A Transdiagnostic Approach to Understanding Psychopathology in Late Adolescents:

Parent-Adolescent Relationship Dynamics Discriminate Latent Classes of Psychological

Adjustment.

by

Kaitlyn E. Panza

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Graduate Supervisory Committee:

Thomas J. Dishion, Chair
Keith A. Crnic
Jenn-Yun Tein

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ABSTRACT

Comorbidity is a significant problem for current classification systems of psychopathology (i.e., DSM-V). One issue is that the underlying mechanisms shared among comorbid disorders are poorly understood, especially potential psychosocial mechanisms such as family dynamics. The current study used latent class analysis to empirically classify patterns of psychopathology within a large community sample of late adolescents (age 18-19) based on their lifetime psychological adjustment measured using the World Health Organization Composite International Diagnostic Interview. Videotaped family interactions of adolescents (age 16-17) and their parents were micro and macro coded and the resulting family dynamics were compared across the three empirically defined groups of psychological adjustment which emerged from the latent class analysis: 1) an early onset, persistent antisocial behavior class; 2) an emotionally distressed and substance using class; and 3) a typically developing class. It was found that some directly observed family dynamics, including parental monitoring, dyadic positive engagement and coercive engagement discriminated among empirically derived classes. It was also found that particular tasks better discriminated among classes with regard to specific family dynamics (e.g., family activity task best discriminated among classes on dyadic positive engagement). Overall, findings suggest that novel methodologies like latent class analysis can be useful in attempting to map underlying transdiagnostic mechanisms onto the current diagnostic framework. The findings also highlight the importance of taking many variables into consideration when attempting to understand how family dynamics are associated with psychological adjustment.

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INTRODUCTION

Traditional classification systems for psychopathology are increasingly being called into question, and the implications for diagnosis, assessment and treatment are significant. Currently, the predominant approaches to the classification of psychopathology include the use of the Diagnostic and Statistical Manual of Mental Disorders (DSM) (just revised to form the fifth edition) (American Psychiatric Association, 2013), and the International Classification of Diseases (ICD) (World Health Organization, 1992), which is being revised to form the 11th edition. These are disorder-specific classification systems that prioritize rendering a single primary clinical problem to describe the adjustment of individuals. Traditionally, clinicians and researchers have treated comorbid problems separately, in a sequential manner, or through some combination of empirically supported strategies. However, the decision rules by which these strategies are chosen are becoming increasingly more complicated and in general are not well supported. One of the main contributors to this problem lies in the fact that any given diagnosis can present differently across individuals. That is, two people can be diagnosed with the same disorder, yet symptomatically present in completely different ways. The same is true for the opposite. Two different diagnoses can have overlapping phenotypic presentations and be very difficult to distinguish. This is because classification systems such as the DSM-V and the ICD-10 prioritize reliability of diagnostic categories over the validity of these categories. In other words, these systems provide a common language that ensures that the same terms are used in the same way, but they do not ensure that these descriptions reflect meaningful and distinct phenomena. The presence of heterogeneous or overlapping symptoms across diagnoses suggests that

the nominal approach to classifying disorders is flawed. Definitions must be clearly operationalized, and unique from one another, in order to understand and effectively treat psychopathology.

The recent movement to develop the Research Domain Criteria (RDoC) is a significant step away from the traditional approach of using diagnostic categories to classify psychopathology. This approach first emphasizes the identification of reliable and valid behavioral and biological dimensions of functioning and their disruptions, with the ultimate goal of understanding how disruptions in these dimensions of functioning are related to psychiatric symptoms (Insel et al., 2010; Sanislow et al., 2010). Rather than a focus on traditional diagnostic categories to define experimental groups or psychopathology, researchers instead would look across diagnostic categories and rely on hypothesized psychopathological mechanisms. Revisions to the DSM-IV, the ICD-10, and the creation of the RDoC has prompted clinicians and researchers alike to revisit the way that psychopathology is classified, assessed, and treated.

Among the challenges mentioned above, another issue that continues to be highlighted as a major contributor to the difficulties of classification of psychopathology is the high rates of comorbidity among disorders. Comorbidity[1], which is the tendency for mental disorders to co-occur more frequently than would be expected by chance, continues to be a fundamental challenge for clinical classification, assessment, prevention and intervention. The co-occurrence of psychopathology is not only a concern in adulthood (Kessler et al., 1994; Kessler, Chiu, Demler, & Walters, 2005b; Kessler et al., 2005a), but has also been well documented in childhood and adolescence (Angold,

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[1] For purposes of simplification, comorbidity and co-occurrence are used interchangeably and refer to the tendency for mental health disorders to co-occur more frequently than would be expected by chance.

Costello, & Erkanli, 1999; Kessler et al., 2011; Lilienfeld, 2003; Merikangas et al., 2010). It has been shown to be common within the broad areas of internalizing disorders and externalizing disorders (homotypic comorbidity), as well as across the two areas (heterotypic comorbidity) (Angold, et al., 1999; Kessler et al., 2011; Lilienfeld, 2003). In addition to comorbidity, the prevalence of "multimorbidity," has led to a substantial literature documenting the common occurrence of more than one mental health disorder across the range of psychopathology, concurrently as well as across the lifespan (e.g. Kessler et al., 1994; Kessler et al., 2005b; Kessler et al., 2005a). Overall, studies have shown that more than 50% of individuals with a mental disorder in a given year meet criteria for multiple disorders (Kessler et al., 2005b; Demyttenaere, et al., 2004), and that having a clinical diagnosis of one disorder significantly increases the odds of having a second disorder (Kessler et al., 1994, Angold, et al., 1999). It has become increasingly clear that, across the lifespan, comorbidity is the rule and not the exception.

Not only has comorbidity been identified as prevalent phenomenon, but it also has been linked to the overall severity and impairment of psychopathology and higher risk for negative outcomes (e.g. Kessler et al., 1994; Kessler et al 2005b; Dishion, 2000; Vickers & McNally, 2004; Nock & Kessler, 2006). Kessler et al. (2005b), in the National Comorbidity Survey- Replication, showed that severity of psychopathology was strongly related to comorbidity with 9.6% of respondents with 1 diagnosis, 25.5% with 2 diagnoses, and 49.9% with 3 or more diagnoses being classified as serious cases (see Kessler et al. (2005b) for a description of how they qualified serious cases). Among other issues, youth with comorbid psychopathology have been shown to be at increased risk for suicide gestures and attempts (e.g., Capaldi, 1991; Vickers & McNally, 2004; Nock &

Kessler, 2006), associating with deviant peers (Dishion, 2000; Fanti & Henrich, 2010), having lower academic adjustment and social competence (Capaldi, 1992; Ingoldsby, Kohl, McMahon & Lengua, 2006), engaging in sexually promiscuous behavior (Dishion, 2000), and committing criminal offenses (Sourander et al., 2007). In a study examining long-term outcomes in a large birth cohort sample from age 8 to early adulthood, Sourander et al. (2007) found that the 4% of the sample with comorbid conduct disorder and internalizing problems were responsible for 26% of all criminal offenses at follow-up.

Patterns of comorbidity are clearly an important phenomenon to study; however, the methodological issues are complex and must be considered carefully. As the field starts shifting away from diagnostic categories and focusing more on mechanisms across disorders, the way in which psychopathology is classified and assessed will inevitably change. Novel classification systems focused on mechanisms that may underlie multiple disorders (e.g., deficient impulse control) are now being developed to better understand psychopathology, rather than relying simply on clinical description. The field seems to be trending towards a transdiagnostic approach (as evidenced by new classification systems such as the RDoC), in which multiple diagnostic problems are addressed and linked by underlying etiological or maintaining mechanisms. Transdiagnostic assessment and interventions have been gaining support in the adult literature as well as the child and adolescent literature (Barlow, Allen, & Choate, 2004; Dishion & Connell, 2006; Chu, 2012; Racer & Dishion 2012). Looking at psychopathology through a transdiagnostic lens allows multiple forms of psychopathology to be understood and treated within a unified theoretical framework and enables a focus on common mechanisms that

transcend diagnostic categories. In one study, for example, Racer and Dishion (2012) were able to show that disordered attention is present in a wide range of psychological disorders and contributes to the etiology and/or maintenance of symptoms. In another study, Dishion and Connell (2006) found self-regulation to be an underlying mechanism in both internalizing and externalizing disorders that appears to act as a protective factor in youth. By using a transdiagnostic framework, the multivariate nature of psychopathology can be better accounted for and understood. This trend is even apparent within the statistical methods used to understand psychopathology. Researchers have turned to statistical techniques such as cluster analysis and variants of mixture modeling (e.g. latent class analysis) to look within and across diagnostic categories in an attempt to understand how to more effectively classify psychopathology (e.g. Kessler et al., 2005b; Connell, Bullock, Dishion, Shaw, Wilson & Gardner, 2008). For example, recently many studies have chosen to use latent class analysis, which defines groups using model based posterior membership probabilities, as a way to empirically define classes or groups. In the current study a transdiagnostic approach will be taken, looking across internalizing and externalizing disorders, using latent class analysis to empirically group late adolescents based on lifetime psychiatric disorders and antisocial problem behaviors. Further, family relationship dynamics at age 16-17 will be investigated to determine if they discriminate between these empirically derived groups of psychopathology.

RDoC and other approaches to conceptualizing comorbidity are becoming increasingly sensitive to the need to consider etiology. The most salient environmental factor linked to emerging psychopathology in childhood and adolescence are family relationship dynamics (Beach et al., 2007). Furthermore, family dynamic patterns are also

of particular importance to intervention theory, as these are often the target of evidence-based family centered interventions. The fact that common psychological disorders in adults often first emerge in childhood and adolescence (Kessler et al, 2005a; Merikengas et al., 2010), and that comorbid cases have been shown to have more shared environmental influence and less genetic influence (Gjone & Stevenson, 1997) highlights the importance of targeting family processes. Parent–child dynamics are one of the central factors implicated in the development of childhood psychopathology in general (e.g., Dadds, 1987; Maccoby & Martin, 1983) and targeting these processes may have important implications for preventing the progression of primary disorders and the onset of comorbid disorders.

Because family interventions are often central to the treatment of many forms of adjustment problems in childhood and adolescence (see Weisz & Kazdin, 2010), various studies aim to identify which parent-child relationship dynamics distinguish between different presentations of psychopathology. For example, parent-child relationship dynamics have been found to be associated with both externalizing and internalizing psychopathology in children. Externalizing psychopathology in children has consistently been associated with poor monitoring, inconsistent parenting, harsh discipline, increased conflict, and low parental control and responsiveness (e.g. Patterson, Reid, & Dishion, 1992; Capaldi, 1991; Capaldi, 1992; Capaldi & Stoolmiller, 1999; Shaw, Owens, Giovanelli, & Winslow, 2001; Granic & Lamey, 2002; Kim, Ge, Brody, Conger, Gibbons & Simons, 2003; Keiley, Lofthouse, Bates, Dodge, & Petit, 2003; Dishion, Forgatch, Van Ryzin & Winter, 2012). Family coercive cycles have been implicated consistently in children with externalizing psychopathology (Patterson, 1982; Dishion & Patterson,

2006; Loeber & Dishion, 1983; Smith, Dishion, Shaw, Wilson, Winter & Patterson, 2014). Internalizing psychopathology in children has also been associated with harsh, hostile, and inconsistent parenting as well as over involved parenting, and high parental control (e.g., Cole & Rehm, 1986; Capaldi, 1991, 1992; Messer & Beidel, 1994; Keiley et al., 2003; Kim et al., 2003).

As can be seen above, extensive research has been conducted on how parent-child relationship dynamics are associated with pure internalizing and pure externalizing disorders. However, research on parent-child relationship dynamics and co-occurring disorders in children is still lacking. A few studies have attempted to tease apart the relationship between family processes and co-occurring problems in children and adolescents, but it is difficult to draw clear conclusions from the available evidence. For example, some studies found that co-occurring psychopathology was able to be differentiated from pure internalizing or pure externalizing psychopathology based on parent-child relationship dynamics (Capaldi, 1991; Capaldi, 1992; Ge et al., 1996; Granic & Lamey, 2002). Ge et al. (1996) found that the parent-child relationship dynamics of adolescents with both elevated depressive symptoms and conduct problems were significantly more hostile and less warm than adolescents with a single problem alone or no problem. In another study, Capaldi (1991) found that parents of 6th-grade boys who were comorbid for both conduct disorder and depression displayed greater deficits in family management skills, such as poor disciplinary skills and monitoring, than boys with a single problem or none at all.

On the other hand, a number of studies found that co-occurring psychopathology was not necessarily able to be differentiated from pure internalizing and pure

externalizing using parent–child relationship dynamics. Capaldi and Stoolmiller (1999) looked at differences between children with pure depression, pure antisocial psychopathology, and children with and co-occurring psychopathology and found no differences between the pure externalizing and the co-occurring groups of children. They noted that hostile, ineffective discipline and strong parental rejection were characteristic of both groups. Interestingly, however, both Dadds et al. (1992) and Sanders and colleagues (1992) found similar characteristics of parent-child relationship dynamics in both pure internalizing and comorbid groups, while different patterns emerged for children with pure externalizing disorders. They found that parent –child relationship dynamic patterns of children with pure externalizing psychopathology were characterized by aversive, angry, and depressed affect whereas the group with comorbid psychopathology and pure internalizing were characterized by lack of hostility and elevated levels of depressed affect.

The study of parent-child relationship dynamics and the co-occurrence of psychopathology presents several methodological challenges. One potential limitation and possible reason for the discrepant findings in the studies cited above is that the effects of at least some parenting behaviors may differ as a function of the interaction task in which they are observed or the larger context in which the behavior occurs. Many studies examine parent–child relationship dynamics through self-report questionnaires (e.g. Kim et al., 2003), while some have used a single live interaction task (e.g., Dadds et al., 1992) and others have combined data across multiple interaction tasks (Ge et al., 1996). However, when different tasks are directly compared in terms of their association with psychopathology, interesting results can emerge. For example, Donnenberg and

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Weisz (1997), found that a conflict discussion task, but not a cooperative planning task, was better able capture clinically significant patterns of relationship dynamics, and thus may be a more efficient method for identifying important group differences. This highlights the importance of taking intrafamilial context (i.e., the situation in which the behaviors are observed) into consideration when examining relationship dynamics in order to enhance our understanding of child development and the emergence of psychopathology in children.

Another issue that may be contributing to discrepant findings in the literature is that measures of parenting often differ across studies. As mentioned above, some studies have measured parenting behavior using questionnaires (e.g. Kim et al., 2003) while others have used direct observations of family interactions (Capaldi & Stoolmiller, 1999; Capaldi, 1991; Capaldi 1992; Ge et al., 1996). Using questionnaires poses the risk of informant discrepancy. Informant discrepancy (i.e., lack of consistency in informants responses about the same person or experience), especially in the assessment of childhood psychopathology, has been raised as a major issue that has the potential to impact the validity and effectiveness of assessment, classification, and treatment of childhood psychopathology (e.g. Achenbach, McConaughy & Howell, 1987; De Los Reyes & Kazdin, 2005; Dishion, Burraston & Li, 2003). For example, Kim et al. (2003) found that, based on youth report, children with co-occurring problems reported significantly higher levels of parental hostility compared to other groups. Interestingly, however, it appears that the strength of the support for this conclusion varied depending on the informant. Relying on the parents' reports would lead to the conclusion that co-occurring symptoms are not systematically related to parenting practices, whereas

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consideration of youths' report would lead to the opposite conclusion. The disparity between the parents' and youths' reports in this study illustrates the importance of gathering data from multiple sources and/or using a more objective form of measurement, such as direct observation of dyadic behavior.

There are two strategies for utilizing direct observation of family interactions: macrorating and microsocial coding. Macroratings summarize behavior over an entire observation period, whereas microsocial codes capture behaviors as they unfold in real time. These methods each have advantages and disadvantages, however from a functional perspective are both important to consider (Dishion & Granic, 2004). While it is encouraging that the majority of the studies above chose to use at least one measure of direct observation, it is notable that they all used macroratings of family dynamics. None of the studies also looked at the microsocial dynamics between families, thus potentially failing to capture important, more subtle dynamics between families that cannot be captured through global impressions.

In one innovative study, which used microsocial observation and was also sensitive to intrafamilial context, Granic and Lamey (2002) looked at parent–child relationship dynamics of "pure" externalizing children compared to children comorbid for externalizing and internalizing problems. They asked the parent and child to discuss a problem and then try to "wrap up" in response to a signal (a knock on the door). This signal was intended to act as a perturbation and was intended to increase the pressure on the dyad, triggering the need for a reorganization of their behavioral system. Interestingly, they found that the externalizing dyads engaged in a permissive pattern throughout the problem-solving session, whereas comorbid dyads shifted from a

permissive pattern to a mutually hostile pattern after the perturbation. It appears the comorbid group was only distinguished from the externalizing-only group as a result of this reorganization, but not before. While this study used objective measures of dyadic behavior rather than relying on questionnaires, and was sensitive to the context within which this behavior is embedded, it was limited by a small sample size, the lack of a comparison group, and the inclusion of only boys and their mothers as participants. Another limitation is that the study used clinically referred families. Clinically referred samples have been shown to be subject to certain biases when assessing comorbidity, including 1) that comorbidity may reflect more extensive psychopathology (Nottelmann & Jensen, 1995), 2) that comorbidity may be subject to the Berkson (1946) bias, which states that there may be higher comorbidity rates in the clinic population than those in the general population, and 3) that they are likely to be subject to referral biases (Caron and Rutter, 1991). To avoid these problems, the present study focused on a large community-based sample of adolescents.

It remains unclear whether and under what circumstances parent–child relationship dynamics are able to discriminate between different categories of psychopathology. The studies reviewed above suggest that there is still much room for further inquiry in this area and that certain methodological factors, such as the valid measurement of parent-child interaction, the context within which this behavior is embedded, and possible biases inherent in study samples, need to be carefully considered. In the present study our aim was to use latent class analysis to empirically describe psychological adjustment (including psychopathology) in a community sample of late adolescents and to examine the associations between these empirically derived classes

and observed parent-child dynamics, thus contributing to the literature on transdiagnostic family processes that may be associated with comorbid psychopathology.

The present study is an empirical investigation of the associations among 6 lifetime psychiatric disorders and antisocial behavior problems in a sample of 997 multiethnic youth originally assessed in 6th grade. Latent class analysis, a novel methodological approach, was used to reveal the underlying structure of psychopathology in a community sample of late adolescents (one year after high school). Then, coded direct observations of family relationship dynamics collected two years prior (11th grade) were used to distinguish between the empirically derived classes in an attempt to better understand how family processes are related to psychopathology in youth. In this study it was hypothesized first that latent class analysis would identify an empirically meaningful way to describe and classify comorbid psychopathology in a community sample of late adolescence (one year after high school). Second, it was hypothesized that family relationship dynamics when the adolescents were in 11th grade would discriminate between empirically derived groups of lifetime co-morbid psychopathology measured when the adolescents were one year out of high school. Specifically, it was hypothesized that high levels of coercion, low levels of family monitoring and low levels of positive engagement would discriminate between classes. Finally, it was hypothesized that the discriminant validity of family interaction tasks would differ. Specifically, it was predicted that family dynamics within the conflict task would better discriminate between the empirically based groups than family dynamics within cooperative task.

METHOD

PARTICIPANTS

Participants included 997 adolescents and their families who were recruited in sixth grade from three middle schools in an ethnically diverse metropolitan community in the northwestern United States (Project Alliance 1; see Dishion and Kavanagh (2003) for further description). Parents of all sixth grade students in two cohorts were approached for participation in the study, and 90% consented. Two children and their families were excluded because they were missing key demographic information. The sample included 525 males (52.7%) and 472 females (47.3%). By youth self-report, the sample was comprised of 423 European Americans (42.4%), 291 African Americans (29.2%), 68 Latinos (6.8%), 52 Asian Americans (5.2%), and 163 (16.3%) other ethnicities (including biracial). Biological fathers were present in 585 families (58.6%). Annual family income ranged from less than $5,000 to more than $90,000, with the median being $30–$40,000. Youths were randomly assigned at the individual level to either control (n = 497 youths) or intervention (n = 500) classrooms in the spring of sixth grade. Approximately 80% of youths were retained across the study (sixth grade to one year after high school).

MEASUREMENT PROCEDURES

In the spring semester, from 6th through 9th grade, and again in the 11th grade, students were surveyed with the Oregon Youth Survey, developed by scientists at the Oregon Research Institute, to assess family functioning and child outcomes (Metzler, Biglan, Rusby, & Sprague, 2001). Assessments were conducted primarily in the schools. If students moved out of their original schools, they were followed up at their new residence. One year after high school (age 18-19) the youth and their parent(s) were

surveyed regarding overall mental health and adolescent behaviors (i.e., antisocial behaviors), using questionnaires and interviews. When youth were in 11th grade, families participated in a home-based videotaped interaction assessment. Of the 997 families in the larger study 649 families (65%) completed the videotaped interaction assessment. Of the families participating in the videotaped interaction, 42.7% had two parents present. Mothers were present for the vast majority (83%) of the families and fathers were present 60% of the time, 77% of whom were biological fathers. Participating parents and the target child were asked to complete eight discussion tasks of 5 to 8 minutes in length. The first task was a warm-up task and was not coded. The seven tasks that were subsequently coded included (a) an encouragement task, during which parents were asked to discuss an area of school in which they would like to encourage their adolescent; (b) a monitoring task, during which parents and adolescents discussed a time when the adolescent was with friends and away from adult supervision; (c) a family conflict task, involving a discussion of a time when the parent and adolescent experienced conflict with each other; (d) a problem-solving task, when the parent and youth were asked to solve a problem that both had identified as a "hot topic" on a previously administered questionnaire; (e) a substance-use task, during which the parent and child discussed norms and expectations for adolescent substance use; (f) a family activity task that involved the parent and adolescent discussing a fun activity they could potentially do in the next week; and (g) a positive recognition task, when the parent and adolescent were asked to express appreciation for each family member present. The observation tasks retained for current analyses were the family conflict task and the family activity task (cooperative task).

MEASURES

Lifetime psychiatric diagnoses. Lifetime psychiatric diagnoses, up to age 18-19 (when the youths were one year out of high school), were based on the WHO Composite International Diagnostic Interview (CIDI), version 2.1 (1997). The CIDI is a structured, lay administered interview used to determine diagnoses for psychiatric conditions according to ICD-10 and DSM-IV criteria. In total, six dichotomous variables, 1) depression, 2) anxiety, 3) tobacco dependence, 4) alcohol dependence, 5) cannabis dependence, and 6) hard drug dependence were assessed and included in the analyses. Depressive and anxiety indicators were collapsed within diagnostic categories to create dichotomous variables. Single or recurrent major depressive episodes and dysthymia were collapsed to create the dichotomous depression variable. Panic disorder with and without agora phobia, simple phobia, agoraphobia diagnosis, social phobia diagnosis, and generalized anxiety disorder were collapsed to create the dichotomous anxiety variable. Substance dependence diagnoses (tobacco, alcohol, cannabis, and hard drug) were retained as unique dichotomous variables.

Lifetime antisocial behavior. The lifetime youth antisocial behavior variable was a composite of the child's self-reported antisocial behavior in grades 6, 7, 8, 9, 11, and one year out of high school (up to age 18-19). A self-report of nine items from the Oregon Youth Survey that assesses frequency of antisocial behavior during the past month was used to measure youth antisocial behavior in 6th-9th and 11th grade (Metzler et al., 2001). Reliability analyses indicated that the internal consistency of this scale was acceptable at each wave of assessment: 6th grade ($\alpha = 0.83$), 7th grade ($\alpha = 0.84$), 8th grade ($\alpha = 0.77$), 9th grade ($\alpha = 0.70$), and 11th grade ($\alpha = 0.73$). The Adult Self-Report (ASR)

questionnaire (ASR ABCL; Achenbach, 2003), which measures frequency of antisocial behavior over the past six months, was administered one year after the youth was out of high school and had an internal consistency of α= 0.69. To maximize content similarity across these waves of data collection, 7 items on the ASR, similar to the 9 item measures used in previous waves, were used. Scores were z-scored within wave and an average z-score to represent lifetime antisocial behavior was created. When missing data was present, the lifetime z-score was estimated if the participants provided data in at least four of the six waves.

Family dynamics.

Relationship Affect Coding System (RACS). The Relationship Affect Coding System (RACS) (Peterson, Winter, Jabson, & Dishion, 2008) was used to code all family interaction tasks. The three dimensions that are captured are verbal and physical behaviors, as well as affect. Verbal codes reflect two different types of events: general conversation (positive, negative, or neutral) and attempts at changing the behavior of another (directives, negative directive, and positive structure). Physical behaviors are those that involve a physical interaction (positive physical contact, negative physical contact and neutral physical contact). Affect codes reflect the general affect displayed by parent and youth in an interaction (anger/disgust, validation, distress, positive affect and, ignore). The cues used for code selection are based on facial expression, vocal tone, and nonverbal cues, such as body posture and/or orientation.

At any given moment during an interaction, the parent and youth can have one code (or event or state) recorded from each of these three data streams. The RACS coding was recorded using Noldus Observer XT, Version 11.0 (Noldus Information Technology,

2012) which allows for continuous coding of an interaction of youth and parent simultaneously. Given that there are 3 simultaneous data streams for each participant in the interaction tasks, six behavior clusters that summarize the three data streams for each person in the interaction were created. The six behavior summary clusters are positive, neutral, directive, negative, no talk and ignore. For example, the positive cluster included behaviors like positive verbal, structure, affect or physical, as well as validation; the negative cluster included anger and disgust, negative verbal statements, and negative physical interaction. Decision rules were created as to which behavior stream would win out in instances of conflict (see Dishion et al., 2012; Sitnick et al., 2014). For example, if a parent said something mean (negative verbal) and then laughed (positive affect) at the same time, the negative verbal would trump the positive. The order of trumping was as follows: Ignore, negative, positive, directive, no talk, and lastly neutral behavior. Given the new behavior clusters, which state or cluster the youth was in at the same time as the parent was observable at each time point, thereby arriving at dyadic states. Using this approach, it is possible to calculate durations and frequencies of behavior clusters for each family member, but more importantly, for the dyadic states, the interaction dynamic between family members.

The five dyadic states derived were: 1) Dyadic Positive Engagement, 2) Parent Coercive Engagement, 3) Child Coercive Engagement, 4) Dyadic Coercive Engagement, and 5) Dyadic Non-engagement. The duration of dyadic states reflects both the parent and youth's interactive state. A summary score was created for observed *dyadic positive engagement* that reflected the duration of Positive and Neutral Engagement between the parent and the youth. As shown in Figure 1, this includes the duration of continuous time

that the parent or youth was engaged in positive (POS) or neutral (NEU) behavior while

the other member of the dyad was also engaged in POS or NEU engagement. The dyadic

region identified as positive engagement included 4 out of 36 possible cells on the

grid. Similarly, a summary score was created for *dyadic coerce,* which identified

mutually coercive behaviors between the parent and youth. Dyadic coerce included

interactions in which either participant was negatively engaged (NEG) or directive (DIR),

and the other member of the dyad responding by not talking (NTK), ignoring (IGN),

NEG, or DIR (see Figure 1), and included 12 out of 36 possible cells on the grid. Finally,

the total duration each parent-youth dyad was observed in this region was calculated and

divided by the overall session time to get a duration proportion score. Reliability

coefficients were in the "good" to "excellent" range with an overall Kappa score of .93

and coder reliability at 94% agreement. Kappa coefficients were obtained from Noldus

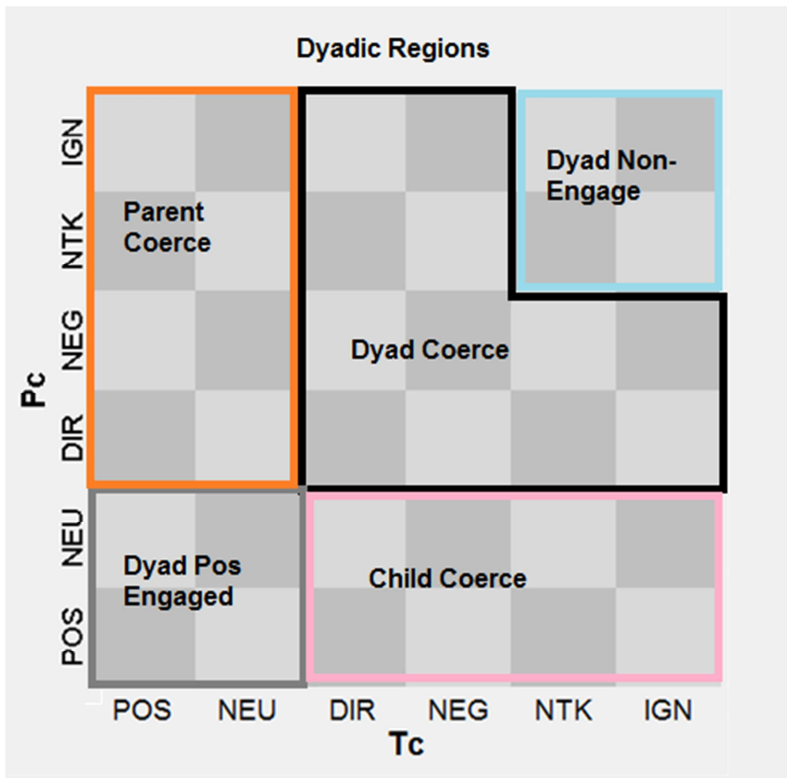Observer. The Kappas are computed based on the duration and sequencing of coded

behavior.

Figure 1. Dyadic state space grid.

Global ratings of observed family management. Global ratings of family management were also used to code all family interactions tasks (see Dishion et al., 2012). Coders were trained to provide macroratings after each family discussion task, which reflect their impressions of various aspects of the parent–child relationships based on the overall parent–child interaction during the whole task. Macrorating coder agreement across the entire project was 84%. Indicators were then created for the following four parenting constructs: parental monitoring, problem solving, positive behavior support (positive recognition), and relationship quality (child conflict).

Parental monitoring. The Parental Monitoring scale includes 7 items rated on a 9-point Likert scale anchored at 1 (*not at all*), 5 (*somewhat*), and 9 (*very much*). Coders were asked to respond to items such as: "Does it seem that the child spends time away from adult supervision," "Does the child indicate being with friends in settings without adult supervision," and "Does there seem to be a lack of adult involvement in this child's daily life." An indicator, lack of monitoring, was constructed from coder responses and was then reverse-coded so that all parental monitoring indicators were in the same direction. The Cronbach's alpha value for this scale was .77.

Problem solving. The Problem Solving scale includes 5 items rated on a 9-point Likert scale anchored at 1 (*not at all*), 5 (*somewhat*), and 9 (*very much*). Coders were asked to respond to items such as: "How clearly was the problem specified," "Was the problem stated in a neutral or positive tone (e.g., no blaming or criticism)," and "Are alternative solutions discussed by the family." The Cronbach's alpha value for this scale was .74.

Positive behavior support (positive recognition). The Positive Behavior Support scale includes 6 items rated on a 9-point Likert scale anchored at 1 (*not at all*), 5 (*somewhat*), and 9 (*very much*). Coders were asked to respond to items such as: "Does the family use sincere and meaningful statements to describe each other," "Does the family mention or describe each other's positive behaviors," and "Does the family seem to have difficulty with recognizing the positive attributes." The Cronbach's alpha value for this scale was .89.

Relationship quality (child conflict). The Relationship Quality scale includes 3 items rated on a 9-point Likert scale anchored at 1 (*not at all*), 5 (*somewhat*), and 9 (*very much*). Coders were asked to respond to items such as: "Child criticizes other (i.e. blaming, putting each other down)," "Child views others with contempt," and "Child escalates any conflict that occurs during the task." The Cronbach's alpha value for this scale was .86.

ANALYSIS PLAN

All analyses were conducted within Mplus version 7 using full information maximum likelihood estimation for missing data (Muthén, & Muthén, 2012). An outlier analysis was completed and no influential points were identified using cook's D as a criterion (Cook, 1977).

First, latent class analysis (LCA) was used to examine the optimal number of latent classes based on lifetime psychological adjustment. LCA is a specific form of mixture modeling used to identify latent subgroups/classes within a population (e.g. Nylund, Asparouhov & Muthén, 2007). The observed scores within a class are assumed to come from the same probability distribution, representing a distinct sub-population

from those of other classes (Vermunt & Magidson, 2002). The variables included in the LCA were the lifetime antisocial behavior score (a continuous observed variable), lifetime depression, lifetime anxiety, lifetime tobacco dependence, lifetime alcohol dependence, lifetime cannabis dependence, and lifetime hard drug dependence (categorical observed variables). Youth-reported ethnic/racial background (1= European American, 0 = other ethnic backgrounds), socio-economic status and gender (1 = male, 0 = female) were included as covariates in the analyses when determining the composition and number of latent classes. Table 1 summarizes the frequency and valid percent of all categorical variables and Table 2 provides the basic descriptive statistics of all continuous variables.

Table 1

Frequency and Valid Percent of Categorical Indicators and Covariates

	Frequency (N)	Valid Percent
Psychological Adjustment Variables		
Depression		
Meets criteria	137	17
Does not meet criteria	656	83
Anxiety		
Meets criteria	201	25
Does not meet criteria	592	75
Tobacco Dependence		
Meets criteria	65	8
Does not meet criteria	727	92
Alcohol Dependence		
Meets criteria	61	8
Does not meet criteria	730	92
Cannabis Dependence		
Meets criteria	69	9
Does not meet criteria	722	91
Hard Drug Dependence		
Meets criteria	27	3
Does not meet criteria	764	97
Covariates		
Gender		
Female	472	47
Male	525	53
Ethnicity		
European American	423	42
All other ethnicities	574	58

Note: descriptive statistics above are based on the original sample; full information maximum likelihood estimation was not used.

Table 2

Means, Standard Deviations, Skewness and Kurtosis of the Continuous Indicator, Covariates, and Family Dynamic Variables

	Mean	S.D.	Range	Skewness	Kurtosis
Psychological Adjustment Variable					
Lifetime Antisocial Behavior	-.01	.66	-.74-3.17	1.85	4.29
Covariates					
SES	.01	.72	-2.53-1.09	-.78	-.03
Family Dynamic Variables					
Family Conflict Task					
Dyadic Positive Engage	.59	.23	.00-1.00	-.26	-.67
Parent Coerce	.15	.13	.00-.63	1.10	1.01
Child Coerce	.18	.17	.00-.97	1.38	1.96
Dyadic Coerce	.02	.04	.00-.28	3.27	12.94
Dyadic Non-engage	.06	.10	.00-.67	2.85	9.64
Family Activity Task					
Dyadic Positive Engage	.65	.23	.00-1.00	-.53	-.35
Parent Coerce	.13	.12	.00-.71	1.17	1.60
Child Coerce	.16	.15	.00-1.00	1.83	4.83
Dyadic Coerce	.01	.02	.00-.16	4.80	27.44
Dyadic Non-engage	.07	.11	.00-1.00	3.11	14.07
Global Ratings of Family Management					
Parental Monitoring	3.91	1.05	1.00-8.14	.55	.85
Positive Behavior Support (Positive Recognition)	5.54	1.54	1.33-8.50	-.43	-.53
Relationship Quality (Child Conflict)	2.28	1.41	1.00-9.00	1.77	3.80
Problem Solving	4.83	1.24	1.00-8.00	-.09	-.14

Note: descriptive statistics above are based on the original sample; full information maximum likelihood estimation was not used.

With latent class models there is not a single statistical indicator of good model fit, and thus a combination of statistical indicators and theory was used to identify the best fitting model. Muthén and Muthén (2000) recommend four criteria for selecting the optimal number of latent classes in factor mixture models: (a) the Bayesian information criteria (BIC) and a sample-size adjusted version of the BIC (Adj BIC), with lower scores representing better-fitting models; (b) the bootstrapped likelihood ratio test (BLRT), which provides a statistical comparison of the fit of a given model with a model of one fewer classes; (c) the theoretical relevance and usefulness of the latent classes; and (d) entropy, which is a measure of the quality of classification across models, with higher values indicating better classification of individuals into their most likely trajectory class. Simulation studies by Nylund et al. (2007) supported the use of Adj BIC and BLRT for selection of the optimal number of classes in LCA models, with the BLRT providing particularly consistent correct results. Lo, Mendell, and Rubin (2001), developed the Lo–Mendel–Rubin likelihood ratio (LMR LR), which compares the improvement in fit between neighboring class models and provides a p-value that can be used to determine whether there is a statistically significant improvement in fit with the inclusion of one more class. The LMR LR has also been shown to be a useful empirical tool for class enumeration. In light of this information, to select the optimal number of classes a primary weight was placed on the following values: 1) BIC and Adj BIC; 2) LMR LR; 3) BLRT; 4) theoretical relevance and usefulness of the latent classes; and 5) entropy. Finally, because the local maximum is often encountered in likelihood estimation, multiple different sets of starting values were used (Muthén, 2004). After determining the number of latent classes, means on the continuous indicator and the conditional

probabilities of the categorical indicators were used to characterize the classes. Finally, posterior probabilities were used to assign youth to their most likely class based on lifetime psychiatric adjustment. The LCA solution provides posterior probabilities of membership, ranging from 0 to1, in each class for each individual in the sample. When the LCA solution fits the data well, most individuals will have a posterior probability of close to 1 for the one profile that represents the "most likely" class to which they are assigned, and a probability of close to 0 for the other classes. This "classify and analyze" approach has been used successfully in other studies (Agrawal, Lynskey, Madden, Bucholz & Heath, 2007; Varvil-Weld, Scaglione, Cleveland, Mallett, Turrisi & Abar, 2014).

Once classified, a multinomial logistic regression, within Mplus, was used to test for differences across latent classes on family interaction patterns. Specifically, the five basic dyadic behavior clusters of: 1) Dyadic Positive Engagement, 2) Parent Coercive Engagement, 3) Child Coercive Engagement, 4) Dyadic Coercive Engagement) and 5) Dyadic Non-engagement were examined within the family conflict task and the planning a family activity task. Four global ratings of family management based on direct observation were also examined. All analyses controlled for youth-reported ethnic/racial background (European American compared to other ethnic backgrounds), socio-economic status and gender. Due to the high correlation between family variables, logistic regressions were run separately to deal with mulitcollinearity.

RESULTS

In the present study, all models were tested using 100 different starting values. As was suggested by Muthén & Muthén (2012), patterns of fluctuations in log likelihood values and the number of profile counts were examined to verify that the final model had reached a stable trustworthy solution. Lifetime (up through one year after high school) antisocial behavior, anxiety, depression, tobacco dependence, alcohol dependence, cannabis dependence, and hard drug dependence were specified as indicators in the latent class models. Latent class analysis was first conducted with a one class solution with classes iteratively increased until the best solution was indicated by fit indices and theoretical interpretation. Latent class analysis identified a three class solution based on the fit indices and the interpretability of patterns of lifetime psychiatric adjustment on the observed indicators. Model fit indices (BIC and Adj. BIC) continued to decrease up until the three class model and the LMR-LRT and the BLRT confirmed that the three class solution provided a better fit for the data relative to the two class solution. Separation among the three classes was found to be high with entropy = .80 (Clark & Muthen, 2009). The four and five class solutions did not converge and thus cannot be considered stable trustworthy solutions. Fit indices for all tested solutions are presented in Table 3.

Table 3

Model Fit Comparisons

Number of Classes	BIC	Adj. BIC	LMR-LR	BLRT	Entropy
1	9056.48	9002.48	-	-	-
2	8734.39	8645.46	394.14, p <.002	399.33, p <.001	.85
3	8603.77	8479.90	203.44, p <.001	206.12, p <.001	.80

Note. BIC = Bayesian Information Criteria. Adj. BIC = small-sample adjusted version of BIC. LMR-LR= Lo-Mendell-Rubin Adjusted LRT Test. BLRT = Bootstrapped Likelihood Ratio Test.

The three classes that emerged are as follows (see Figure 2 for categorical variables & Figure 3 for the continuous variable). An **early-onset, persistent antisocial (ASB)[2]** class comprised of 6% of the sample that was characterized by high levels of lifetime antisocial behavior, as well as moderate levels of anxiety, depression, and substance dependence. A **high emotional distress and high substance dependence (EDSD)** class comprised of 10% of the sample that was characterized by high levels of anxiety, depression, substance dependence, and average levels of lifetime antisocial behavior. The final class was a **typically developing, low psychopathology group (TD)** comprised of 85% of the sample which had low levels of anxiety and depression, almost no substance dependence, and very low levels of lifetime antisocial behavior. No significant differences in gender, socio-economic status, or racial/ethnic background were found when comparing the TD class to the EDSD class and the TD class to the ASB class (see Table 5)[3].

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[2] See Table 4 for standardized means and standard deviations of youth antisocial behavior across at each wave of assessment across the three latent classes

[3] There were no statistical differences between classes based on intervention status X^2 (2) =.922, p=.631, however, a previously reported study on antisocial behavior at age 18-19 found that the intervention was associated with less antisocial behavior (Van Ryzin & Dishion, 2012).
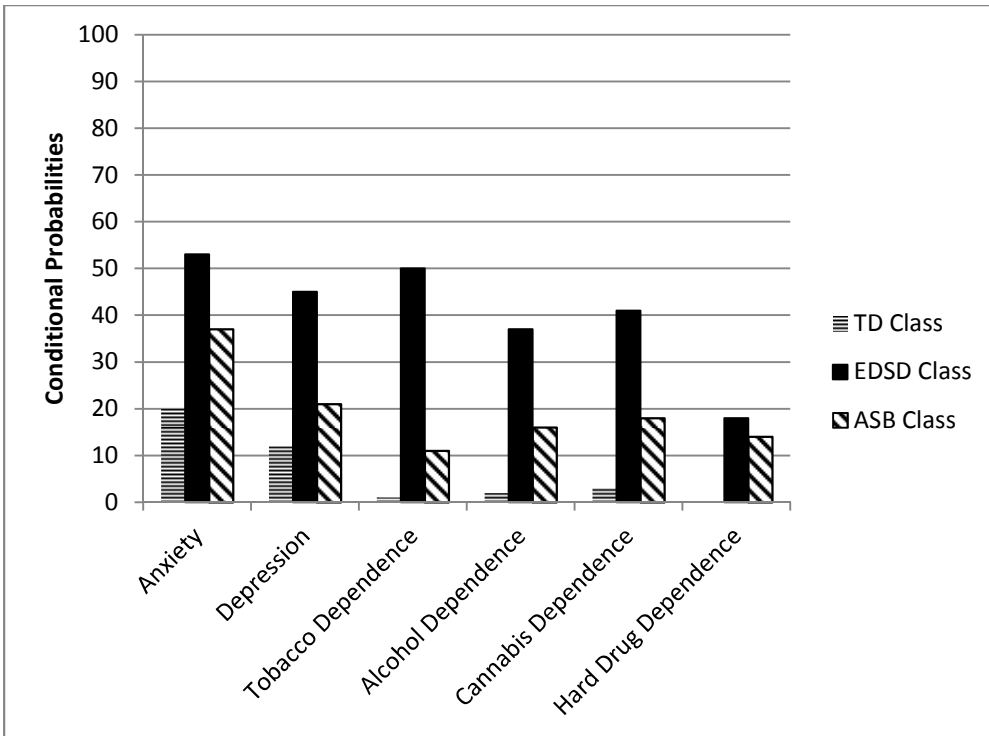
Figure 2. Conditional probabilities of WMH-CIDI disorders based on a three-class latent class analysis (n = 997).
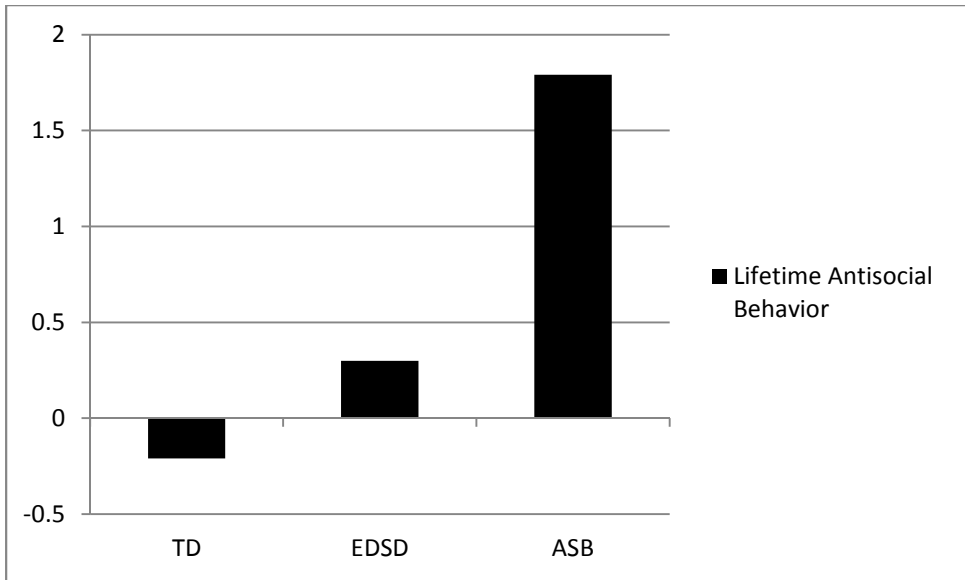
Figure 3. Standardized means for the continuous indicator of lifetime antisocial behavior across the three classes.

Table 4

Standardized Means and Standard Deviations of Youth Antisocial Behavior at Each Wave of Assessment across the Three Latent Classes

	TD	EDSD	ASB
Antisocial Behavior: 6th grade	-.14(.83)	.18(.94)	1.77(1.62)
Antisocial Behavior: 7th grade	-.17(.73)	.35(1.13)	2.18(1.71)
Antisocial Behavior: 8th grade	-.16(.76)	.25(.92)	1.98(1.81)
Antisocial Behavior: 9th grade	-.19(.75)	.41(.86)	2.08(1.70)
Antisocial Behavior: 11th grade	-.21(.69)	.62(1.06)	1.73(2.01)
Antisocial Behavior: one year out of high school	-.17(.72)	.50(1.20)	1.46(2.04)

Table 5

Differences in Gender, SES, and Ethnicity across the Three Latent Classes

Covariates		TD Referent Class			
	Class	Logit	SE	OR	t(p)
Gender	**EDSD**	-.37	.34	.69	-1.07(.28)
	ASB	.52	.32	1.67	1.60(.11)
Socio-Economic Status	**EDSD**	-.17	.32	.84	-.54(.59)
	ASB	-.37	.23	.69	-1.61(.11)
Ethnicity	**EDSD**	.64	.40	1.90	1.61(.11)
	ASB	-.58	.40	.56	-1.44(.15)

Note. Comparisons were only made between the TD class and the EDSD class and the TD class and the ASB class. Comparisons were not made between the EDSD and ASB classes.

Significant differences were found between classes in family interaction patterns in the family conflict task (see Table 6). Within the family conflict task, the ASB class was found to exhibit significantly higher levels of coercive parent behavior than all other classes. Significant differences were also found between classes in family interaction patterns in the family activity task (see Table 7). Within the family activity task the ASB class was found to exhibit significantly higher levels of coercive child behavior than all other classes. Also, within the family activity class, there were significant differences in dyadic positive engagement among the classes. The greatest level of dyadic positive engagement was found in the EDSD class and the lowest level of dyadic positive engagement was found in the ASB class.

Table 6

Differences in Dyadic Family Interaction Patterns within the Family Conflict Task across the Three Latent Classes

Predictors	Class	TD Referent Class				ASB Referent Class			
		Logit	SE	OR	t(p)	Logit	SE	OR	t(p)
Family Conflict Task									
Dyadic Positive Engage	**EDSD**	.20	.52	1.23	.39(.70)	1.26	.84	3.53	1.50(.13)
	ASB	-1.06	.72	.35	-1.48(.14)				
Parent Coerce	**EDSD**	-.71	1.04	.49	-.69(.49)	**-3.94**	**1.66**	**.02**	**-2.38(.02)**
	ASB	**3.22**	**1.32**	**25.08**	**2.45(.01)**				
Child Coerce	**EDSD**	-.18	.69	.84	-.26(.80)	-.07	1.22	.93	-.06(.96)
	ASB	-.11	1.07	.90	-.10(.92)				
Dyadic Coerce	**EDSD**	1.65	2.60	5.21	.64(.53)	3.75	4.80	42.58	.78(.44)
	ASB	-2.10	4.31	.12	-.49(.63)				
Dyadic Non-engage	**EDSD**	.20	1.21	1.23	.17(.87)	-0.74	1.90	.48	-.39(.70)
	ASB	.94	1.59	2.57	.59(.55)				

Note: All analyses controlled for youth-reported ethnic/racial background (European American compared to other ethnic backgrounds), socio-economic status and gender.

Table 7

Differences in Dyadic Family Interaction Patterns within the Family Activity Task across the Three Latent Classes

Predictors	Class	TD Referent Class				ASB Referent Class			
		Logit	SE	OR	t(p)	Logit	SE	OR	t(p)
Family Activity Task									
Dyadic Positive Engage	**EDSD**	**1.39**	**.53**	**4.01**	**2.59 (.01)**	**2.92**	**.89**	**18.61**	**3.29(.01)**
	ASB	**-1.54**	**.76**	**.22**	**-2.04 (.04)**				
Parent Coerce	**EDSD**	-1.8	1.06	.16	-1.73(.08)	-3.45	1.82	.03	-1.90(.06)
	ASB	1.61	1.55	5.01	1.04(.30)				
Child Coerce	**EDSD**	-.95	.75	.39	-1.26(.21)	**-3.26**	**1.21**	**.04**	**-2.69(.01)**
	ASB	**2.31**	**1.01**	**10.12**	**2.31(.02)**				
Dyadic Coerce	**EDSD**	-6.20	5.66	.01	-1.10(.27)	-3.27	11.82	.04	-.28(.78)
	ASB	-2.93	10.70	.05	-.27(.78)				
Dyadic Non-engage	**EDSD**	-2.21	1.41	.11	-1.57(.12)	-1.53	2.20	.22	-.70(.49)
	ASB	-.68	1.77	.51	-.38(.70)				

Note: All analyses controlled for youth-reported ethnic/racial background (European American compared to other ethnic backgrounds), socio-economic status and gender.

Finally, several of the expected differences between classes in global ratings of family management reliably differentiated the three groups (see Table 8). The global ratings of family management identified differences between classes in parental monitoring and relationship quality. There was significantly less monitoring in the EDSD class and the ASB class compared to the TD class. It was also revealed that the ratings of relationship quality were reliable lower (higher child conflict) in the ASB class than in the TD class. There were no differences between classes based on problem solving or positive behavior support (positive recognition).

Table 8

Differences in Global Ratings of Family Management across the Three Latent Classes

Predictors	Class	TD Referent Class				ASB Referent Class			
		Logit	SE	OR	t(p)	Logit	SE	OR	t(p)
Global Ratings of Family Management									
Parental Monitoring	**EDSD**	**.38**	**.15**	**1.46**	**2.57(.01)**	-.05	.16	.95	-2.70(.83)
	ASB	**.43**	**.16**	**1.53**	**2.70(.01)**				
Positive Behavior Support	**EDSD**	-.08	.08	.92	-1.01(.31)	-.02	.14	.98	-.16(.87)
(Positive Recognition)	**ASB**	-.06	.12	.94	-.50(.62)				
Relationship Quality	**EDSD**	.14	.08	1.16	1.77(.08)	-.18	.14	.83	-1.36(.17)
(Child Conflict)	**ASB**	**.33**	**.11**	**1.39**	**2.90(.01)**				
Problem Solving	**EDSD**	-.03	.10	.98	-.25(.80)	.23	.18	1.26	1.26(.21)
	ASB	-.25	.16	.78	-1.62(.11)				

Note: All analyses controlled for youth-reported ethnic/racial background (European American compared to other ethnic backgrounds), socio-economic status and gender.

DISCUSSION

The goals of the present study were to 1) use latent class analysis to empirically classify patterns of psychopathology within a community sample of adolescents and 2) to better understand transdiagnostic family processes that may be associated with empirically derived classes of psychopathology. The present study is an empirical investigation of the associations among 6 lifetime *DSM-IV* disorders in the World Health Organization World Mental Health Surveys and lifetime antisocial behavior problems in a large sample of multiethnic youth. Using latent class analysis, three distinct and interpretable classes of late-adolescent psychological adjustment were identified. Associations between these classes and family relationship dynamics, collected two years prior, were then subsequently examined. Three specific hypotheses were evaluated.

First, it was hypothesized that LCA would identify an empirically meaningful way to describe and classify comorbid psychopathology. In general this hypothesis was supported. The analysis resulted in three classes, which were characterized by meaningfully distinct types of psychopathology. The first and smallest class was characterized by early-onset and persistently high levels of antisocial behavior (ASB) (6% of the sample). This class also exhibited moderate levels of anxiety, depression, and substance dependence. The second class was characterized by high emotional distress and high substance dependence (EDSD) (10% of the sample). This class did not exhibit high levels of antisocial behavior. The third and largest class was characterized as a typically developing, low psychopathology group (TD) (85% of the sample), which was characterized by low levels of anxiety and depression, almost no substance dependence, and very low levels of lifetime antisocial behavior.

By classifying comorbid psychopathology using LCA, the present study allowed us to step away from the traditional categorical classification framework and look across diagnostic categories to understand the multivariate nature of psychopathology within a community sample adolescents. Cuthbert (2014) describes the current state of the field as one in transition, moving away from the categorical framework of classification (i.e. ICD/DSM) to a more dimensional approach, with the ultimate goal of "psychiatric nosologies based upon the neuroscience and behavioral science" (p. 28) underlying the descriptive phenomenology. While there is still a long way to go before this ultimate goal is reached, generating studies to build a research literature that can inform future versions of psychiatric nosologies is an important step. The good fit of the latent variable model in the present study adds to the extant literature suggesting that common causal pathways likely account for most of the comorbidity among the disorders considered within this study (e.g. Racer & Dishion, 2012). The current study is a first step towards establishing LCA as a useful empirical method during this time of transition from categorical ICD/DSM approaches to more transdiagnostic approaches to classifying psychopathology.

Furthermore, the composition of these classes provides further insight into the overall structure of psychopathology in a large community sample of late-adolescents. These findings highlight a unique subgroup of youth driven by early onset and persistent antisocial behavior. These results replicate the findings of a number of studies, which have identified a similar small group of youth who engage in antisocial behavior of some kind at every life stage (Robins & Hill, 1966; Patterson, 1993; Moffitt, 1993; Dishion et al., 2012). This has important implications in that the youth exhibiting early onset,

persistent problem behavior appear to be a different subset of children than those that

exhibit later-onset problem behavior and/or other forms of psychopathology. It has been

posited that "life time persistent" antisocial behavior is a complex story, which develops

over time and involves disrupted family environments as well as problematic peer

environments (Dishion & Patterson, 2006). It is important to consider that this group may

be characterized by distinct underlying etiological or maintaining mechanisms. For

example, in another study using this sample to compare the family dynamics of early

onset, persistent antisocial behavior to adolescent onset antisocial behavior and a

typically developing group, Dishion et al., (2014) found that the early onset, persistent

antisocial group had significantly more bouts of conflict than the other two groups. They

also found, when looking across all of the interaction tasks, that the early-starting group

had more difficulty "recovering" from the conflict discussions and continued to be

dysregulated even during positive discussions (a finding that has also previously been

shown by Granic, O'Hara, Pepler, & Lewis, 2007) (Dishion et al., 2014). These findings

provide insight into distinct family dynamic patterns that are present within the early-

onset group and reinforce the need to look more closely at this group's unique underlying

etiological and maintaining factors. The development and maintenance of early onset,

persistent antisocial behavior is a complicated story that merits further investigation, as

this is a group that has been repeatedly identified, both theoretically and empirically, as

unique.

Second, it was hypothesized that coding of videotaped observations of parent-

adolescent interactions would reveal family relationship dynamics would discriminate

between empirically derived groups. More specifically, it was predicted that high levels

of coercion, low levels of positive engagement and low levels of parental monitoring would best discriminate between the classes. These hypotheses were mostly supported, though results were somewhat complex. With regard to the global ratings of observed family management, lack of parental monitoring discriminated both classes characterized by psychopathology (EDSD and ASB) from the typically developing class, replicating many previous findings suggesting that parental monitoring (or lack thereof) can be a protective (or risk) factor for adolescent psychological adjustment (or maladjustment) (e.g. Dishion & McMahon, 1998). Interestingly, of all of the family variables that were explored, parental monitoring was the only variable able to discriminate adolescent psychological adjustment from maladjustment within empirically derived groups. This strongly reinforces the idea that parental monitoring is an important malleable environmental variable (e.g., Dishion, Nelson & Kavanagh, 2003), likely playing a role in the underlying etiological and maintaining mechanisms of adolescent psychological adjustment or maladjustment as well as an important prevention and intervention target.

In terms of the five dyadic states, some of these states discriminated between the empirically derived classes and others did not. There also appeared to be the other contextual factors that played a role in the ability of these dynamics to discriminate between the classes (see below). Overall, as expected coercive family interactions as well as positive family interactions discriminated between the classes, supporting our hypothesis. The coercive family dynamic seemed to most effectively distinguish the ASB class from all other classes, suggesting that the coercive family processes may be uniquely related to psychological maladjustment driven by early-onset and persistent antisocial behavior. This is not surprising as coercive family dynamics have repeatedly

been implicated in the development and maintenance of antisocial behavior (e.g. Patterson et al., 1992; Smith et al., 2014) and targeting these family processes has been shown to reduce problem behaviors (Forgatch & Patterson, 2010). Interestingly, however, when looking more closely at the coercive dynamic, not all coercive dynamics discriminated the ASB class from the other classes. Specifically, the parent coercive dynamic within the family conflict task and the child coercive dynamic within the family activity task were most sensitive to distinguishing the ASB class from the other two classes. This suggests that there is much more to be learned about the coercive process and that it should be studied in more detail, taking into consideration the context within which the family is interacting as well as who (parent, child or both) is driving the coercive process. Furthermore, it would be interesting to examine the developmental trajectory of the coercive process and explore whether it evolves and changes over time with regard to what contexts it may appear in, who may be initiating, escalating as well as ending the coercive battle, and how those differences may be associated with varying types or severity of psychological maladjustment. For example, analyses of another sample of adolescents revealed that males who were early onset and persistent in their antisocial behavior, became functionally autonomous in adolescence (Dishion, Nelson & Bullock, 2004), and the parent(s) effectively gave up their efforts to manage or influence the youth during direct observations. A clear understanding of the nuances of the coercive dynamic and how it is related to psychological adjustment is an important step that is needed to understand how to best target this process within prevention and intervention programs and for whom.

With regard to dyadic positive family interactions, positive engagement was clearly able to discriminate between all three of the empirically derived classes within the family activity task. The family activity task assesses the families' mutual involvement in pleasant activities together. Of particular interest, however, was that it was not just low levels of positive engagement that discriminated between the classes, as was found for the ASB class. Paradoxically, the EDSD class was distinguished from the TD class by *high* levels of positive engagement. Recently researchers have begun to look more closely at positive engagement and the complex relationship it has with psychological adjustment. One specific process, defined by Ha & Kim (2014), which has been implicated in the etiology and maintenance of emotional distress is "up regulation." Up regulation is defined as the likelihood that both people within a dyad display longer durations of positive affective states during conflict discussions (Ha & Kim, 2014). Ha & Kim (2014) suggest that long durations of positive affective exchanges during conflict may indicate that the dyad is unable to deal with conflict and is actively avoiding conflict by up regulating positive affect. In one study exploring the relationship between romantic partners, up regulation and depression, the length of observed up regulation states predicted increases in depressive symptoms in both males and females over the course of 2 years (Ha & Kim, 2014). This may be what is occurring between adolescents and their parents within the EDSD class in the current study. While there are clearly differences between the design of Ha & Kim (2014) and the present study (i.e. more positive affect was observed in the present study within a cooperative task rather than a conflict task; further, the present study examines parent-adolescent dyads rather than romantic partner dyads), this is something that should be considered in future studies. It is interesting to

consider that there may be an up regulation family process that is uniquely related to psychological maladjustment driven by emotional distress.

Finally, the last hypothesis, stating that the conflict task would better discriminate between the empirically derived classes than the cooperative task, was only partially supported. The analyses found that the conflict task was better able to pick up on differences in parent coercion within the dyad, whereas the family activity task was better able to pick up on differences in child coercion and positive engagement within the dyad. Thus, it is not that the conflict task overall is *better* able to discriminate among these classes, but it appears that each of the tasks are better at discriminating very specific family dynamics. These findings suggest that the context within which the families interact draws for certain dynamics that are not the same across all tasks. Other studies are starting to find similar things. For example, Dishion et al., 2012, found that when looking at parent-child interactions across seven different tasks, the longest bouts of conflict were present within the problem solving task whereas the longest bouts of positive engagement were present within the family activity task. It may be easier to see differences between groups on certain constructs when that specific task clearly draws for more of that construct (i.e. positivity within a family activity task). Therefore, based on these findings, it is important to consider the task context when attempting to better understand the influence of family dynamics on the development and maintenance of psychopathology. They also suggest that the practice of aggregating across various types of interaction tasks may wash out or distort important findings. Finally, these findings also have implications when considering which interaction tasks to use in assessments, like the Family Check-Up (Dishion & Kavanagh, 2003; Dishion & Stormshak, 2007),

that draw on direct observation to better understand what is occurring within specific families. It is important to consider that different types of interaction tasks may evoke different dynamics based on varying types or severity of psychological maladjustment.

This study is unusual because of its large sample size, diversity of the families, and the fact that it involved a community sample. Methodically, in terms of measurement, this study is also strong. Many studies examining parenting practices use self-report questionnaires (parent or child) (e.g. Kim et al., 2003), this poses many issues, including informant discrepancy. This study uses direct observation to measure family dynamics, which is ideal and prevents informant discrepancies, as well as informant bias. Further, this study uses both micro and macro coded data. This allows us to capture, both the global dynamics that are occurring, as well as the more subtle nuances of the family interaction, that might not be as clear when looking globally at what is occurring. Furthermore, this study looked the dyadic state of the families, rather than focus solely on individual characteristics. Interactions are dynamic transactional processes and it is important to take both people into account when attempting to understand the influence that interactions have on psychological adjustment. Finally, data was not aggregated across task. Type of context within which the family interacted was considered (i.e. the family discussing a conflict versus planning an activity). When aggregating data across tasks there is an implicit assumption that context within which the family is interacting does not matter. This is not the case and context should be considered when trying to understand family processes. Despite its contributions and strengths, the present study is not without limitations. First, all possible diagnoses from the CIDI were not included and second, to simplify the interpretation of psychopathology, indicators of psychopathology

were collapsed within diagnostic categories to create dichotomous variables. Future studies using LCA would likely benefit from the use continuous measures of these different forms of psychopathology (e.g., anxiety and depression symptom measures) rather than dichotomous indicators of psychopathology. Use of continuous measures might help to identify more meaningful transdiagnostic clusters of psychopathology that share common underlying etiological mechanisms.

As a field, we are still in a place in which we must rely on the common language that the DSM and the ICD have provided, as we start to better understand how certain underlying mechanisms map onto the framework that is already in place; however, that does not mean that we cannot start thinking more transdiagnostically about these disorders. Broadly, this study found that LCA is a useful way of attempting to better understand empirically which disorders likely share underlying mechanisms and can be a useful method to use as a way to inform how psychopathology can better be classified. This study also found that some, but not all family dynamics, discriminated among our empirically-derived classes of psychological adjustment. Finally, this study found that particular tasks better discriminated among classes with regard to specific family dynamics. Overall, it is important to recognize the importance of taking many variables into consideration when attempting to understand how family dynamics are associated with psychological adjustment. Type of psychopathology, differing family dynamics, and context within which the family interacts, are just a few of the many variables that are important to consider. As the field begins the process of moving towards understanding psychopathology in a more dimensional framework and trying to understand what behavioral and biological mechanisms might underlie various disorders, it is also

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important that future research start to address what behavioral and biological mechanisms

might underlie various parenting constructs, such as the coercive process, and possibly

begin to think about parenting within a dimensional framework, as well.

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