Swendsen, J. (2010). Lifetime prevalence of mental disorders in US adolescents:

- results from the National Comorbidity Survey Replication–Adolescent Supplement (NCS-A). *Journal of the American Academy of Child & Adolescent Psychiatry*, 49(10), 980–989.
- Mychailyszyn, M. P., Méndez, J. L., & Kendall, P. C. (2010). School functioning in youth with and without anxiety disorders: Comparisons by diagnosis and comorbidity. *School Psychology Review*, 39(1), 106–121.
- Nolen-Hoeksema, S., & Watkins, E. R. (2011). A Heuristic for Developing Transdiagnostic Models of Psychopathology Explaining Multifinality and Divergent Trajectories. *Perspectives on Psychological Science*, 6(6), 589–609.
- Perrin, S., & Last, C. G. (1997). Worrisome thoughts in children clinically referred for anxiety disorder. *Journal of Clinical Child Psychology*, 26(2), 181–189.
- Puig-Antich, J., Kaufman, J., Ryan, N. D., Williamson, D. E., Dahl, R. E., Lukens, E., ... Nelson, B. (1993). The psychosocial functioning and family environment of depressed adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry*, 32(2), 244–253.
- Rapee, R. M., Bögels, S. M., van der Sluis, C. M., Craske, M. G., & Ollendick, T. (2012). Annual research review: conceptualising functional impairment in children and adolescents. *Journal of Child Psychology and Psychiatry*, 53(5), 454–468.
- Scharfstein, L., Alfano, C., Beidel, D., & Wong, N. (2011). Children with Generalized Anxiety Disorder Do Not Have Peer Problems, Just Fewer Friends. *Child Psychiatry & Human Development*, 42(6), 712–723. doi:10.1007/s10578-011-0245-2

- Scharfstein, L. A., Beidel, D. C., Rendon Finnell, L., Distler, A., & Carter, N. T. (2011). Do pharmacological and behavioral interventions differentially affect treatment outcome for children with social phobia? *Behavior Modification, 35*(5), 451-467. doi:10.1177/0145445511408590
- Schlomer, G. L., Bauman, S., & Card, N. A. (2010). Best practices for missing data management in counseling psychology. *Journal of Counseling Psychology, 57*(1), 1.
- Shaffer, D., Gould, M. S., Brasic, J., Ambrosini, P., Fisher, P., Bird, H., & Aluwahlia, S. (1983). A children's global assessment scale (CGAS). *Archives of General Psychiatry, 40*(11), 1228.
- Silverman, W. K., & Albano, A. M. (2000). *Anxiety Disorders Interview Schedule for Children (ADIS-IV) Child and Parent Interviews*. New York, NY: Oxford University Press.
- Stark, K. D., & Laurent, J. (2001). Joint factor analysis of the children's depression inventory and the revised children's manifest anxiety scale. *Journal of Clinical Child Psychology, 30*(4), 552-567.
- Strauss, C. C., Frame, C. L., & Forehand, R. (1987). Psychosocial impairment associated with anxiety in children. *Journal of Clinical Child Psychology, 16*(3), 235-239.
- Strauss, C. C., Lahey, B. B., Frick, P., Frame, C. L., & Hynd, G. W. (1988). Peer social status of children with anxiety disorders. *Journal of Consulting and Clinical Psychology, 56*(1), 137.

- Vernberg, E. M., Abwender, D. A., Ewell, K. K., & Beery, S. H. (1992). Social anxiety and peer relationships in early adolescence: A prospective analysis. *Journal of Clinical Child Psychology, 21*(2), 189–196.
- Waters, A. M., Bradley, B. P., & Mogg, K. (2014). Biased attention to threat in paediatric anxiety disorders (generalized anxiety disorder, social phobia, specific phobia, separation anxiety disorder) as a function of “distress” versus “fear” diagnostic categorization. *Psychological Medicine, 44*(03), 607–616.
doi:10.1017/S0033291713000779
- Webster-Stratton, C., Reid, J., & Hammond, M. (2001). Social skills and problem-solving training for children with early-onset conduct problems: Who benefits? *Journal of Child Psychology and Psychiatry, 42*(07), 943–952.
- Weems, C. F., Silverman, W. K., & La Greca, A. M. (2000). What do youth referred for anxiety problems worry about? Worry and its relation to anxiety and anxiety disorders in children and adolescents. *Journal of Abnormal Child Psychology, 28*(1), 63–72.
- Weisz, J. R., Southam-Gerow, M. A., Gordis, E. B., & Connor-Smith, J. (2003). Primary and secondary control enhancement training for youth depression: Applying the deployment-focused model of treatment development and testing. In A. E. Kazdin & J. R. Weisz (Eds.), *Evidence-based psychotherapies for children and adolescents* (pp. 165–182). New York, NY, US: Guilford Press.
- Whitmore, M. J., Kim-Spoon, J., & Ollendick, T. H. (2014). Generalized Anxiety Disorder and Social Anxiety Disorder in Youth: Are They Distinguishable? *Child*

Psychiatry & Human Development, 45(4), 456–463. doi:10.1007/s10578-013-0415-5

Winters, N. C., Collett, B. R., & Myers, K. M. (2005). Ten-Year Review of Rating Scales, VII: Scales Assessing Functional Impairment. *Journal of the American Academy of Child & Adolescent Psychiatry*, 44(4), 309–338.
doi:10.1097/01.chi.0000153230.57344.cd

Wittchen, H.-U. (2002). Generalized anxiety disorder: prevalence, burden, and cost to society. *Depression and Anxiety*, 16(4), 162–171. doi:10.1002/da.10065

World Health Organization. (2011). 2.0 WHODAS 2.0. *Geneva: World Health Organization*.

Footnotes

¹ Youth with a “pure” diagnoses of SP, GAD, or DD might have been diagnosed with comorbid diagnoses not investigated in this study (e.g., OCD, ADHD, specific phobia). The decision was made to focus on the main anxiety and mood disorders that capture the majority of treatment seeking youth in general practice.

Table 1. Functional Impairments in youth and their associated measures.

Measure	School Problems	Social Problems	Family Problems	Somatic Problems
ADIS-P Interpersonal Module		X		
ADIS-P Interpersonal Module Family Items			X	
ADIS-P School Module	X			
School Absences	X			
CBCL Activities Competency		X		
CBCL Social Competency		X		
CBCL School Competency	X			
CBCL Social Problems Syndrome Scale		X		
CBCL Somatic Problems Syndrome Scale				X
Target Problems			X	X

Table 2. Comparison of specific functional impairment within domains across disorder.

Dependent Variable	GAD	SP <i>M(SD)</i>	DD <i>M(SD)</i>
<u>School Domain <i>M(SE)*</i></u>	2.88(.23) ^a	1.83(.22) ^b	1.65(.33) ^b
Current year school attendance <i>M(SD)</i>	.30(.37) ^{a,b}	.35(.50) ^{b,c}	.70(.64) ^c
Previous year school attendance <i>M(SD)</i>	.54(.42)	.39(.60)	.43(.71)
Visits to Nurse <i>M(SD)</i>	.29(.52)	.12(.28)	.34(.46)
CBCL School Competency <i>M(SD)</i>	4.34(.93)	4.22(1.17)	4.32(1.13)
<u>Social Domain <i>M(SE)*</i></u>	4.58(.23) ^a	4.45(.22) ^a	2.78(.33) ^b
CBCL Activities Competency <i>M(SD)</i>	9.79(1.40) ^a	8.89(2.64) ^a	7.20(1.72) ^b
CBCL Social Competency <i>M(SD)</i>	7.18(1.94)	6.72(2.97)	6.10(3.02)
CBCL Social Problems <i>M(SD)</i>	5.89(3.76) ^a	4.12(3.19) ^{a,b}	3.50(3.21) ^b
ADIS Interpersonal Module <i>M(SD)</i>	5.00(1.59) ^a	4.38(1.74) ^b	4.70(1.83) ^{a,b}
<u>Family Domain <i>M(SE)**</i></u>	N.S.	N.S.	N.S.

Outcomes with the same Superscripts within a dependent variable indicate nonsignificant differences. Dependent variables without any superscripts are all not significantly different. *Domain-specific results are the vector means produced by the MANOVA. **Vector means and pairwise comparisons were not calculated for the family functioning domain because the three diagnostic groups were not significantly different after the omnibus MANOVA.

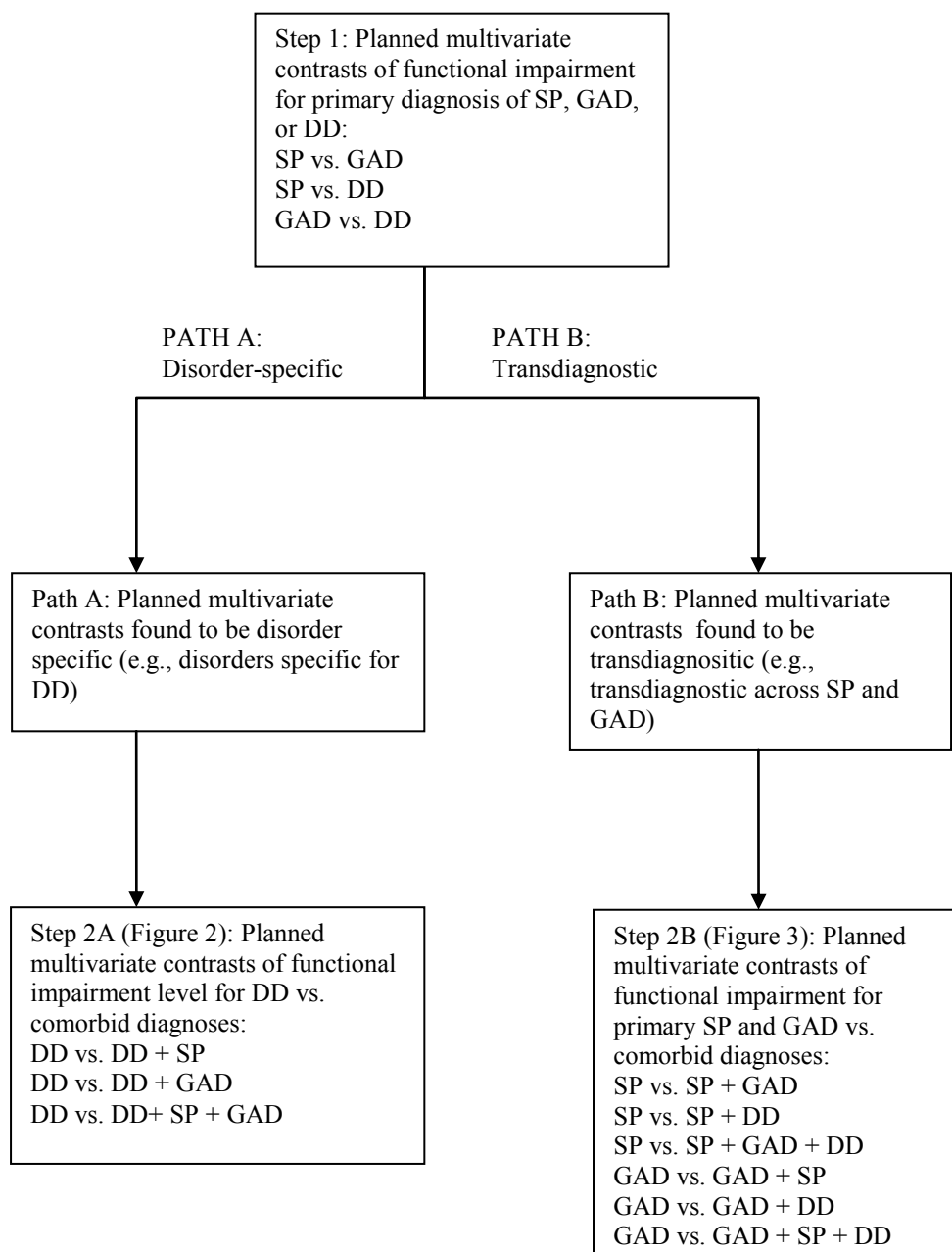


Figure 1. Decision flowchart for disorder-specific and transdiagnostic results of omnibus MANOVA with planned multivariate contrasts comparing functional impairments across “pure” SP, GAD, and DD.

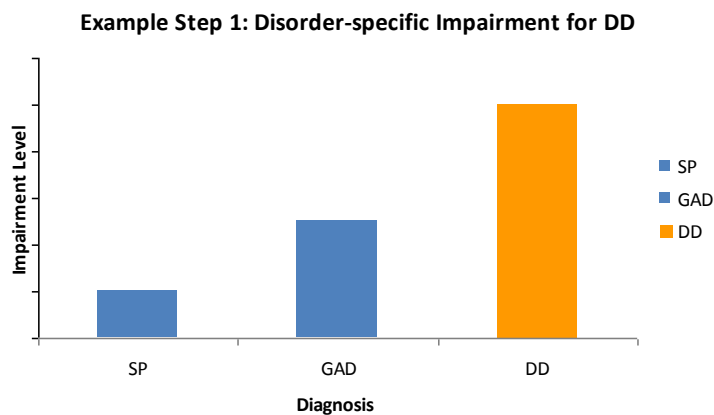


Figure 2-1. Disorder-specific result for DD after omnibus MANOVA with planned multivariate contrasts.

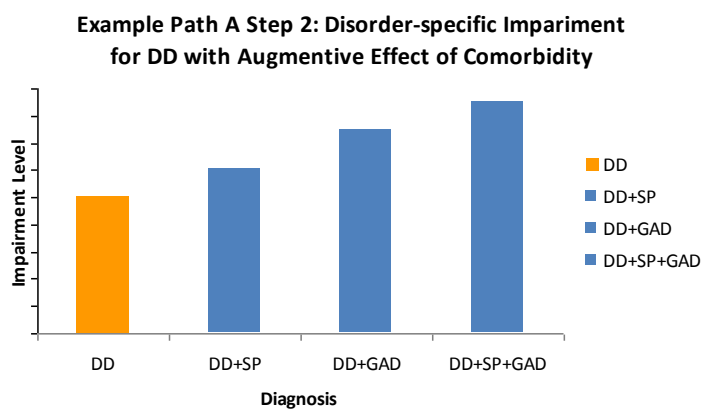


Figure 2-2. Results of MANOVA with planned multivariate contrasts showing an augmentative effect of comorbidity on functional impairment.

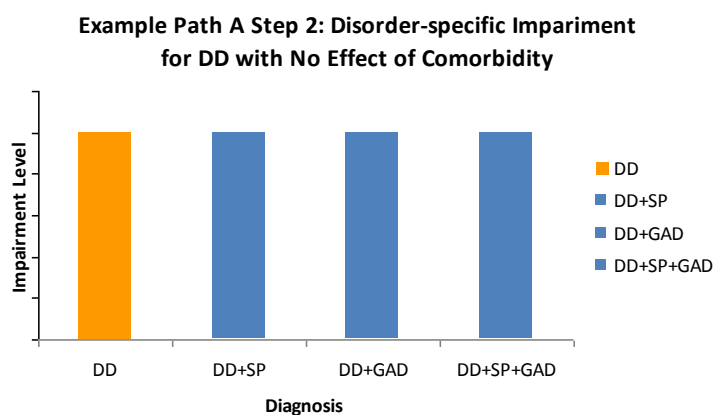


Figure 2-3. Results of MANOVA with planned multivariate contrasts showing no effect of comorbidity on functional impairment.

Example Step 1: Transdiagnostic Impairment Across SP and GAD

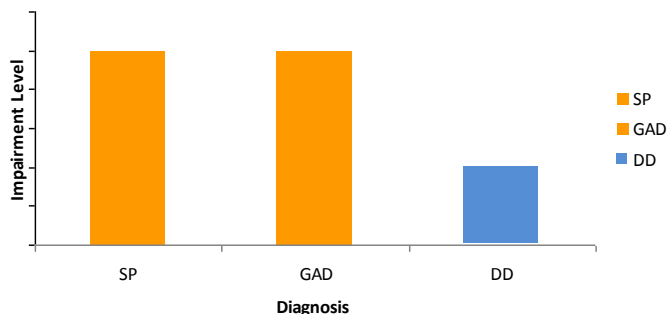


Figure 3-1. Results of MANOVA with planned multivariate contrasts showing a transdiagnostic effect for SP and GAD.

Example Path B Step 2: Transdiagnostic Impairment Across SP and GAD with Augmentive Effect of Comorbidity

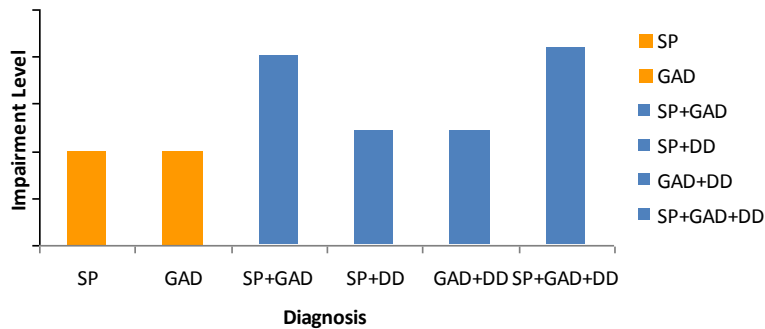


Figure 3-2. Results of MANOVA with planned multivariate contrasts showing an augmentative effect of comorbidity on functional impairment.

Example Path B Step 2: Transdiagnostic Impairment Across SP and GAD with No Effect of Comorbidity

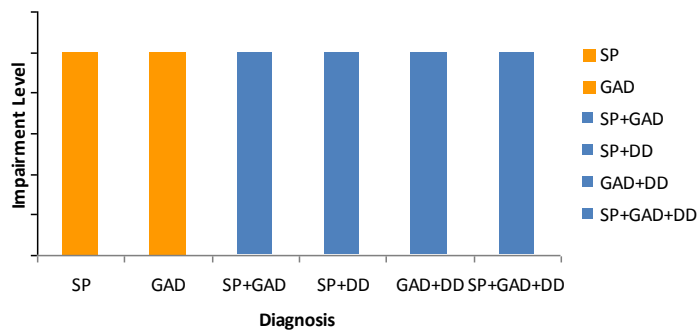


Figure 3-3. Results of MANOVA with planned multivariate contrasts showing no effect of comorbidity on functional impairment.