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## Identifying Youth at Risk for Problematic Absenteeism Using Nonparametric Modeling: The Impact of Youth Psychopathology and Family Environment Risk Factors

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**Identifying Youth at Risk for Problematic Absenteeism Using Nonparametric Modeling:  
The Impact of Youth Psychopathology and Family Environment Risk Factors**

By

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Bachelor of Arts – Psychology  
Hastings College  
2015

A thesis submitted in partial fulfillment  
of the requirements for the

Master of Arts – Psychology

Department of Psychology  
College of Liberal Arts  
The Graduate College

University of Nevada, Las Vegas  
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## Thesis Approval

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## ABSTRACT

### **Identifying Youth at Risk for Problematic School Absenteeism Using Nonparametric Modeling: The Impact of Youth Psychopathology and Family Environment Risk Factors**

by

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Dr. Christopher Kearney, Examination Committee Chair  
Distinguished Professor of Psychology  
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The best cutoff to differentiate problematic school absenteeism from nonproblematic school absenteeism has yet to be identified in the literature (Lyon & Cotler, 2007). Contemporary classification systems, including Multi-Tiered Systems of Support (MTSS), depend upon cutoffs to clearly define the various tiers (Jimerson, Burns, & VanDerHeyden, 2016). The current study aimed to inform the MTSS approach while also contributing to early identification, assessment, and intervention methods for those youth and families at the highest risk of problematic school absenteeism and its negative consequences. The current study identified subgroups of youth at the highest risk of problematic absenteeism, defined as equal to or greater than 1% of full days missed and equal to or greater than 10% of full school days missed cutoffs (Egger et al., 2003; NCES, 2016). Interactions among family environment and youth psychopathology risk factors were evaluated at each cutoff. Participants included 378 elementary, middle, and high school students and their families from clinic and community settings. The current study utilized nonparametric Classification and Regression Tree (CART) procedures via SPSS decision tree software. CART's procedures are meant for generating hypotheses and not testing hypotheses (Markham, Young, & Doran, 2013). Therefore, hypotheses provided were based on the extensive literature base of problematic school absenteeism risk factors. Hypothesis one was that Family Environment Scale (FES) items

addressing family conflict were expected to be the most important FES items to the model while independence items were expected to be the second most important. Hypothesis two was that Revised Children's Anxiety and Depression Scale (RCADS) items addressing generalized anxiety were expected to be the most important RCADS items to the model while major depression items were expected to be the second most important. Post-hoc analyses were also conducted to explore additional cutoff scores (i.e., <1%, 3%, and 5%), gender distinctions (i.e., male and female), and developmental distinctions (i.e., children and adolescents). Hypotheses were partially supported. Implications for clinicians, researchers, and educators are discussed.

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# CHAPTER 1

## INTRODUCTION

The Department of Education (2016) identified absenteeism as an educational crisis because 6 million students missed 15 days or more of school in the 2013-2014 academic year. Also, 13% of students were chronically absent (Department of Education, 2016), translating to approximately 93 million school days missed by American students (Department of Education, 2016). Twenty percent of high schoolers, 12% of middle schoolers, and 10% of elementary schoolers were chronically absent in the United States in any given week (Department of Education, 2016).

Absenteeism is also an important issue in Nevada. The 2010-2011 school year represented a six-year high in truancy rates for the state, with Nevada reporting 5,210 habitually truant students (Nevada Legislative Counsel Bureau, 2015). Habitually truant students are defined as those who were declared truant three or more times in one school year or were declared habitually truant in a school year, and they were absent the next school year without the approval of school officials or their parent/guardian (NRS 392.140). Due to an increased focus on attendance monitoring and the funding of the Student Attendance Review Board (SARB), there has been a significant decrease in the number of habitually truant students in Nevada (Nevada Supreme Court's Committee on School Attendance and Disturbance, 2012). The Clark County School District (CCSD) Accountability Department (2014) reported 1,792 habitual truants in Nevada for the 2014-2015 school year with 668 of those students coming from the Clark County School District. Similarly, during the 2013-2014 school year, there were 1,899 habitual truants in the state of Nevada with 902 in Clark County alone (Skorkowsky, 2014).

Absenteeism is a broad field with psychological research focusing primarily on individual youth causes, such as psychopathology (Department of Education, 2016; Granell de Aldaz, Vivas, Gelfand, & Feldman, 1984; Kearney, 2001; Naylor, Staskowski, Kenney, & King, 1994). Absenteeism researchers in other fields, such as medicine, social work, juvenile justice, and education, have investigated broader variables including school climate (Cohen, McCabe, Michelli & Pickeral, 2009), school violence (Dake, Price, & Telljohann, 2003; Nickerson & Martens, 2008), and neighborhood quality (Bowen, Bowen, & Ware, 2002; Chapman, 2003; Crowder & South, 2003; Henry, 2007).

### **Absenteeism**

School absenteeism refers to any excused or unexcused absence from school among school-aged youth (Kearney, 2008a). Most school absences are considered nonproblematic because they are temporary and do not negatively impact a student (Kearney, 2008a). Nonproblematic absenteeism typically involves legitimate situations approved by parents and school officials and can include true illness, family emergency, holidays, weather, homelessness, or other unforeseeable conditions (Kearney & Albano, 2007). Nonproblematic absenteeism also includes self-corrective behavior such as when a student missed school but returns before social or academic problems arise (Kearney, 2008a).

Problematic absenteeism, on the other hand, can be troublesome for youth and their family. There is a lack of clarity on the precise definition of problematic absenteeism (see Table 1) given the complexity of the construct, inconsistent criteria, and overlapping criteria (Lyon & Cotler, 2007). There is even more inconsistency in defining cutoffs of the severity of problematic absenteeism (Lyon & Cotler, 2007). Previously utilized cutoffs include 25%, 10%, and 1% of full school days missed (Egger, Costello, & Angold, 2003; National Center for Education

Statistics, 2016). Kearney (2008b) defined problematic absenteeism as missing at least 25% of school during the last two weeks, severe difficulty attending classes with significant interference in the student's or family's routine for the last two weeks, or absence from school for at least ten days during any 15-week period school is in session. The Department of Education (2016) defined problematic absenteeism as students missing at least 15 days of school in a year, which translates to approximately 10% of full school days missed. Egger and colleagues (2003) defined problematic absenteeism as students missing at least one-half day of school, which translates to less than 1% of full school days missed. Pflug and Schneider (2016) defined school absenteeism as those who missed any school during the last seven school days. Olson's (2013) study of absenteeism revealed 50% of students who miss 2-4 days in the first few months of school went on to consistently miss school and be chronically absent later in the year.

The best cutoff to differentiate problematic school absenteeism from nonproblematic school absenteeism has yet to be identified in the literature (Lyon & Cotler, 2007). Multiple studies have found negative effects may occur at each cutoff (Ingul et al., 2012; National Center for Education Statistics, 2016; Skedgell & Kearney, 2016). The current study utilized both a 1% and 10% of school days missed cutoff to address concerns of conventional, more liberal cutoffs, not detecting all school absences and therefore impacting prevalence rates and relevant risk factors. To decrease the negative effects of categorizing a continuous variable (Harris, Reeder, & Hyun, 2011) multiple cutoffs (i.e., 1%, 10%, etc.) were utilized to allow for comparison of the relationships among the risk factors at different cutoff scores. Finally, the 1% and 10% cutoffs were utilized to better define the tiers in contemporary Multi-Tiered System of Supports (MTSS). Identifying the best cutoff for problematic school absenteeism is essential because most contemporary classification models depend upon these cutoffs (Jimerson et al., 2016).

## **Multi-Tiered System of Supports**

Multi-Tiered System of Supports (MTSS) is defined as an evidence-based, integrated, and comprehensive framework to align all necessary systems for an individual student's success (California Department of Education, 2017). The goal of MTSS models are to evaluate an individual child's response to interventions by tracking assessment results (Dougherty Stahl, 2016). The use of these models was mandated in the United States by the reauthorization of the Individuals with Disabilities Education Act (IDEA) in 2004 (Dougherty Stahl, 2016). MTSS is an umbrella term that encompasses the Response to Intervention (RtI) processes and all other support programs (California Department of Education, 2017).

MTSS models have recently been applied to school absenteeism. Kearney and Graczyk (2014) proposed the Response to Intervention (RtI) approach to addressing problematic school absenteeism (see Figure 1). This model organizes assessment and intervention strategies for problematic school absenteeism into three tiers: enhancement and prevention (Tier 1), emerging difficulties (Tier 2), and severe difficulties (Tier 3; Kearney, 2016). Each tier is matched with evidence-based intervention recommendations (Fox, Carta, Strain, Dunlap, & Hemmeter, 2010).

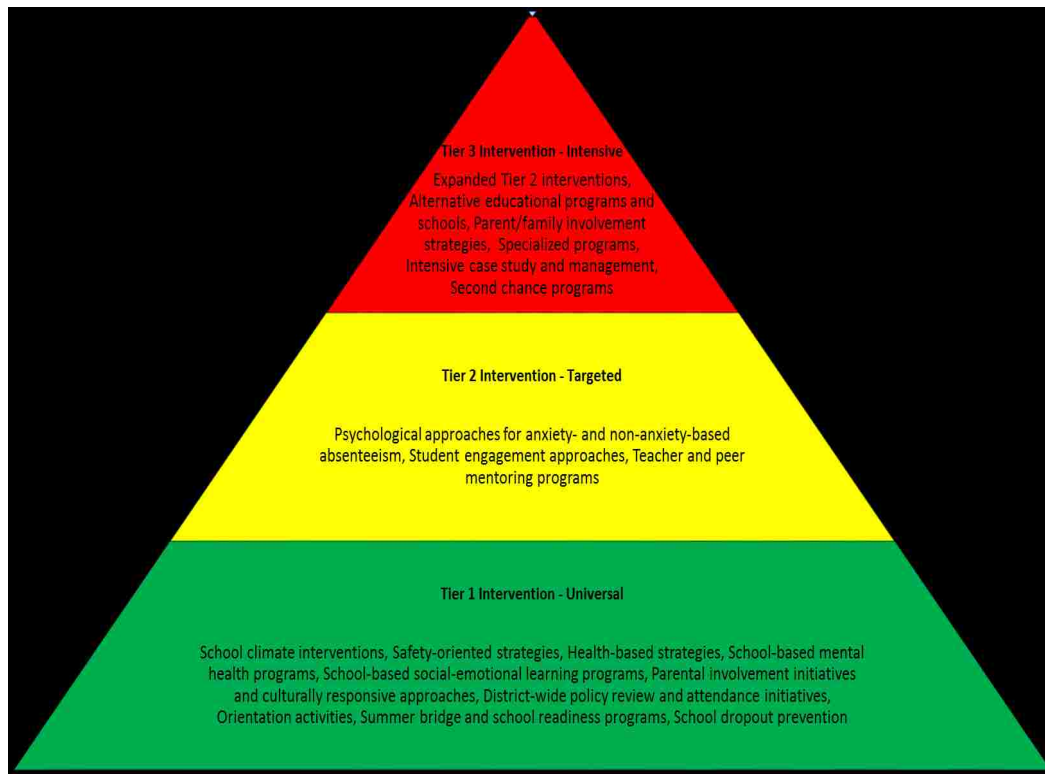


Figure 1. A multitier model for problematic school absenteeism. Reprinted from "Managing school absenteeism as multiple tiers: An evidence-based and practical guide for professions" by C. A. Kearney, 2016, New York: Oxford University Press. Copyright 2016 by the Oxford University Press. Reprinted with permission.



Tier 1, the universal preventative tier, is focused on interventions that can be reasonably applied to the entire population (Kearney & Graczyk, 2014). Examples of Tier 1 intervention include those focused on improving school climate, safety, health, parent-school involvement, or student-school involvement. Tier 2, the targeted early intervention tier, is focused on interventions for those who are not benefiting from the universal strategies and require additional support (Kearney & Graczyk, 2014). Examples of Tier 2 intervention include those focused on peer mentoring, teacher mentoring, therapeutically treating anxiety-based absenteeism, or psychologically treating non-anxiety-based absenteeism. Tier 3, the intensive intervention tier, is focused on interventions specific to those students displaying complex problems (Kearney & Graczyk, 2014). Examples of Tier 3 interventions include alternative schools, case management, or specialty education programs. The advantage of this model is a focus on early identification and clear and immediate action (Kearney, 2016).

MTSS provided a theoretical framework for the current study. Specifically, the current study utilized multiple absenteeism cutoffs (i.e., 1%, 10%, etc.) to further distinguish the differences in the presentation of problematic school absenteeism among the tiers. Recent research focuses on factors that caused or have continued to maintain a youth's problematic absenteeism, but little research has aimed to predict those youth or family types most at risk for problematic absenteeism. The current study extends the literature by examining the role of the family environment and youth psychopathology symptoms in school absenteeism severity while further differentiating the MTSS tiers. The current study aimed to identify subgroups of youth at the highest risk of problematic absenteeism, defined as equal to or greater than 1% and 10% of full school days missed, based on family environment and youth psychopathology risk factors. Results have important implications for distinguishing MTSS tiers while also contributing to

early identification, assessment, and intervention methods for those youth and their families at the highest risk for problematic absenteeism and its negative consequences.

## CHAPTER 2

### REVIEW OF THE LITERATURE

#### Historical Perspective

Researchers have used various terms to define absenteeism throughout history (see Table 1). Initially, absent youth were referred to as delinquent or truant (Broadwin, 1932; Kline & Hall, 1898). As the field developed, researchers focused more on the anxiety aspect of absenteeism and terms such as school phobia (Johnson, 1957) and school refusal behavior (Kearney & Silverman, 1996) became more prominent.

Table 1

#### *Key Definitions Related to Problematic Absenteeism*

Term	Definition
<i>Delinquency</i>	Akin to conduct disorder, refers to rule-breaking behaviors and status offenses such as stealing, physical and verbal aggression, property destruction, underage alcohol or tobacco use, and violations of curfew and expectations for school attendance (Frick & Dickens 2006; McCluskey, Bynum, & Patchin, 2004)
<i>Truancy</i>	Illegal, unexcused absence from school; the term may also be applied to youth absenteeism marked by surreptitiousness, lack of parental knowledge or youth anxiety, criminal behavior and academic problems, intense family conflict or disorganization, or social conditions such as poverty (Fantuzzo, Grim, & Hazan, 2005; Fremont, 2003; Reid, 2003)
<i>School phobia</i>	Fear-based absenteeism, as when a youth refuses school due to fear of some specific stimulus such as a classroom animal or fire alarm (Tyrell, 2005)
<i>Separation</i>	Excessive worry about detachment from primary caregivers and <i>anxiety</i> reluctance to attend school (Hanna, Fischer, & Fluent, 2006)
<i>School refusal</i>	A broader term referring to anxiety-based absenteeism, including panic and social anxiety, and general emotional distress or worry while in school (Suveg, Aschenbrand, & Kendall, 2005)
<i>School refusal</i>	An even broader term referring to any youth-motivated refusal to

*behavior* attend school or difficulty remaining in classes for an entire day, whether anxiety-related or not (Kearney & Silverman, 1996)

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*Note.* Adapted from “An Interdisciplinary Model of School Absenteeism in Youth to Inform Professional Practice and Public Policy,” by C.A. Kearney, 2008, *Educational Psychology Review*, 20, p. 259. Copyright 2008 by Springer Science + Business Media, LLC. Adapted with permission.

**Truancy.** Early researchers identified truant youth as individuals whose home lives had minimal influence over them and whose “moral sense, self-respect, and ambition are greatly wanting” (Kline & Hall, 1898, p. 418). This idea encouraged the idea that truancy was a form of, condition of, or precursor to, delinquency (Kearney, 2001). Truancy refers to an unauthorized and deliberate absence from school without consent or knowledge of parents or school officials (Kearney, 2001). Truancy is often seen as a behavior problem linked to antisocial tendencies (Stroobant & Jones, 2006). Fremont (2003) defined truancy as nonanxiety-based absenteeism (see Table 2). Youth who are truant choose to not attend school due to their lack of interest in school or desire to engage in other activities. Youth who are truant are generally unwilling to conform to a school’s expected behavior or code of conduct (Elliott, 1999). Truant youth commonly hide their behavior from their families and do not spend their free time at home (Fremont, 2003). Truant youth also have been linked to poor academic performance, school dropout, substance abuse, maladjustment, and criminality (Henry, 2007; Kearney, 2001; Reid, 1984a). Elliott (1999) distinguished truancy as youth who were not fearful or anxious about school. Truant youth also rarely exhibit somatic complaints or anxious distress, like their peers with school refusal behavior (Pilkington & Piersel, 1991). Table two further defines the differences between youth with school refusal behavior and truant youth.

Table 2

*Criteria for Differential Diagnosis of School Refusal and Truancy*

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School Refusal	Truancy
Severe emotional distress about attending school; may include anxiety, temper tantrums, depression, or somatic symptoms.	Lack of excessive anxiety or fear about attending school
Parents are aware of absence; youth often tries to persuade parents to allow him or her to stay home.	Youth often attempts to conceal absence from parents.
Absence of significant antisocial behaviors such as juvenile delinquency.	Frequent antisocial behavior, including delinquent and disruptive acts (e.g., lying, stealing), often in the company of antisocial peers.
During school hours, youth usually stays home because it is considered a safe and secure environment.	During school hours, youth frequently does not stay at home.
Youth expresses willingness to do schoolwork and complies with completing work at home.	Lack of interest in schoolwork and unwillingness to conform to academic and behavior expectations.

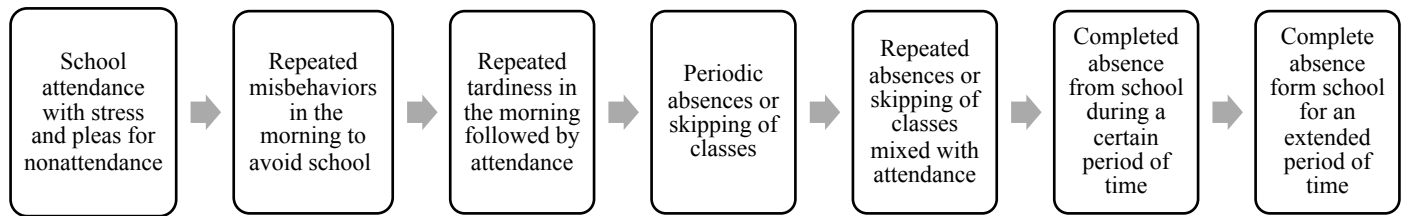
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*Note.* Adapted from “School Refusal in Children and Adolescents,” by W.P. Fremont, 2003, *American Family Physician*, 68(8), p. 1555. Copyright 2003 by American Academy of Family Physicians. Adapted with permission.

**School Phobia.** Broadwin (1932) introduced the idea of school absence due to fearfulness or anxiousness and not necessarily truancy. Partridge (1939) described a subtype of truancy, psychoneurotic truancy, which referred to youth who displayed guilt, anxiety, aggression, tantrums, and a desire for attention from an overprotective parent. Johnson and colleagues (1941) developed the term school phobia, a subtype of psychoneurotic truancy, characterized by youth with anxious and obsessive tendencies. The three specific aspects of school phobia are (1) acute youth anxiety with hypochondriacally and compulsive symptoms

caused by organic disease, or emotional conflict; (2) increased anxiety in a youth's mother due to a life stressor involving a threat to her safety; and (3) a historically unresolved, over-dependent mother-youth relationship (Kearney, 2001). These researchers further encouraged the splinter in the study of absenteeism into two groups (1) a "traditional" group viewed absenteeism as a form of truant behavior, and (2) a "contemporary" group saw absenteeism as a complicated condition referred to as school refusal (Kearney, 2001).

**School Refusal Behavior.** Kearney and Silverman (1996) coined the term school refusal behavior as an umbrella term including youth between the ages of 5-17 with youth-motivated refusal to attend school or difficulty staying in school for the entire day. School refusal behavior is thought to be on a continuum (see Figure 2) of attendance (Kearney, 2001).



*Figure 2.* Continuum of school refusal behavior based on attendance. Adapted from *School Refusal Behavior in Youth: A Fundamental Approach to Assessment and Treatment* (p. 7), by C. A. Kearney, 2001, Washington, D.C.: American Psychological Association. Copyright 2001 by the American Psychological Association. Adapted with permission.

This continuum encompasses all historical definitions of school refusal behavior including school truancy and school phobia (Kearney & Silverman, 1996). Youth may be on this continuum if they consistently miss school or if the goal of their behavior is to miss school. Youth with school refusal behavior share their desire to miss school time (Kearney, 2001). School refusal behavior is a problem for school districts nationally, though the exact rates at which youth refuse school varies across settings.

### **Epidemiology**

**Prevalence.** Approximately 35% of school-aged youth exhibit school refusal behavior at some point during their education (Pina et al., 2009). In the clinic setting, school refusal behavior is a problem for 5% of youth (Mcshane, Walter, & Rey, 2004). One out of 16 youth referred to a clinic for any emotional or behavioral disorder present with absenteeism as a primary problem, half displaying mild to moderate school refusal behavior and the others displaying severe to very severe behavior (Kearney & Beasley, 1994). Kearney and Beasley (1994) found the prevalence of school refusal behavior to be higher than most childhood psychiatric disorders (5%; Costello, Egger, & Angold, 2005; Emerson, 2003). Youth who attend school and experience emotional distress or fear have a prevalence rate of 1.7-5.4% (Granell de Aldaz et al., 1984).

The Department of Education (2016) found that more than six million students missed 15 or more school days, accounting for 14% of students in the 2013-2014 school year. Absenteeism is consistently a problem across the United States; approximately 500 school districts reported that 30% or more of their students missed at least three weeks during the 2013-2014 school year (Department of Education, 2016). Prevalence rates differ slightly in public and private schools, though private schools tend to have higher rates of perfect attendance in the last month (Centers for Disease Control and Prevention, 2006). High schools have higher rates of chronic



absenteeism than middle and elementary schools; 20%, 12%, and 11%, respectively (Department of Education, 2016). High poverty urban schools have reported some of the highest rates of absenteeism with up to one-third of students qualifying as chronically absent (Balfanz & Byrnes, 2012). Similarly, high poverty rural schools have reported up to one in four students missing a month of school days (Balfanz & Byrnes, 2012). In Nevada, during the 2014-2015 school year, there were 1,792 habitual truants (0.39% of students; Clark County School District Accountability Department, 2014).

Complete absenteeism occurs when youth miss an entire day of school. Absenteeism can occur in many different forms, whether that be a full day missed, partial day missed, tardiness, skipping class, and many other forms of absenteeism. Balfanz and Byrnes (2012) estimated 5 to 7.5 million American students miss approximately a month of school each year. While prevalent, not all absenteeism is problematic. Balfanz and Byrnes (2012) defined chronic absenteeism as a student missing 10% of school days, which produced a prevalence rate of 14-15% nationally. Of those identified as chronically absent, about 50% meet that definition for multiple school years (Kearney, 2016) and about 25% qualify as severely chronically absent, defined as missing at least two months of school (Balfanz & Byrnes, 2012).

Partial absences occur when youth are tardy, skip class, or are missing certain classes. Partial absence rates are often not accounted for in absenteeism prevalence rates (Kearney, 2008a). Guare and Cooper (2003) found that 54.6% of high school students sometimes skip a class and 13.1% often skip a class. Partial absences can still be problematic despite a student not missing entire school days (Kearney, 2016). Office disciplinary referral data from 1,510 schools nationwide indicated that tardiness comprised 24% of referrals and skipping classes 21% of referrals (Spaulding et al., 2010). Kearney (2001) identified 4.4-9.5% to be a reasonable

prevalence rate for morning tardiness. Problematic absenteeism continues to be a systemic problem that leads to many short and long-term consequences for school-aged youth.

### **Effects of Problematic Absenteeism**

**Short Term.** Numerous negative consequences are associated with short-term or acute absenteeism. Kearney (2001) identified severe childhood distress, problems with homework, declining grades, social alienation, family conflict, disruption in a family's routine, financial expense, and possible youth maltreatment as common short-term consequences of problematic absenteeism. Lounsbury and colleagues (2004) identified school absences to be associated with a youth's educational goals and intelligence score. Problematic absenteeism may also result in various negative consequences such as gang membership, lack of supervision, legal trouble, and juvenile delinquency (Dube & Orpinas, 2009; Kearney, 2001; Kearney, 2007; Kearney & Bates, 2005).

**Long Term.** Chronic absenteeism and its negative consequences may linger into one's adulthood. Academically, youth who are chronically absent are associated with a reduction in educational test scores, a long-term decrease in academic performance, eventual drop-out, and decreased chance of postsecondary enrollment (Carroll, 2010; Chang & Romero, 2008; Kearney & Graczyk, 2014; Mac Iver & Mac Iver, 2010; Rumberger, 2011). For example, youth who were both living in poverty and chronically absent in kindergarten were revealed to have the lowest academic performance in fifth grade (Chang & Romero, 2008), and 25% of 12<sup>th</sup> grade youth who were chronically absent between 8<sup>th</sup> and 11<sup>th</sup> grade dropped out (Utah Education Policy Center, 2012). Kearney (2001) noted about two-thirds of youth continue to have moderate to serious adjustment problems later in life. Researchers have identified various negative consequences related to chronic problematic absenteeism such as economic deprivation, marital problems,

occupational problems, family difficulties, social maladjustment, physical health issues, and mental health issues (Dube & Orpinas, 2009; Hibbett & Fogelman, 1990; Kearney & Bates, 2005; Kearney & Hugelshofer, 2000). These consequences also pose billions of dollars in societal costs due to lost revenue from underemployment and money spent on welfare programs, unemployment programs, crime prevention, and persecution of crimes (Christenson & Thurlow, 2004).

### **Psychopathology**

Youth with problematic absenteeism display a range of internalizing and externalizing behavior problems (Kearney, 2016). Common characteristics include separation anxiety, social anxiety, general anxiety, depression, physical complaints, fatigue, fear, noncompliance, clinging, tantrums, and running away (Kearney & Bates, 2005; Wimmer, 2010). The current study focuses primarily on internalizing behavior problems. The Revised Child Anxiety and Depression Scale (RCADS) (see below) includes measures of youth internalizing disorders, including separation anxiety, generalized anxiety, panic, social phobia, obsessions/compulsions, and depression. These individual youth subscales directly relate to internalizing symptoms of youth with problematic absenteeism.

**Internalizing Disorders.** Individuals with problematic absenteeism frequently display internalizing symptoms (Park et al., 2015). As many as 50% of youth with an anxiety disorder and 80% of youth who were referred due to school refusal behavior have been found to endorse at least one somatic complaint (Crawley et al., 2014; Honjo et al., 2001). Youth who refuse school often report sleeping difficulties, stomachaches, headaches, and other somatic complaints (Hans & Ericksson, 2013). Kearney (2001) identified the most common somatic complaints among youth who refuse school to be headaches, sweating, nausea, vomiting, stomach pain, back

pain, chest pain, heart palpitations, blurred vision, shortness of breath, loss of voice, joint pain, trouble swallowing, and menstruation symptoms.

Internalizing disorders are common among those who refuse school. Around 50% of these youth have an anxiety diagnosis (Maynard et al., 2015). Common diagnoses include separation anxiety disorder, generalized anxiety disorder, social anxiety disorder, and depression (Egger et al., 2003; Ek & Eriksson, 2013; Hughes, Gullone, Dudley, & Tonge, 2010; Maynard et al., 2015; Wimmer, 2010). For example, Last and Strauss (1990) found, among youth with problematic absenteeism, that many met criteria for separation anxiety disorder (38.1%), social phobia (30.2%), simple phobia (22.2%), panic disorder (6.3%), and post-traumatic stress disorder (3.2%). Similarly, McShane and colleagues (2001) found the majority (54%) of their sample of school refusing youth to be diagnosed with an anxiety disorder. Kearney and Albano (2004) found, among those with problematic absenteeism, diagnoses of separation anxiety disorder (22.4%), generalized anxiety disorder (10.5%), depression (4.9%), specific phobia (4.2%), and social anxiety disorder (3.5%). Among youth who do not meet full criteria for an anxiety disorder, many display anxiety symptoms prevalent enough leading to an Anxiety Disorder Not Otherwise Specified diagnosis (Maynard et al., 2015). The comorbidity of anxiety and depression diagnoses in youth who refuse school is consistent with high child and adolescent comorbidity rates between anxiety and depression (Essau, 2003). Adolescents and youth with comorbid diagnoses have been linked to inferior treatment outcomes (Hirschfeld, 2001; Maynard et al., 2015).

**Externalizing Disorders.** Various externalizing symptoms and disorders are also common among youth with problematic absenteeism. Recent research has identified externalizing problems and symptoms to be a more robust predictor of problematic absenteeism

than internalizing problems (Ingul, Klockner, Silverman, & Nordahl, 2012). Kearney (2001) identified the most common externalizing symptoms as verbal aggression, physical aggression, noncompliance, clinging, hiding, running away, temper tantrums, lying, and refusal to move. Kearney and Albano (2004) found, among those with problematic absenteeism, that youth were diagnosed with oppositional defiant disorder (ODD, 8.4%), conduct disorder (2.8%), and attention deficit hyperactivity disorder (ADHD, 1.4%). Harada and colleagues (2002) identified problematic absenteeism in 80% of their sample diagnosed with ODD and 17% with ADHD. Youth with problematic absenteeism and multiple externalizing behaviors are diagnosed with oppositional defiant disorder 21-44% of the time (Maynard et al., 2015).

### **Classification Systems**

Classification systems aim to operationally define conceptual terms, organize symptoms for taxonomic purposes, include relevant risk factors, account for frequent changes in behaviors, and link to applicable therapeutic or assessment resources (Kearney, 2008a; Stein, Lund, & Nesse, 2013). Classification systems increase the utility of related symptomology in clinical and scientific settings. Many researchers and clinicians have attempted to classify problematic absenteeism, with little consensus (Bernstein & Garfinkel, 1986; Coolidge, Hahn, & Peck, 1957; Ingul et al., 2012; Kearney, 2016; Kearney & Silverman, 1996; Kennedy, 1965; Partridge, 1939; McShane et al., 2001). Understanding the evolution of these systems is beneficial to the conceptual understanding of school refusal behavior.

**Psychoneurotic vs. Traditional Truancy.** Partridge (1939) identified five types of truancy. Four of Partridge's five types were related to detached family relationships and antisocial behavior, including undisciplined, hysterical, desiderative, and rebellious subtypes. Partridge found key features of each of these types to be a lack of discipline, running away from

challenging situations, a desire for something, and oppositional behavior towards parents (Partridge, 1939). Psychoneurotic truancy, the fifth type, referred to youth with overprotective parents who exhibited guilt, anxiety, tantrums, aggression, or a desire for attention (Partridge, 1939). This type later split the study of absenteeism into two groups (1) a traditional group viewed absenteeism as an illegal, delinquent behavior referred to as truancy and (2) a contemporary group viewed absenteeism as a more complex neurotic condition referred to as school refusal or psychoneurotic truancy (Kearney, 2001). Waldfogel, Coolidge, and Hahn (1957) defined school phobia as one displaying hesitancy to attend school due to fear of something about school. This addition is important for the development of school refusal or psychoneurotic truancy as it points to the significant fear one experiences related to the school environment specifically.

**Neurotic vs. Characterological.** Coolidge, Hahn, and Peck (1957) hypothesized two subtypes of youth with school phobia, the neurotic type and the characterological type. The neurotic type generally represented the idea of school phobia. This type was characterized by younger youth with acute sudden onset anxiety symptoms (Coolidge et al., 1957). The characterological type generally represented school refusal or psychoneurotic truancy. This type was characterized by older youth with depression and paranoia symptoms with a more gradual onset that is more severe (Coolidge et al., 1957). These subtypes were generally well received except for a criticism by A.M. Johnson (1957) who believed the characterological subtype purely encompassed youth whose symptoms developed gradually and lasted longer.

**Acute vs. Chronic.** Kennedy (1965) modified Coolidge, Hahn, and Peck (1957)'s neurotic/characterological distinction by emphasizing the duration and overt symptoms youth have experienced. Kennedy (1965) identified two specific types of school phobia. Type 1, the

neurotic crisis, was characterized by acute onset of the first absenteeism episode, concerns about death, lower ages, generally good parental communication and adjustment, questionable mother physical health, and a competitive father-mother relationship focused on home management (Kennedy, 1965). Type 2, the way-of-life-phobia, was characterized by slow onset and multiple school refusal episodes, upper ages, poor parental communication and adjustment, neurotic maternal behavior, father displaying little interest in home or children, and no concerns about death (Kennedy, 1965). Both types shared common symptoms such as fears specific to school and disasters, somatic complaints, separation anxiety, and parent-school conflict (Kennedy, 1965).

Kearney and Silverman (1996) expanded upon Kennedy's modification by introducing an atheoretical differentiation based on the length of the problem. Kearney and Silverman's (1996) approach included self-corrective, acute, and chronic school refusal behavior. *Self-corrective school refusal behavior* identifies youth whose behavior corrected spontaneously within two weeks. This form of school refusal behavior may occur during transitional periods (i.e., beginning of the year) or when a youth is attempting to "test" their parent's boundaries. *Acute school refusal behavior* identifies youth whose absenteeism lasts from 2 weeks to 1 calendar year (Kearney and Silverman, 1996). *Chronic school refusal behavior* identifies youth whose absenteeism continues longer than one calendar year (Kearney & Silverman, 1996).

**Diagnostic.** Little attention was given to the diagnostic aspect of problematic absenteeism or school refusal behavior before 1980 due to a lack of definitional clarity and overlap with other disorders (Kearney, 2001). The creation of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM) created an opportunity to classify those with problematic absenteeism into specific psychiatric categories (American Psychiatric Association, 1980).

Bernstein and Garfinkel (1986, 1988) suggested that youth with school phobia fit into four subgroups based on the DSM system: (1) those with only an affective disorder, (2) those with only an anxiety disorder, (3) those with both affective and anxiety disorders, (4) those with neither an affective disorder nor an anxiety disorder. Last and others (1987) supported these categories with their finding that youth with a primary diagnosis of school phobia also met DSM-III criteria for additional diagnoses, including phobic disorders (52.6%), and affective disorders (31.6%). Further, Ek and Eriksson (2013) found that 90% of youth with school refusal behavior also met criteria for another diagnosis.

Multiple studies (Last et al., 1987; Last & Strauss, 1990) found separation anxiety and phobia to be the main diagnostic subtypes of anxiety-based school refusal. Youth in the anxiety-based subtype have also been found to have worry and anxiety as a specific personality characteristic (Brandibas, Jeunier, Clanet, & Fourasté, 2004). This finding provides evidence for the argument that school refusal behavior is characterized by symptoms similar to that of separation anxiety (Egger et al., 2003). Similarly, Ek and Eriksson (2013) found school refusal behavior was often comorbid with separation anxiety and depression. The current edition of the DSM (APA, 2013) lists no formal diagnosis of school refusal behavior. School refusal behavior is currently conceptualized as a manifestation of many symptoms but not an official diagnosis (Zaky, 2017). The DSM-5 does incorporate school refusal behavior as a symptom of separation anxiety (i.e., “persistent reluctance or refusal to go to school”) and conduct (i.e., “often truant from school”) disorder (APA, 2013, pp. 191, 470).

**Functional.** Established disorders gradually evolved toward a categorical-dimensional system, though these systems did not include problems like school refusal behavior (Barlow, 1992). Due to the lack of inclusion in the DSM system, Kearney and Silverman (1996) proposed



a categorical-dimensional model focusing on the function of school refusal behavior. This model was advantageous as it included all presentations of school refusal behavior, integrated precise definitions to decrease confusion, included direct links to treatment strategies for functions, and was supported by reliable assessment processes (Haight, Kearney, Hendron, & Schafer, 2011; Kearney & Albano, 2007; Kearney & Silverman, 1996). For example, the results of a functional analysis may reveal school refusal behavior to decrease distress which can then be linked to a treatment plan focused on anxiety management (Haight et al., 2011). This functional approach differs from past approaches because it focuses more on maintaining variables or motivating variables of one's school refusal behavior instead of an individual's symptoms (Kearney & Silverman, 1996). Functional approaches are also advantageous as these approaches seem to be better able to discriminate types of school refusal behavior than models focused on behavior (Kearney, 2007). Kearney and Silverman's (1996) functional model proposed that youth have four main functions for refusing school: negative reinforcement, positive reinforcement, pure profiles, or mixed profiles. The four functions were selected as they represent a wide range of youth with school refusal behavior (Kearney & Silverman, 1996). This model aims to identify one function as the primary maintaining variable while at the same time isolating other relevant functions (Kearney & Silverman, 1996).

***Negative Reinforcement.*** Youth who refuse school for negative reinforcement are thought to do so for two different functions, while some youth may do so for both reasons. The first function is to avoid stimuli that provoke general negative affectivity (Kearney & Silverman, 1996). Youth in this function tend to be younger and not be able to identify a specific fear-provoking stimulus but instead have general feelings of "misery" when at school and experience anxious symptoms (Kearney, 2001; Kearney & Albano, 2004). Youth who refuse school for this

function tend to report symptoms of anxiety, depression, and somatic complaints (Kearney & Silverman, 1993).

Youth in this function are associated with higher generalized anxiety and depression scores (Haight et al., 2011). Specifically, common diagnoses for youth in this function included generalized anxiety disorder (35.7%), no disorder (28.6%), depression (21.4%), separation anxiety disorder (19.6%), social anxiety disorder (17.9%), panic disorder (10.7%), and specific phobia (10.7%), among other less common diagnoses (Kearney, 2001). Youth in this function are more likely to have a diagnosis of an anxiety disorder and have more severe presentations than youth in other functions (Kearney & Albano, 2004). Additionally, youth in this function typically are diagnosed with an anxiety or mood disorder but do not tend to have multiple diagnoses (Kearney & Albano, 2004; Kearney & Silverman, 1993). Parents of youth in this function indicate significantly lower scores on attention problems and delinquent and aggressive behaviors than youth in other functions (Kearney, 2001). Interventions identified to be effective for youth in this function include youth psychoeducation, somatic symptom control, cognitive restructuring, and exposures (Haight et al., 2011). Family Environment Scale (FES) data on the families of youth in this function indicate they scored significantly higher on scales of expressiveness, cohesion, and activity and significantly lower on scales of conflict than youth in other functions (Kearney & Silverman, 1995). Kearney and Silverman (1995) suggested that youth and their family are similar in that they seem to be healthy other than one confined difficulty or diagnosis.

The second negative reinforcement function is to escape aversive evaluative or social situations (Kearney & Silverman, 1996). Compared to youth in other functions, youth in this function tend to be older youth/ adolescents who identify specific fear-inducing stimuli

(Kearney, 2001; Kearney & Albano, 2004). Specific situations include public speaking, interactions with others, tests, being graded, walking to class or in hallways, writing on the board, and being called on in class (Beidel, Turner, & Morris, 1999). Youth in this function may have high levels of social anxiety, unsatisfying peer relationships, or avoid people at school such as a specific person, group of peers, or crowds (Kearney, 2001; Kearney & Silverman, 1990).

Youth in this function are associated with higher anxious-shy and social difficulties scores than youth in other functions (Haight et al., 2011). Youth in this function tend to indicate general and social anxiety, depression symptoms, stress, and some somatic complaints (Kearney & Silverman, 1993). Specifically, common diagnoses for youth in this function include generalized anxiety disorder (61.5%), social anxiety disorder (61.5%), depression (53.8%), avoidant disorder (46.2%) and oppositional defiant disorder (23.1%) among other less common diagnoses (Kearney, 2001). Youth in this function were found to be more likely to have a diagnosis of an anxiety disorder (Kearney & Albano, 2004). Interventions identified to be effective for youth in this function include youth psychoeducation, somatic symptom control, cognitive restructuring, and exposures (Haight et al., 2011). FES data on the families of youth in this function indicate they scored significantly lower on scales of intellectual-cultural focus and activity than youth in other functions (Kearney & Silverman, 1995). Kearney and Silverman (1995) suggested similar families may encourage isolation and therefore include youth who have difficulty forming and maintaining peer relationships.

***Positive Reinforcement.*** Youth who refuse school for positive reinforcement are thought to do so for two different functions. The first function is to gain attention from significant others (Kearney & Silverman, 1996; Haight et al., 2011). Youth in this function tend to be younger and misbehave in the morning than youth in other functions (Kearney & Albano, 2004). Morning

behaviors often include tantrums, clinging, screaming, locking themselves in their room or the car, guilt-inducing behavior, reassurance seeking, noncompliance, running away, and exaggerated complaints of physical symptoms (Kearney, 2001).

Youth in this function are associated with higher separation anxiety scores than youth in other functions (Haight et al., 2011). Common diagnoses for youth in this function include separation anxiety disorder (66.7%), generalized anxiety disorder (33.3%), no disorder (20.5%), avoidant disorder (12.8%), oppositional defiant disorder (12.8%), and avoidant disorder (12.8%) (Kearney, 2001). Compared to youth in other functions, youth in this function are more likely to have a diagnosis of separation anxiety (Kearney & Albano, 2004). Youth reported elevated levels of overall fear and social anxiety (Kearney, 2002b) and the lowest level of overall stress on the Daily Life Stressors Scale than youth in other functions (Kearney, 2001). The variability in the scores may reflect the devious behavior of youth in this group (e.g., presenting themselves as more dysfunctional; Kearney, 2001). A specific intervention identified to be effective for youth in this function includes parent contingency management systems (Haight et al., 2011). FES data on the families of youth in this function indicate they scored significantly lower on scales of independence than youth in other functions (Kearney & Silverman, 1995). Kearney and Silverman (1995) suggested similar families may be enmeshed and therefore include youth who have difficulty separating from the family unit or significant others.

The second function is to pursue tangible reinforcement outside of school (Kearney & Silverman, 1996). Compared to youth in other functions, youth in this function tend to be older youth who either skip classes, entire sections of the day, or a full day to pursue a tangible reinforcement (Kearney, 2001; Kearney & Albano, 2004). Common reinforcements include video games, television, sports, the internet, sleeping, visiting friends in person or on the

telephone, eating off campus, going to day parties, engaging in drug use, shopping, attending casinos, or working (Kearney, 2001). This group provides the best example of a nonanxiety based school refusal behavior (Kearney & Silverman, 1993).

Youth in this function are associated with higher oppositional difficulty scores than youth in other functions (Haight et al., 2011). Common diagnoses in this function include generalized anxiety disorder (27.6%), oppositional defiant disorder (25.9%), no disorder (25.9%), conduct disorder (10.3%), and depression (10.3%), among other lesser common diagnoses (Kearney, 2001). Youth in this function are more likely to have a diagnosis of disruptive behavior disorders than youth in other functions (Kearney & Albano, 2004). Interventions identified to be effective for youth in this function include family contingency management systems and communication skills (Haight et al., 2011). FES data on the families of youth in this function indicate they scored significantly lower on scales of cohesion than youth in other functions (Kearney & Silverman, 1995). Kearney and Silverman (1995) suggested similar families may be detached and conflictive and therefore include youth who are more likely to display oppositional behaviors.

***Pure vs. Mixed Profiles.*** Despite most youth refusing school due to one of the four functions (see above), multiple functions can simultaneously maintain one's school refusal behavior (Kearney & Silverman, 1996). Some youth may initially begin refusing school due to something unpleasant at school but then start to enjoy staying home and continue refusing school to stay home. On the other hand, some youth who have refused school or have not attended school for long periods of time may be nervous about attending school again. Each of these situations provide examples of youth refusing school for both negative and positive reinforcement (Kearney, 2002a). Haight and colleagues (2011) found the tangible reinforcement function to be the primary function of absenteeism among their sample, though many families

endorsed multiple functions as contributors to their youth's school refusal behavior. Little work has focused on youth who refuse school for multiple reasons (Kearney, 2002a). Due to the complexity of school refusal behavior and one's individual function, ongoing functional assessment is necessary for youth with mixed profiles (Kearney & Silverman, 1996).

**Contemporary.** Contemporary models involve two approaches focusing on relevant contextual factors (Kearney, 2016). The two approaches are statistical models and comprehensive models, particularly Multi-Tiered System of Supports (MTSS), of school refusal behavior. Statistical models of school refusal behavior aim to specify major predictive factors of problematic absenteeism and dropout. These studies have provided a better empirical understanding of early warning signs (Ingul et al., 2012; McShane et al., 2001) and the risk factors, both closely and distantly, influencing absenteeism and dropout (Kearney, 2016). Key operational definitions of problematic absenteeism have been identified through these models, including numbers of days missed (Cabus & De Witte, 2015). Despite the benefit to the literature base, these studies have not led to models focused on assessment and treatment.

Comprehensive models of school refusal behavior aim to be inclusive of the various risk factors contributing to one's absenteeism. Several comprehensive models have been proposed. Reid (2003) introduced a preventative model of school refusal behavior that included an extensive range of school personnel who monitored attendance while also fostering a positive school climate. This model places students in groups based on their level of risk for attendance problems (i.e., no, some, minor, and persistent) and teams of school personnel are assigned to each group (Kearney, 2016). Lyon and Cotler (2009) proposed a model focused on microsystem, mesosystem, and exosystem influences and approaches. Microsystem approaches are focused on the student directly (Kearney, 2016). Examples of microsystem approaches include therapy,

mentoring, or social skills training. Mesosystem approaches are focused on people or systems that influence the link between exosystems (Kearney, 2016). Examples of mesosystem approaches include better parent-teacher contact, better teacher-law contact, or better parent-therapist contact. Exosystem approaches are focused on broad populations and have no direct impact on one student (Kearney, 2016). Examples of exosystem approaches include school attendance policies or state attendance laws. Similarly, Rodriguez and Conchas (2008) proposed a model focused on bridging the relationship between schools and communities. Kearney (2008a) introduced an interdisciplinary model which includes five levels of risk factors matched to interventions for each level. Levels include the following 1) youth psychopathology prevents consistent attendance despite appropriate familial and school support; 2) youth psychopathology prevents consistent attendance without appropriate familial support; 3) youth psychopathology, parental/familial dysfunction, and additional risk factors prevent consistent attendance; 4) youth, parent, family, and/or peer factors and school risk factors prevent consistent attendance; and 5) many risk factors prevent consistent attendance (Kearney, 2008a). As the levels increase, the number of risk factors, the complexity of the case, the difficulty of treatment, and the complexity of the intervention increases.

Comprehensive models of school refusal behavior have become expansive in their coverage of the various risk factors and literature base. A fallback of this approach though is its lack of utility for school personnel or clinical providers due to its theoretical and abstract emphasis (Kearney, 2016). In order to increase the utility of comprehensive models of school refusal behavior, MTSS models (described above) have been utilized.

### **Risk Factors**

Problematic absenteeism is associated with many overlapping risk factors (see Table 3). Specific youth, peer, school, community, and family risk factors have been linked to problematic absenteeism. Youth with problematic absenteeism often have complex presentations involving multiple risk factors (Kearney, 2016). The addition of each new risk factor has been linked to an increase in the severity of one’s absenteeism and an increased risk for chronic absenteeism (Kearney, 2016).

Table 3

*Proximal and Distal Factors Related to Problematic School Absenteeism*

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Factors

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<i>Key child factors</i>	<ul style="list-style-type: none"> <li>Extensive work hours outside of school</li> <li>Externalizing symptoms/psychopathology</li> <li>Grade retention</li> <li>History of absenteeism</li> <li>Internalizing symptoms/psychopathology</li> <li>Learning-based reinforcers of absenteeism/functions</li> <li>Low self-esteem and school commitment</li> <li>Personality traits and attributional styles</li> <li>Poor health or academic proficiency</li> <li>Pregnancy</li> <li>Problematic relationships with authority figures</li> <li>Race and age</li> <li>Trauma</li> <li>Underdeveloped social and academic skills</li> </ul>
<i>Key parent factors</i>	<ul style="list-style-type: none"> <li>Inadequate parenting skills</li> <li>Low expectations of school performance/attendance</li> <li>Maltreatment</li> <li>Problematic parenting styles (permissive, authoritarian)</li> <li>Poor communication with school officials</li> <li>Poor involvement and supervision</li> <li>Psychopathology</li> <li>School dropout in parents and among relatives</li> <li>School withdrawal</li> </ul>
<i>Key family factors</i>	<ul style="list-style-type: none"> <li>Single parent</li> <li>Enmeshment</li> <li>Ethnic differences from school personnel</li> <li>Homelessness</li> <li>Intense conflict and chaos</li> <li>Large family size</li> <li>Poor access to educational aids</li> <li>Poor cohesion and expressiveness</li> <li>Poverty</li> </ul>



	Resistance to acculturation
	Stressful family transitions (divorce, illness, unemployment, moving)
	Transportation problems
<i>Key peer factors</i>	Participation in gangs and gang-related activity
	Poor participation in extracurricular activities
	Pressure to conform to group demands for absenteeism or other delinquent acts
	Proximity to deviant peers
	Support for alluring activities outside of school such as drug use
<i>Key school factors</i>	Victimization from bullies or otherwise
	Dangerousness/poor school climate
	Frequent teacher absences
	High systemic levels of grade retention
	Highly punitive or legal means to address all cases of problematic absenteeism
	Inadequate, irrelevant, or tedious curricula
	Inadequate praise for student achievement and attendance
	Inadequate responsiveness to diversity issues
	Inconsistent or minimal consequences for absenteeism
	Poor monitoring of attendance
	Poor student-teacher relationships
<i>Key community factors</i>	School-based racism and discrimination
	Disorganized/unsafe neighborhood
	Economic pull factors (e.g., plentiful, well-paying jobs requiring little formal education)
	Geographical cultural and subcultural values
	High gang-related activity
	Intense interracial tension
	Lack of social and educational support services
	School district policies and legal statutes regarding absenteeism

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*Note.* Reprinted from “An Interdisciplinary Model of School Absenteeism in Youth to Inform Professional Practice and Public Policy,” by C.A. Kearney, 2008, *Educational Psychology Review*, 20, p. 259. Copyright 2008 by Springer Science + Business Media, LLC. Reprinted with permission.

**Youth Risk Factors.** Specific youth factors have been commonly found to influence problematic absenteeism. Common risk factors include gender, age, grade, ethnicity, socioeconomic status, learning disorders, illness, pregnancy, self-concept, and personality.

**Age.** Researchers initially thought youth who refused school were primarily 5-10 years old (Kearney, 2001). Evidence later indicated the most common age of onset of problematic

absenteeism was in early adolescence (Kearney & Albano, 2007). Recent literature has recommended an average age of onset between 10-14 years (Gonzalvez et al., 2016; Kearney & Albano, 2007, McShane et al., 2001). Youth and their family have reported seeking treatment an average of 1-2 years after the onset of symptoms (Last & Strauss, 1990; Hansen, Sanders, Massaro, & Last, 1998). The following average ages have been reported at the time of assessment in clinical samples: 14.0, 14.2, and 15.1 years (Haight et al., 2011; Heyne, Vreeke, Maric, Boelenes, & Widenfelt, 2017; Walter et al., 2010). Transitional periods are the time of highest risk for absenteeism, though youth of any age can refuse school. Specifically, youth are most at risk of displaying problematic absenteeism at the beginning of the school year (Kearney & Albano, 2007) and when entering kindergarten, middle school, or high school (Reynolds, Vannest, & Fletcher-Janzen, 2014). High school youth are the most likely to be chronically absent when comparing absenteeism rates across grade levels. Almost one out of every five high school youth qualify as chronically absent, compared to 12% of middle school youth and 11% of elementary youth (Department of Education, 2016).

**Gender.** Problematic absenteeism generally occurs evenly in boys and girls (Department of Education, 2016; Kearney & Bates, 2005; McShane et al., 2001). However, the severity of problematic absenteeism may differ between male and female youth. Male youth are more likely to miss more days of school than female youth (McCoy, Darmody, Smyth, & Dunne, 2007). Further, status dropout rates, including 16-24-year-olds not enrolled in school and without a high school credential, are slightly higher for male than female students (National Center for Education Statistics, 2016). According to most recent data, male status dropout rates are somewhat higher (7.1%) than females (5.9%) with both gender's rates dropping significantly since 1990 (12.3% and 11.8 respectively) (National Center for Education Statistics, 2016). In

other words, despite the national decrease in dropout rates, nationally 72.9% of females and 66% of males graduate high school (Week, 2010). Male youth are also more likely than females to display oppositional or conduct type symptoms at school or with a purpose to miss school (Kearney, 2001). For example, male youth are more likely to skip school than female youth (McCoy et al., 2007). Female youth tend to display more fear-anxiety symptoms at school or with the intent to miss school than male youth (Kearney, 2001).

***Ethnicity.*** Problematic absenteeism occurs similarly among ethnic minority youth and tends to occur more among White youth than youth of other ethnicities in clinical settings (Kearney, 2001; Kearney & Bates, 2005). For example, of 222 youth in one outpatient clinic most were White (67.6%), 5.4% were Hispanic, 3.2% were African American, and 1.8% were other (Kearney, 2007). Minority youth are likely underrepresented in clinical settings making exact rates in ethnic groups challenging to identify (Kearney, 2001). The underrepresentation of minority groups has been revealed by recent reviews indicating that only 44.7% of studies of panic disorder reported ethnicity data and only 24% of studies of obsessive-compulsive disorder included Latino participants (Mendoza, Williams, Chapman, & Powers, 2012; Wetterneck et al., 2012).

However, in nonclinical settings, minority youth exhibit more problematic absenteeism than their majority youth peers. For example, Skedgell and Kearney (2016) reported a minority dominated sample. Of 118 youth, 73.5% were Hispanic, 10.2% were African-American, 4.3% were multiracial, 3.4% were Asian-American, 2.4% were European American, and 6% were other. In general, minority youth are at a greater risk of problematic absenteeism than their White peers. Compared with their White peers, American Indian and Pacific Islander students are 50% more likely to miss three weeks of school or more, African-American students are 30% more

likely to miss three weeks of school or more, and Hispanic students are 9% more likely to miss three weeks of school or more (U.S. Department of Education, 2016). Similarly, Hispanic and African-American students are more likely to drop out of high school than their White peers. The National Center for Education Statistics (2016) identified Hispanic students as having the highest dropout rate (10.6%), followed by African-American (7.4%), and White (5.2%) students. Notably, youth who are English language learners are 1.2 times less likely to be chronically absent than their English-speaking peers (Department of Education, 2016).

***Socioeconomic Status.*** Absenteeism rates vastly differ across socioeconomic status (Bernstein & Garfinkel, 1986; Hansen et al., 1998; Last et al., 1987; Kearney, 2001; Reid, 1982). Compared to their peers, youth from impoverished areas are consistently more likely to miss school (Kearney, 2016; Zang, 2003). Youth in the lowest quartile of family income also have the highest status dropout rate (11.6%), followed by the low middle quartile (7.6%) and high middle (4.7%) and high quartiles (2.8%) (National Center for Education Statistics, 2016). The disparity between the highest and lowest quartiles is currently 8.8 percentage points, down from 21.4 points in 1990 (National Center for Education Statistics, 2016). Youth who qualify for free or reduced-price lunch are more likely to have higher absenteeism rates, defined as missing at least 3 days in the past month (Centers for Disease Control and Prevention, 2006). More youth who receive free lunch have been identified in truancy court settings than all youth in the school district (86.3% and 27.1% respectively; Hendricks et al., 2010). Youth who are homeless have been found to be two times more likely to be chronically absent than their chronically absent peers with stable homes (36% and 19% respectively; Institute for Children, Poverty, and Homelessness, 2015). Further, 58% of youth living in shelters were revealed to be chronically absent while 36% of youth classified as homeless and 25% of youth living with a family member

or other person due to economic circumstances were chronically absent (Institute for Children, Poverty, and Homelessness, 2015). Low socioeconomic status has been consistently found to be one of the strongest demographic correlations with problematic absenteeism (Chen, Culhane, Metraux, Park, & Venable, 2016).

***Learning Disorders.*** Learning disorders among youth have been identified as additional risk factors for problematic absenteeism. Students with disabilities have been found to be 50% more likely to be chronically absent than their peers without disabilities (Department of Education, 2016). Chen and colleagues (2016) found students with disabilities, both learning disorders and serious emotional disturbance, were at high risk of being chronically absent in both more severe and more persistent forms than their peers without disabilities. Lane and colleagues (2006) found youth with learning disorders and emotional disturbances missed an average of 24 and 10.19 school days, respectively. Students who received special education services exhibited higher levels of absenteeism than their peers (Hansen et al., 1998; Koetering & Braziel, 1999; Naylor et al., 1994). Students with disabilities were 34% more likely to be chronically absent than their peers without disabilities (Department of Education, 2016). Similarly, elevated rates of problematic absenteeism were found in students with learning disorders and emotional disturbances, with particularly elevated rates in 9<sup>th</sup> grade (Redmond & Hosp, 2008). Naylor and colleagues (1994) found students with problematic absenteeism received significantly lower verbal intelligence scores, math and written language scores, and lower language competence scores than those without problematic absenteeism.

***Illness.*** Youth may miss school due to an illness. Youth with frequent illnesses may miss school due to legitimate reasons and then struggle to reintegrate themselves into the school environment. Fowler, Davenport, and Garg (1992) found youth in poor or fair health missed

significantly more school than those in good or excellent health. Youth with asthma missed more school than those without asthma (Moonie, Sterling, Figgs, & Castro, 2006). Overweight and obese youth missed 36% and 37%, respectively, more school than their normal-weight peers due to sick days (Pan, Sherry, Park, & Blanck, 2013). Youth with somatic symptoms were 30% less likely to attend school than their peers without somatic symptoms (Vila et al., 2009). Further, if somatic symptoms become persistent youth have an increased likelihood of being absent from school (Romero-Acosta et al., 2013). Bernstein and colleagues (1997) found the most common somatic complaints to be headaches, sweating, lightheadedness, nausea, vomiting, stomach pain, back pain, chest pain, palpitations, trouble walking, blurred vision, shortness of breath, loss of voice, joint pain, difficulty swallowing, and menstruation symptoms. Torrens Armstrong and colleagues (2011) found that school health staff consistently reported two major themes of illness in schools, legitimate and non-legitimate, and identified these staff members as beneficial to the absenteeism screening process. The role of illness is still unclear among youth with problematic absenteeism.

***Pregnancy.*** Teenage pregnancy has been linked to youth with problematic absenteeism. The Centers for Disease Control and Prevention (2017) found that approximately 24.2 out of 1,000 teenage girls will become pregnant. Absenteeism is more likely to occur if a student becomes pregnant for the second time (Seitz & Apfel, 1993). Becoming a mother is a salient risk factor for school dropout for female youth (Dalton, Glennie, & Ingles, 2009). Teenage mothers have about a 50% chance of graduating high school by the age of 22 (Perper, Peterson, & Manlove, 2010). Additionally, teenage fathers are more than twice as likely as non-fathers to miss school (Stouthamer-Loeber & Wei, 1998). Teenage parents are more likely to stay in school

with access to family support, alternative education options, and school-based prenatal services (Barnet, Arroyo, Devoe, & Duggan, 2004).

***Self-Concept and Personality.*** Youth with problematic absenteeism may display personality traits that maintain their problematic absenteeism. Lounsbury and colleagues (2004) identified personality traits linked to problematic absenteeism. Openness, conscientiousness, and emotional stability were negatively related to absenteeism (Lounsbury et al., 2004). Youth with problematic absenteeism were also low in conscientiousness, agreeableness, emotional stability, and openness (Lounsbury et al., 2004). Multiple researchers have also found that youth with problematic absenteeism exhibit low self-esteem, poor academic skills, immaturity, passivity, dependence, and introverted personality traits (Berg & McGuire, 1974; Corville-Smith, Ryan, Adams, & Dalicandro, 1998; Hersov, 1960a; Okuyama, Okada, Kuribayashi, & Kaneko, 1999; Reid, 1984b, 1982; Southworth, 1992). Ingul and Nordahl (2013) found negative personality traits and relational difficulties to be the most influential risk factors for problematic absenteeism. These negative personality traits indicate some may begin school predisposed for problematic absenteeism and, as they develop, are exposed to additional risk factors (e.g., psychopathology, learning difficulties, school climate) that further increase their risk (Ingul & Nordahl, 2013). Youth with problematic absenteeism also tend to have negative cognitions and automatic thoughts specifically focused on personal failure, hostility, and overgeneralizations (Maric et al., 2011). Recently, 52% of caregivers of those diagnosed with borderline personality disorders identified school refusal/truancy to be an issue during their childhood (Wlodarczyk, & Lawn, 2017).

**Peer Risk Factors.** Youth involvement with their peers impacts absenteeism, though the specific role of the peer group is unclear. Research specifically focusing on peers and their

effects on youth with problematic absenteeism is limited (Kearney, 2008a). French and Conrad (2001) found that youth who are antisocial and rejected by their peers may be at a higher risk of school dropout and absenteeism than their peers. Similarly, youth who are rejected by their peers have been linked with anxiety, depression, and related symptoms (Craun, Haight, DeCou, Babbitt, & Wong, 2017). Students with problematic absenteeism reported feeling lonely at school, perceiving themselves as not having friends, feeling like strangers in their schools, and feeling as though they could not fit in at school (Hirata & Sako, 1998). Hirata and Sako (1998) also identified those with problematic absenteeism had difficulty meeting with others outside of class and felt uncomfortable engaging with their peers. Youth with problematic absenteeism were found to rate their quality of relationships as influencing their reluctance to attend school (Egger et al., 2003) Poor relationships with their peers at school is an important risk factor for problematic absenteeism (Havik, Bru, & Ertesvåg, 2015).

**School Risk Factors.** Specific school factors influence one's problematic absenteeism. Specific factors include school climate, school violence, involvement, engagement, connectedness, enforcement of absentee rules, and boredom.

**School Climate.** School climate is related to youth problematic absenteeism, such that schools with an inadequate environment are associated with attendance difficulties (Kearney, 2008). Researchers have found set educational programs, student boredom, strict attendance and behavior disciplinary practices, increased student-teacher conflict, and lack of awareness of language and culture differences to be related to increased attendance difficulties (Lee & Burkam, 2003; Stickney & Miltenberger, 1998; Werblow, Robinson, & Duesbery, 2010). Henry (2007) found youth who are committed to their classes, have achievable future goals and perceive their school as safe are less likely to display school absenteeism while youth who have a



low perception of their probability of graduating from high school and poor academic performance are more likely to exhibit school absenteeism. Youth who perceive their school to be unsafe and have high levels of violence negatively impacts student motivation to attend school (Dake et al., 2003; Glew, Fan, Katon, Rivara, & Kernic, 2005; Henry, 2007; Jenkins, 1995; Robers, Zhang, Truman, & Snyder, 2012). Smaller schools that offer challenging courses, grade promotion, and foster positive student-teacher relationships have been found to decrease rates of dropout (Lee & Burkam, 2003).

Youth relationships with their teachers also impact absenteeism. Youth who perceive their teachers to have control of the classroom, be supportive, and not to display absenteeism show decreased rates of absenteeism (Ehrenberg, Ehrenberg, Rees, & Ehrenberg, 1989; Lee & Burkam, 2003; Moos & Moos, 1978). Ingul and colleagues (2012) found being treated with disrespect and having frequent negative interactions with their teachers to increase absenteeism. Additionally, Havik and colleagues (2015) found teachers' classroom management techniques can influence a youth's absenteeism. Specifically, teachers can decrease student absenteeism by applying classroom management techniques that increase peer support, regulate student to student relationships, demonstrate teacher support, and decrease student-teacher mistrust (Havik, Bru, & Ertesvåg, 2015).

***Involvement/Engagement/Connectedness.*** Youth's involvement, engagement, or connectedness to their school also impacts youth absenteeism. In general, youth who are engaged in their school are at a decreased risk for poor attendance and dropout (Klem & Connell, 2004). Youth lack of involvement with school activities (South, Haynie, & Bose, 2007), after school programs (Epstein & Sheldon, 2002), and college preparation activities (Henry, 2007) increases absenteeism. Shochet and colleagues (2006) found students who have higher school

connectedness and get along well with their teachers are less likely to have problematic absenteeism. Jenkins (1995) reported low levels of student commitment to school increased the rates of school crime, school misconduct, and school nonattendance. Youth boredom at school has also been found to increase absenteeism (Guare & Cooper, 2003).

**Community Risk Factors.** Specific community factors also influence one's problematic absenteeism. Socioeconomic status has been shown to impact absenteeism (Berg et al., 1993; Chen et al., 2016; National Center for Education Statistics, 2016; Reid, 1982). One's income level directly impacts access to education (Van der Berg, 2008). Youth in low-income areas have a higher chance of lack of access to appropriately funded schools, community support, quality healthcare, and affordable housing compared to youth living in affluent areas (Ladson-Billings, 2017; Teasley, 2004; Van der Berg, 2008). Youth living in low-income areas are more likely to have lower levels of educational attainment due to the increased rate of unemployment and poverty in their neighborhood (Crowder & South, 2003; Strelitz, & Lister, 2008). Further, youth living in communities where high-paying employment opportunities require little education are more likely to develop problematic absenteeism and leave school (Kearney, 2001). One's negative perception of the quality of their neighborhood has been linked to lack of parental response, decreased parental supervision, and higher levels of youth independent care (Chapman, 2003; Henry, 2007). Higher levels of school absenteeism have been associated with increased neighborhood crime, low levels of neighborhood safety, decreased neighborhood support, and negative peer culture (Chapman, 2003; Crowder & South, 2003; Henry, 2007).

**Family Risk Factors.** Specific family risk factors also influence one's problematic absenteeism. Common risk factors include parent relationship status, parent psychopathology, parenting behaviors, parent-youth involvement or relationship, and parent-school involvement.

***Parent Relationship Status.*** Conflicted families and marital problems are common among youth with problematic absenteeism. Timberlake (1984) found many students with school phobia reported their parents had marital problems (52.7%), communication issues (79.7%) and multiple family stressors (55.4%). McShane, Walter, and Rey (2001) also found 43% of families experienced significant conflict within the family before a youth began refusing school. Further, Dube and Orpinas (2009) identified the most commonly stressful or traumatic event reported in their sample was parental divorce (32.3%). It is common for youth with problematic absenteeism to be disengaged from or in conflict with their parents (Baruch, Vrouva, & Fearon, 2009; Bryce & Baird, 1986). Recent studies report most parents of youth with problematic absenteeism are married or involved in long-term relationships (Havik et al., 2014).

***Parent Psychopathology.*** Parent psychopathology is linked to a youth's diagnosis, and specific diagnoses are common among youth with problematic absenteeism (Egger et al., 2003; Ek & Eriksson, 2013). Common parent diagnoses include panic disorder, agoraphobia, social phobia, separation anxiety, major depression, and disruptive behavior disorder (Bernstein, 1991; Biederman et al., 2001; Last & Strauss, 1990; Kearney & Albano, 2004). Mothers of youth with problematic absenteeism are likely to have a history of at least one anxiety disorder and refusing school, and currently have an anxiety disorder (Egger et al., 2003; Last, Francis, Hersen, Kazdin, & Strauss, 1987; Last & Strauss, 1990). McShane and colleagues (2001) found parents of youth with problematic absenteeism had high rates of parental psychiatric disorders, with mothers (53%) having higher rates than fathers (34%). Youth have also been found to duplicate their parent's adverse coping strategies, including avoidance or attention-seeking behavior (Sánchez-García, 2009).

***Parenting Behaviors.*** Researchers have linked corporal punishment, inconsistent discipline, and physical punishments to youth problematic absenteeism (Bahali, Tahiroglu, Avoi, & Seydaoglu, 2011; Farrington, 1980; Hersov, 1985; Tyerman, 1968). Youth maltreatment is associated with problematic absenteeism (Chang, Chen, & Brownson, 2003; Rouse & Fantuzzo, 2009). Maltreated youth may avoid school for various reasons. Parents may keep their child home from school to conceal maltreatment, neglect a youth's attendance, and encourage nonattendance (Kearney, 2008b). Maltreated youth may also miss school due to the maltreatment, including physical problems or mental problems (e.g., anxiety or depression) (Kearney, 2008b). Conversely, Kearney (2001) noted that some maltreated youth may increase their attendance to avoid their home situation.

***Parent-Youth Involvement.*** Maccoby and Martin (1983) defined parent involvement as the degree to which a parent is dedicated to their parental role and nurturing of a youth's development. Multiple researchers have found that parental involvement impacts a youth's attendance and academic success (Bogenschneider, 1997; Reynolds, Weissberg, & Kaspro, 1992). Poor parental involvement, poor supervision, and permissive parenting are associated with a youth's absenteeism (Astone & McLanahan, 1991; Ekstrom, Goertz, Pollack, & Rock, 1986; Fagan & Pabon, 1990). Conversely, at-risk youth whose parents are involved in their academics are linked to homework completion, higher test scores, and higher grades (Voorhis, 2011; Wilder, 2013). Youth who report having at least one supportive adult in their life are linked to higher levels of academic engagement than youth who don't report having at least one supportive adult (Woolley & Bowen, 2007). Results have consistently found that youth with more nurturing and involved parents have decreased rates of absenteeism.

***Parent-School Involvement.*** Parent-school involvement also directly impacts youth absenteeism (LaRocque, Kleiman, & Darling, 2011). Parent-school involvement contributes to better school-family relationships and increased communication (Epstein & Sheldon, 2002; Roberts et al., 2010). Epstein and Sheldon (2002) found that family-school partnerships and home visits predicted an increase in daily student attendance and a decrease in problematic absenteeism. Schools working towards improving parent-school involvement have improved attendance an average of 0.5%, whereas schools who do not have similar goals have had a steady decline in attendance rates each year (Sheldon, 2007). Language barriers, cultural differences, low level of acculturation, low socioeconomic status, and school-based discrimination may decrease parent involvement with the school (Broussard, 2001; Franklin & Soto, 2002; Turney & Kao, 2009).

School officials report frustration and confusion in knowing how to best respond to youth who refuse school due to a range of possible explanations or factors involved in the behavior (Chitiyo & Wheeler, 2006). Further, school officials often report frustration with lack of parental involvement, but involvement is rarely prompted and attempts to involve parents are seldom implemented (Cohen, 1996; Guare & Cooper, 2003; Kearney, 2008a; Kessler-Skar, 2000). Despite barriers to parent-school involvement, increasing the parents' level of involvement is important to decrease youth problematic absenteeism. In addition to family risk factors, one's family type is associated with problematic absenteeism. Although some types of families may decrease a youth's likelihood of displaying problematic absenteeism, other family types may increase such likelihood.

### **Classification of Family Types**

The impact of family processes on youth functioning is well documented (Morrongiello & Corbett, 2013). Family types, including relationship patterns and structure, impact youth development (Lee & McLanahan, 2015; Sturge-Apple, Davies, & Cummings, 2006). Developmental impacts include cognitive development (Magnuson & Berger, 2009), behavioral problems (Osborne & McLanahan, 2007), and mental and physical health (Morrongiello & Corbett, 2013). Patterns of family types are also associated with youth functioning and adjustment. Cohesive families are linked to better relationships and lower internalizing and externalizing symptoms (Sijtsema et al., 2013). On the other hand, enmeshed families are linked to elevated internalizing symptoms (Lindblom et al., 2017), and disengaged families are linked to elevated externalizing symptoms (Poon, Zeman, Miller-Slough, Sanders, & Crespo, 2017).

The impact of the family environment continues to be influential to youth as they transition to academic environments. Certain family processes (i.e., parent negative affect, decreased autonomy) may negatively impact children's ability to adapt to and function in school settings (M. Sturge-Apple, Davies, & Cummings, 2010). For example, youth from disrupted families achieved less academic progress than their peers in nondisrupted families (Sun & Li, 2011). Further, youth in enmeshed and disengaged families displayed more difficulties with internalizing symptoms and emotional adjustment in the school setting compared to youth in cohesive families (M. Sturge-Apple et al., 2010).

There is limited research directly linking family processes and school absenteeism. The available research base has mainly worked with clinical populations (Bahali et al., 2011) to identify family process predictors of school absenteeism (i.e., family dysfunction; Melvin, Carless, Melvin, Tonge, & Newman, 2015), subtypes of families among youth who refuse school (Kearney & Silverman, 1995), or the function of youth school refusal behavior (Kearney &

Silverman, 1996). Kearney and Silverman (1995) identified six subtypes of familial relationships among youth with problematic absenteeism. The subtypes include enmeshed, conflictive, detached, isolated, healthy, and combined families. Due to the critical role families play in the development of youth (Sacks, Moore, Shaw, & Cooper, 2014), the current study aimed to expand the literature base by identifying the most relevant family environment risk factors for youth with problematic absenteeism. The Family Environment Scale (FES) was used to measure youth family environment. The FES (see below) includes measures of expressiveness, conflict, independence, achievement orientation, intellectual-cultural orientation, active-recreational orientation, moral religious emphasis, organization, and control within one's family. These individual family subscales relate to the family subtypes (described below) identified by Kearney and Silverman (1995).

**Enmeshed.** Early psychodynamically-oriented psychologists thought of absenteeism as a “school phobia” caused by separation anxiety between a mother and youth (Johnson et al., 1941). These models emphasized mother and youth dependency, over-protectiveness, and hostility as an explanation for problematic absenteeism in youth (Kearney & Silverman, 1995). Conversely, fathers were thought to be characterized by passive and withdrawn behavior. For example, a mother may fear for her child's safety and choose to keep her child close to the family, therefore causing frustration in the youth as they strive for increased independence. This type of parent-youth interaction has been found to contribute to overall family dysfunction including issues with boundary maintenance, communication, and parental role (Waldron et al., 1975).

Empirical studies began to support “school phobia” models with findings including parents' attitudes toward their youth's problematic absenteeism, parents' lack of an awareness of their youth's need to be separated from the family, youth low levels of independence, and high

levels of family disengagement (Bernstein et al., 1999; Hersov, 1960; Waldron et al., 1975). However, critics have identified methodological issues in research on enmeshed families. Studies on enmeshed families were biased towards psychodynamic approaches, seldom used objective family or youth functioning measures, focused solely on the mother-youth relationship, and lacked demographic variety (Kearney & Silverman, 1995). Despite such criticism, the idea of enmeshed families is still a popular conceptualization for understanding some youth with problematic absenteeism.

**Conflictive.** Youth with problematic absenteeism may also have families that demonstrate high levels of conflict. Many researchers have identified families with youth with problematic absenteeism to be characterized by conflict and hostility (Kearney & Silverman, 1995; Makihara, Nagaya, & Nakajima, 1985). Conflict from a psychodynamic perspective is conceptualized as the explicit expression of an unclear mother-child relationship (Coolidge et al., 1957). For example, a mother may experience hostility towards her child resulting in feelings of both love and hate confusing both the mother and the child. From a behavioral perspective, conflict is conceptualized as a coercive process in which a youth seeks parental compliance with continuing demands to not go to school (Kearney & Silverman, 1995). The continued conflict, either between parents or between parents and youth, may maintain a youth's nonattendance. Early researchers found youth with school phobia had families who endorsed greater hostility (i.e., parent resentment of youth demands, youth blamed by parents for events) compared to youth with other disorders (Waldron et al., 1975). Flook and Fuligni (2008) found family stress or conflict the day before school attendance to predict more absenteeism and learning difficulties. Additional studies also found a high degree of conflict in families of youth with problematic absenteeism (Makihara et al., 1985; Mihara & Ichikawa, 1986).



**Detached.** Detached families occur when members are not well involved with one another or are inattentive to the needs of others within the family (Robin & Foster, 1989). Parents within a detached family tend not to be vigilant about their youth's activities or problems until they are apparent or severe (Kearney & Silverman, 1995). Weiss and Cain (1964) were one of the first to identify detached family types from their analysis of 16 case records in which they identified a "type 2" family. Type 2 families were marked by a withdrawn mother, who was overwhelmed by the needs of her children and sought greater independence from her children. Her children thus refused school due to fears of parental abandonment. Other researchers have also identified detached families among youth with problematic absenteeism (Choi, 1961; Bernstein, Svingen, & Garfinkel, 1990; Waldron et al., 1975).

**Isolated.** Youth with isolated families may also increase one's risk for problematic absenteeism. Isolated families are characterized by little to no contact outside of the family unit, problematic mother-youth interactions, youth maltreatment, and a decreased likelihood to seek outside help (Garbarino, 1977; Kearney & Silverman, 1995; Wahler, 1980). Treatment of isolated families should integrate the family into the greater community due to their lack of extrafamilial contact (Kearney & Silverman, 1995). Despite the lack of research on isolated families, two studies support the idea that they are common. Kearney and Silverman (1996) found 33% of families referred to a clinic for problematic absenteeism treatment may be of the isolated family type due to their lack of seeking further treatment or not pursuing scheduling appointments or assessments.

**Healthy.** Families of youth with problematic absenteeism may not display any of the above characteristics. A significant number of families exhibit healthy or adaptive everyday functioning despite having a youth with problematic absenteeism (Kearney & Silverman, 1995).

Further, Bernstein and colleagues (1990) identified little impairment in family functioning if youth with problematic absenteeism presented with only an anxiety disorder. A family dynamic may be healthy despite a youth's absenteeism.

**Mixed Family Profiles.** Families of youth with problematic absenteeism may display primary characteristics of more than one of the family types. Mixed family profiles include families that exhibit more than one of the following primary characteristics of enmeshment, detachment, conflict, isolation, and health (Kearney & Silverman, 1995). For example, families may concurrently display enmeshment and conflict or isolated and detached. Kearney and Silverman (1995) also found dysfunction may arise in separate dyads in a family. For example, a family may have a detached father while also having an enmeshed mother-youth relationship or a conflictive family that promotes isolation from outside agencies.

### **Binary Recursive Partitioning**

Due to the critical roles of family environment (Sacks et al., 2014) and youth psychopathology (McLaughlin, 2016) to youth development and outcomes, the current study investigated family environment and youth psychopathology risk factors. Ample statistical approaches have been used to examine risk factors for problematic absenteeism. Commonly used parametric approaches include analyses of variance (ANOVA) and logistic regression (Harris, Reeder, & Hyun, 2011; Rizzo, Chen, Fang, Ziganshin, & Elefteriades, 2014). The use of nonparametric approaches is gaining support due to their advantages (e.g., missing data, multiple types of risk factors, researcher bias, and multicollinearity) over traditional parametric approaches (Whitley & Ball, 2002).

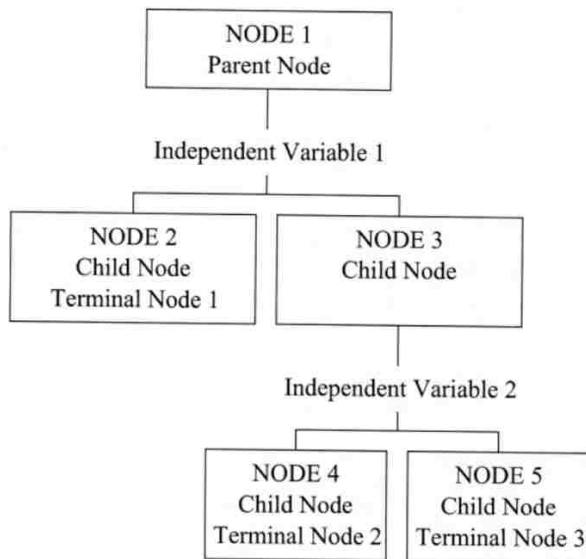
Binary Recursive Partitioning is a nonparametric decision tree technique that identifies subgroups of cases with similar outcomes (Markham et al., 2013) based on various risk factors.

BRP uses algorithms to repeatedly split groups into the smallest and most homogenous subgroup possible. BRP's algorithm includes three parts: 1) partitioning, 2) binary, and 3) recursive (Merkle & Shaffer, 2011). *Partitioning* occurs when the algorithm predicts the dependent variable by splitting the participants into subgroups based on the contrasting risk factors. The goal of the split is to create the best fit of two subgroups that are homogenous within the group and differ significantly between groups on the dependent variable. Each split is determined by a different risk factor dependent upon the best fit of the subgroups. *Binary* indicates that at each split only two subgroups are created. Finally, *recursive* indicates the algorithm continues to split the groups until a stopping criterion has been met.

This technique identifies multiple, differing routes to the same outcome by modeling interactions (e.g., identifying different paths to the development of risk for a disorder) whereas traditional techniques include independent linearly-additive effects (Markham et al., 2013). Thus, BRP is beneficial for datasets with complex interactions, many variables, or those that contain missing data (Zhang & Singer, 2010). The readability of BRP decision trees is also beneficial (see Figure 3). Readability is increased by the "IF-THEN-ELSE" rules produced by the tree. IF-THEN-ELSE rules function in the following steps, (1) "IF" the identified condition is true the code following "THEN" is employed, but (2) "IF" the identified condition is not true the code following "ELSE" is employed (Microsoft, 2018). Readability is also increased by the similarity of the trees to DSM clinical-diagnostic trees familiar to many clinicians (Morgan, Olson, Krueger, Schellenberg, & Jackson, 2000).

**Classification and Regression Tree (CART) Analyses.** CART is a nonparametric procedure which narrows a population into comprehensive subgroups based on a common characteristic (Lemon, Roy, Clark, Friedmann, & Rakowski, 2003). The characteristic shared by

the subgroup (i.e., a risk factor) directly influences the dependent variable. CART can meaningfully interpret multiple independent variables in any combination of continuous or categorical (Lemon et al., 2003). Specifically, CART can be thought of as describing or depicting interactions among multiple risk factors or predictor variables (Merkle & Shaffer, 2011). Two types of trees are generated, regression or classification. A regression tree is generated if the dependent variable is continuous, while a classification tree is generated if the dependent variable is categorical (Lemon et al., 2003). Regression trees estimate the average value of the dependent variable within the members of each node, while classification trees estimate the probability of having the dependent variable within the members of each node (Lemon et al., 2003). The final product, regardless of the type, is a multilevel output resembling a tree. The illustration of a CART tree (see Figure 3) will serve as an example throughout the following sections.



*Figure 3.* Illustration of CART Tree. Reprinted from “Classification and regression tree analysis in public health: methodological review and comparison with logistic regression,” by S.C. Lemon, J. Roy, M.A. Clark, P. D. Friedmann, & W. Rakowski, 2003, *Annals of behavioral medicine*, 26(3), p. 173. Copyright 2003 by Springer. Reprinted with permission.

***Nodes and Splitting.*** Groups and subgroups are referred to as a “node” (Lemon et al., 2003). The tree starts with the “parent node”. The parent node includes the entire sample (Lemon et al., 2003), depicted as “Node 1” in Figure 3. Independent variables are referred to as a “splitting variable” (Lemon et al., 2003). The CART algorithm utilizes splitting criteria (described below) and considers all possible splitting variables to identify two nodes (Lemon et al., 2003). The algorithm chooses the two nodes that are both homogenous within the node and heterogeneous between the nodes based on the dependent variable (Merkle & Shaffer, 2011). The parent node then branches into the two identified “child nodes.” The first set of child nodes are depicted as “Node 2” and “Node 3” in Figure 3. Each branch represents one risk factor and is referred to as a “split” (Lemon et al., 2003). From there the same algorithm is utilized to split the child nodes into a new set of child nodes, illustrated as “Node 4” and “Node 5” in Figure 3. The process continues using all available splitting variables until a stopping criterion (described below) is met (Lemon et al., 2003). At this point, a “terminal node” is generated (Lemon et al., 2003). Terminal nodes are exhaustive subgroups within the population, depicted as “Node 2” in Figure 3. The final tree provides one with clear subgroups most related to the dependent variable based on common independent variables.

***Splitting Criteria.*** CART algorithms utilize predetermined splitting criteria at each split. Without splitting criteria, CART has a selection bias towards independent variables that produce a larger number of splits (Shih, 2004). Splitting criteria is, therefore, utilized to correct for this selection bias and produce an overall less biased tree (Lemon et al., 2003). Splitting criteria is based on impurity functions which are utilized to define impurities within a node (Lemon et al., 2003). A node with high impurity would have high variability in the dependent variable (i.e., a mix of 0s and 1s), while a node with low impurity would have low variability in the dependent

variable (i.e., 0s or 1s) (Lemon et al., 2003). Specifically, the splitting criteria select the split with the “largest difference between the impurity of the parent node and the weighted average of the impurity of the child nodes” (Lemon et al., 2003, pg. 174). Common impurity functions include Gini, entropy, and minimum error (Lemon et al., 2003).

The most commonly used impurity function is the Gini improvement measure (Zhang & Singer, 1999). The Gini improvement measure identifies the best possible split by calculating an improvement measure (described below) and determining which split produces the greatest decrease in this measure (Merkle & Shaffer, 2011). The Gini improvement measure has a minimum value of 0 and a maximum value of .5 (Strobl, Malley, & Tutz, 2009). A measure of 0 indicates complete discernment within the node (Merkle & Shaffer, 2011). The improvement measure is calculated by subtracting the weighted impurity of the child nodes (i.e., weighted diversity index) from the impurity of the parent node (i.e., diversity index of the parent node) (Lemon et al., 2003). At each split, the Gini improvement measure analyzes all possible splits and chooses the split with the greatest decrease (Merkle & Shaffer, 2011). This process continues until a predetermined stopping criterion is reached (described below).

*Stopping Criteria.* Stopping criteria are a predetermined set of rules that end the tree growing process. These criteria ensure the tree does not become too large or continue to split despite lack of statistical interpretability (Lemon et al., 2003). Three stopping criteria can be used simultaneously. The first stopping criterion requires defining the smallest number of participants to be included in the nodes (Lemon et al., 2003). The second stopping criterion requires defining the maximum number of splits and the maximum number of independent variables to describe one terminal node (Lemon et al., 2003). The third stopping criterion requires defining the smallest impurity value of the splitting criteria (Lemon et al., 2003).

Selecting stopping criteria is a difficult process with important implications for the final tree. For example, if one identifies too strict of stopping criteria important associations can be missed due to premature stopping. Due to this concern, stopping criteria are intended to over-fit the data making the output best fit the current data and unsuccessful at predicting future data without employing the pruning process (described below; Merkle & Shaffer, 2011). With each additional split, the model increasingly fits the current data and becomes further unable to predict future data. It is necessary to remove splits through pruning to increase the tree's predictive ability (described below).

**Pruning.** CART tends to match the model to the current data set decreasing its overall generalizability or overfitting the data. Pruning is utilized to correct for this tendency. Pruning occurs when a large tree is systematically reduced by removing splits that are not influential to the model (Merkle & Shaffer, 2011). Tree pruning occurs in steps beginning with a large tree (e.g., many nodes, splits, minimal N per terminal node; Lemon et al., 2003). Next, splits considered to be insignificant to the model are identified and pruned one by one. After one split is pruned the tree's predictive ability is measured via cross-validation before continuing the pruning process with the next split (Merkle & Shaffer, 2011). A final tree is chosen based on comparing the trees' predictive ability and selecting the tree with the best fit (Merkle & Shaffer, 2011). Pruning thus produces smaller trees that are better able to predict future data.

The splitting criteria (described above) utilizes Gini improvement measures, while the pruning processes use k-fold cross-validation (Merkle & Shaffer, 2011). K-fold cross-validation is a two-step process. First, the current data are split, and a "training" set tree is built with half of the data (Merkle & Shaffer, 2011). Second, a "validation" set,  $k$ , is created with the other half (Merkle & Shaffer, 2011). The validation set is sequentially built into trees, pruned



appropriately, labeled  $T^{(1)}$ ,  $T^{(2)}$ , etc., and misclassification cost,  $R(T)$ , is calculated for each tree (Merkle & Shaffer, 2011). Each tree will vary in the independent variables included, number of terminal nodes, and levels of branches. Due to the variety, trees are matched based on the number of terminal nodes (Merkle & Shaffer, 2011). Various measures of misclassification cost,  $R(T)$ , have been utilized for choosing pruned trees, including minimum cost-complexity, least absolute shrinkage, selection operator, and one-standard-error (SE) rule (Lemon et al., 2003). The SE rule indicates the selection of the smallest tree with a misclassification cost within one standard error of the tree with the smallest misclassification cost (Breiman et al., 1984). This rule identifies the smallest tree while not sacrificing the tree's predictive ability (Merkle & Shaffer, 2011). Once chosen, the original tree is pruned to the selected tree's level using the steps above. CART's algorithm utilizes pruning techniques and stopping criteria (described above) simultaneously.

***CART in Research.*** Since the development of the CART procedure by Breiman and colleagues (1984), the technique has been increasingly used in medical and physiological research. For example, CART has been utilized to predict whether one will develop the seasonal flu (Afonso et al., 2012), the short-term outcome of those with acute-on-chronic hepatitis B liver failure (Shi et al., 2016), and whether patients who are hospitalized in an area of high tuberculosis (TB) prevalence will develop pulmonary TB (Aguiar et al., 2012). CART has also been utilized to identify periodontal prognosis risk factors (Nunn et al., 2012), clinical and laboratory risk factors of treatment failure of infants with early onset neonatal sepsis (Metsvaht et al., 2009), and various primary care providers' thresholds of action for employing treatments for cardiovascular disease (Schilling et al., 2016). CART has also been utilized to determine the

relationship among psycho-social adjustment, motor performance, and participation in structured activities in boys with developmental coordination (Poulsen, Johnson, & Ziviani, 2011).

Nonparametric approaches are underutilized in psychological research, though it is recently gaining in popularity. CART has been used to identify risk factors and protective factors of bullying among adolescents (Moon, Kim, Seay, Small, & Kim, 2016), psychosocial factors relevant to the quality of life of those with HIV/AIDS (Li & Rapkin, 2009), and common personality profiles in public safety offenders and non-offenders (Masias et al., 2016). CART has been applied to improve the clinical diagnostic accuracy between Autism Spectrum Disorder and Attention Deficit and Hyperactivity Disorder (Cohen et al., 2016). CART has also been utilized to predict risk factors for recurrent child maltreatment (Sledjeski, Dierker, Brigham, & Breslin, 2009), those most at risk for developing problematic gambling (Markham et al., 2013), and youth at risk for developing post-traumatic stress disorder (PTSD) symptoms clusters (Ross & Kearney, 2015). Clearly the use of nonparametric procedures, particularly CART, has increased in recent years.

***CART vs. Other Multivariate Methods.*** The use of nonparametric approaches, while sporadic in the literature, has been increasing in popularity due to advantages over traditional parametric approaches (Whitley & Ball, 2002). Multivariate statistical methods have been the dominant approach in the literature to identify subgroups from a larger group. Common multivariate methods include standard linear modeling, logistic regressions, and cluster analysis (Rizzo et al., 2014). These methods have limitations when including several influential risk factors and high-risk levels (Harris et al., 2011; Rizzo et al., 2014). Despite CART's shortcomings, the algorithm diminishes many limitations other multivariate methods cannot address.

First, missing data within the current study is a notable limitation of the usage of traditional multivariate methods. Due to the data collection process (described below) and the general characteristics of the population (i.e., absentee middle and high school students), missing data are relevant. Traditional regression methods identify missing data as problematic because it decreases power, increases bias in one's estimate of their parameters, reduces generalizability, and complicates analyses (Kang, 2013). Second, the use of both ordinal and nominal risk factors simultaneously is a limitation of traditional multivariate methods. Dichotomous variables are required by logistic regression models (Zhang & Singer, 2010). If one wanted to use different types of variables in logistic regression, dichotomous dummy variables would need to be created for each variable (Zhang & Singer, 2010). Third, traditional multivariate methods, like logistic regression, are unable to consider multiple risk factors simultaneously because their main purpose is to determine how a risk factor, or independent variable, is related to a dependent variable (Lemon et al., 2003). Further, the order in which predictive variables are entered into traditional multivariate models impacts their weighted significance, therefore, influencing the overall model (Kiernen, Kraemer, Winkleby, King, & Taylor, 2001). This process also introduces researcher bias into the model (Kiernan et al., 2001). Finally, multicollinearity would be a significant limitation of the analyses if traditional multivariate methods were utilized (Yoo et al., 2014). Multicollinearity occurs when predictive variables within the model are highly correlated, or not independent (Yoo et al., 2014). Multicollinearity causes loss of power and bias estimations (Yoo et al., 2014).

On the other hand, CART is not impacted or is only marginally impacted by these limitations. CART's algorithms can address missing data. CART is marginally impacted by outliers and efficiently able to address missing data (Merkle & Shaffer, 2011). Missing data is

handled automatically by the algorithm without the necessity for imputation techniques (Merkle & Shaffer, 2011). There are two options for dealing with missing data, surrogate splits and “missings together” (MT) approach (Zhang & Singer, 2010). The MT approach is ineffective if the amount of missing data is equal to present data (Zhang & Singer, 2010). Additionally, one may choose to impute missing values before constructing trees which no longer requires the data be considered missing (Zhang & Singer, 2010). The CART cross-validation process also ensures the generalizability of the final model, despite the presence of missing data. CART’s algorithm can simultaneously enter variables of all types with marginal impact on the output (Merkle & Shaffer, 2011). CART does not include significance tests or stochastic models and instead relies on generalizability as measures of a tree’s predictive power (Merkle & Shaffer, 2011). The correlation among risk factors also minimally impacts CART, because the algorithm’s purpose is to model multiple interactions among related risk factors (Markham et al., 2013). Researchers who identify influential variables and, therefore, leave out other variables in traditional multivariate methods are likely to produce models that miss important interactions and lack predictive accuracy (Harris et al., 2011; Kiernan et al., 2001). Instead of linearly adding certain variables, CART can identify various, diverse paths to an outcome in a dimensional data set with missing data (Markham et al., 2013).

### **Rationale for CART Application in Current Study**

The current study used CART procedures to identify subgroups of youth who are at the highest risk of problematic absenteeism, defined as equal to or greater than 1% and 10% of full school days missed (Egger et. al., 2003; National Center for Education Statistics, 2016), based on family environment and youth psychopathology risk factors.

The identification of high-risk subgroups is important for several reasons. First, research on well-supported risk factors has primarily utilized traditional parametric approaches (e.g., logistic regression, SEM, ANOVA). These approaches have been used to identify independent predictors of risk (Kiernan et al., 2001) which leaves the interaction between these factors unclear and difficult to identify. To build the best model of prediction as many relevant predictor variables as possible should be included (Rizzo et al., 2014). Further, parametric approaches can lead to unstable findings as multicollinearity among risk factors is common (Hastie, Liverani, Azizi, Richardson, & Stücker, 2013). The utilization of CART in the current study allowed for the simultaneous testing of multiple predictors of risk and the identification of interactions among these risk factors. The current study evaluated RCADS item scores aimed at identifying youth psychopathology risk factors and FES item scores aimed at identifying family environment risk factors.

Second, the current literature base lacks research on the identification of youth subgroups at the highest level of risk. The current study added to this gap in the literature by identifying subgroups at the highest risk for problematic absenteeism. The identification of these subgroups, based on multiple risk factors, is important due to the complex processes involved in the development of many diagnoses or symptom clusters, including school refusal behavior (National Institutes of Health (US), 2007). Broadly, identification of high-risk subgroups contributes to the field's understanding of the development of problematic absenteeism and, in turn, benefits youth and their families through refined assessment and intervention procedures. Contributing to the literature base in this manner is imperative for accurate medical decision making for both clinicians and clients (Sankar, Beattie, & Wijeyesundera, 2015) and the precise identification of the high-risk subgroups. The benefits of early identification are well-

documented and numerous, including improving adult psychological and physical health (Campbell et al., 2014).

Finally, current literature focuses almost solely on small clinical populations (Egger, Costello, & Angold, 2003; Kearney & Albano, 2004; Low, Cui, & Merikangas, 2008; Pina, Zerr, Gonzales, & Ortiz, 2009). The sole inclusion of clinical populations is problematic for many reasons, including limited ability to generalize, increased selection bias, and increased risk for false-positive findings (Low, Cui, & Merikangas, 2008). The current study utilized youth and their families from both clinical and community settings. The inclusion of both samples allows for findings to better represent and generalize to the population (American Psychological Association, 2017). Additionally, the current study utilized a sample size larger ( $n=378$ ) than most relevant psychological studies. Low published sample sizes is a known limitation to psychological research (Merenda, 2007). Marszalek and colleagues (2011) revealed published sample sizes in the field of Psychology have not statistically significantly increased between 1955 and 2006, with an average sample size of 196.78 and median of 40 in 2006.

## **Hypotheses**

CART procedures are meant for generating hypotheses and not the testing of one's hypotheses (Markham et al., 2013). Due to this, the literature base on youth and family risk factors were used to inform the hypotheses for the current study (Lemon, Roy, Clark, Friedmann, & Rakowski, 2003). Each hypothesis utilized CART procedures to identify the most relevant risk factors for absenteeism severity, defined as equal to or greater than 1% and 10% of full school days missed (Egger et. al., 2003; National Center for Education Statistics, 2016).

Hypothesis one was that splits on the Family Environment Scale (FES) items addressing family conflict were expected to produce the greatest impurity reduction of the FES variables in

the model, while independence items were expected to produce the second greatest impurity reduction. In other words, the FES conflict items were expected to be the most important FES items to the model and the independence items were expected to be the second most important items to the model. Hypothesis one utilized both the 1% (i.e., hypothesis 1a) and 10% (i.e., hypothesis 1b) of full school days missed cutoffs.

Previous research supports a relationship between absenteeism severity and the degree of conflict within one's family (Flook & Fuligni, 2008; Kearney & Silverman, 1995; Makihara, Nagaya, & Nakajima, 1985). High levels of conflict have been found to negatively impacts one's absenteeism as it may encourage a coercive process within the family, prevent the identification of solutions, and increase hostility (Kearney & Silverman & 1995). Additionally, significantly lower levels of conflict were endorsed by youth with healthy families, other than their one confined difficulty or diagnosis (Kearney & Silverman, 1995). Previous research also supports a relationship between absenteeism severity and one's degree of independence within their family (Kearney & Silverman, 1996; Haight et al., 2011). Significantly lower levels of independence were endorsed by youth who also had enmeshed families (Kearney & Silverman, 1995). These scores indicate that youth's low level of independence and enmeshment may be linked to their difficulty attending school due to difficulty separating from the family unit or significant others (Kearney & Silverman, 1995).

Hypothesis two was that splits on the Revised Children's Anxiety and Depression Scale (RCADS) items addressing generalized anxiety were expected to produce the greatest impurity reduction of the RCADS variables in the model, while major depression items were expected to produce the second greatest impurity reduction. In other words, the RCADS generalized anxiety items were expected to be the most important RCADS items to the model and the major

depression items were expected to be the second most important items to the model. Hypothesis two utilized both the 1% (i.e., hypothesis 2a) and 10% (i.e., hypothesis 2b) of full school days missed cutoffs.

Previous research supports a relationship between absenteeism severity and comorbidity with generalized anxiety (Egger, Costello, & Angold, 2003; Ek & Eriksson, 2013; Hughes et al., 2010; Wimmer, 2010). Multiple researchers found comorbid generalized anxiety diagnosis within their sample of youth with problematic absenteeism (Essau, 2003; Haight et al., 2011; Hirschfeld, 2001; Kearney & Albano, 2004; McShane et al., 2001). Previous research also supports a relationship between absenteeism severity and comorbidity with depression (Egger, Costello, & Angold, 2003; Ek & Eriksson, 2013; Hughes et al., 2010; Wimmer, 2010). Multiple researchers found comorbid depression diagnoses within their sample of youth with problematic absenteeism (Essau, 2003; Haight et al., 2011; Hirschfeld, 2001; Kearney & Albano, 2004). Post-hoc analyses based on derived models were conducted as needed.



## CHAPTER 3

### METHODOLOGY

#### **Participants**

**Overall Sample.** Participants in the sample included 378 students aged 5-19 years ( $M = 12.59$ ;  $SD = 3.29$ ) and their families. The sample had more males (57.2%) than females. Students were Caucasian (52.5%), Hispanic (31.0%), African American (5.6%), multiracial or biracial (3.4%), other (6.4%), and Asian (1.1%). Most of the student's parents were married (45.7%), while others were separated (17.1%), divorced (19.0%), never married (16.2%), or other (1.9%). The students had an average of 2.43 siblings ( $SD = 1.72$ ). Overall, 98 fathers (49.0%) and 119 mothers (56.1%) graduated from high school.

**Clinic Sample.** Participants in the clinic sample included 246 students aged 5-17 years ( $M = 11.24$ ;  $SD = 3.16$ ) and their families from the University of Nevada, Las Vegas Child School Refusal and Anxiety Disorders Clinic. The clinic sample had more males (63.3%) than females. Participants were Caucasian (79.3%), Hispanic (7.7%), other (6.9%), African American (3.3%), and multiracial or biracial (2.8%).

**Community Sample.** Participants in the community sample included 132 students aged 11-19 years ( $M = 15.12$ ;  $SD = 1.63$ ) and their families from the Clark County Family Courts and Services Center and the Truancy Diversion Program. The community sample had more females (54.2%) than males. Participants were Hispanic (74.8%), African American (9.9%), Asian (3.1%), multiracial or biracial (4.6%), other (5.3%), and Caucasian (2.3%). The majority (53%) of parents completed the measures in English while others (46.2%) completed the measures in Spanish.

#### **Measures**

**Demographic Form.** A demographic form (Appendix C) was administered to the parent(s)/ guardians to assess their child’s age, gender, and ethnicity as well as parent demographics, age and gender of the youth’s siblings, and who was completing the parent/guardian packet.

**Family Environment Scale (FES).** The FES (Moos & Moos, 2009) is a 90-item true/false measure of individual family’s relationships, personal growth, and system maintenance (see Appendix D). The ideal form (Form I) of the FES measures one’s ideal family environment, the expectations form (Form E) of the FES measures one’s expectations about the family environment, and the real form (Form R) of the FES measures one’s current family environment. The current study utilized Form R. The FES Form R was administered to the parent(s)/guardian(s) and youth independently. Analyses of the current study used the youth report. The FES comprises ten subscales: cohesion, expressiveness, conflict, independence, achievement orientation, intellectual-cultural orientation, active-recreational orientation, moral-religious emphasis, organization, and control (Table 4). A Spanish version of the measure is also available. Internal consistency is sufficient for each subscale, with Cronbach’s alpha between 0.61-0.78. Furthermore, 2- and 4-month test-retest reliabilities for each subscale were between 0.70-0.91 (Moos, 1990).

Table 4

*Family Environment Scale Subscale Definitions*

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Dimension	Subscale	Definition
Relationship	Cohesion	The degree of help, support, and commitment family members provide to one another
	Expressiveness	The extent to which family members are encouraged to express their feelings directly

	Conflict	The amount of anger and conflict expressed openly among family members
Personal Growth	Independence	The extent to which family members are self-sufficient, assertive, and make decisions for themselves
	Achievement Orientation	How much activities (e.g., school & work) are cast into a competitive framework
	Intellectual-Cultural Orientation	The level of family interest in intellectual, cultural, and political issues
	Active-Recreational Orientation	The amount of family participation in recreational and social activities
System Maintenance	Moral-religious Emphasis	The amount of emphasis placed on ethical and religious issues and values
	Organization	The level of importance of clear structure and organization in planning family responsibilities and activities
	Control	The amount of set rules and procedures used to structure family lives

*Note.* Reprinted from “Differences in Absenteeism Severity Among Community Youth (Master’s thesis),” by K. K. Sheldon, 2015, Proquest Dissertations and Theses, 10014589, p. 57.

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**Revised Child Anxiety and Depression Scale (RCADS).** The Revised Children’s Anxiety and Depression Scale (RCADS; Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000) is a 47-item self-report or parent-report measure of psychopathology in children and adolescents. The RCADS was administered to the parent(s)/guardian(s) and youth independently. Analyses of the current study utilized the youth report. The RCADS includes subscales for symptoms of the following disorders: social anxiety disorder, social phobia, generalized anxiety disorder, obsessive-compulsive disorder, panic disorder, and major depressive disorder. The RCADS is

measured on the following agreement scale: never = 0, sometimes = 1, often = 2, and always = 3. Each of the scores on the individual items are summed together to create an overall total score. Internal consistency is good for each subscale, with Cronbach's alpha between 0.78-0.88 (Chorpita, Moffitt, & Gray, 2005). Confirmatory factor analysis indicated the 6-factor model is an adequate fit, with loadings from 0.51-0.79 (Chorpita, Moffitt, & Gray, 2005). Among the Revised Children's Manifest Anxiety Scale (RCMAS) and the Child Depression Inventory (CDI), convergent validity is good for each subscale, with correlations between 0.32-0.72 (Chorpita, Moffitt, & Gray, 2005). Discriminant validity, among the same measures, is also good for each subscale, with correlations between -0.01-0.17 (Chorpita, Moffitt, & Gray, 2005). Receiver operator characteristic (ROC) analysis revealed adequate sensitivity (AUC= 0.59-0.78) and specificity (AUC= 0.64-0.92; Chorpita, Moffitt, & Gray, 2005).

**Absenteeism Severity.** School staff provided absenteeism severity data in the form of the number of full school days missed. Percentage of full school days missed was calculated by dividing the student's total number of full school days missed by the number of days of school in that academic year, at the time of consent, and then multiplying that number by 100.

## **Procedure**

**Clinic Sample.** Participants in the clinic sample were recruited from the University of Nevada, Las Vegas (UNLV) Child School Refusal and Anxiety Disorders Clinic. Data from current clients and their families as well as past clients was included. Clients were either referred from the Clark County School District or self-referred. The clinic specializes in youth between the ages of five and 16 years old with problematic absenteeism or anxiety problems. Common disorders seen in the clinic include generalized anxiety disorder, panic disorder, selective

mutism, and social phobia. Therapists at the clinic are clinical psychology doctoral students in their third year or above of clinical training. The clinic is open during the academic year.

Potential clients and their families are first screened by Dr. Kearney, the director of the clinic. If deemed an appropriate client, then intake assessments are conducted by the therapist. Initially, a youth's parent(s)/guardian signs a consent form allowing the client to be involved in the research study. Intake assessments take approximately two hours and involve structured interviews for a youth and parent(s), youth and parent measures, and behavioral observations.

**Community Sample.** Participants in the community sample were recruited from two different locations: the Truancy Diversion Program (TDP) and the Clark County Family Courts and Services Center. TDP was conducted at various Clark County District schools in Las Vegas, Nevada, and the Clark County Truancy Court was held at the Clark County Family Courts and Services Center in Las Vegas, Nevada. Data collection at the Clark County Family Courts and Services Center has currently been suspended, but the project is ongoing at TDP (Protocol #710884-7).

**Truancy Diversion Program.** The Court Appointed Special Advocates (CASA) program directs the Truancy Diversion Program (TDP) to decrease absenteeism rates in the Clark County School District by improving student's attendance rates and grades through a point-based incentive program. Participants in TDP are recruited from their perspective Clark County elementary, middle, or high school due to their truancy risk based on prior absences. Once their school identifies them as at risk for truancy, school administration or the student's parent(s)/guardian can refer them to TDP. After a student is enrolled in TDP, they and their parent(s)/guardian, if they choose, attend weekly truancy court sessions to meet with a judge, a

CASA representative, a school administrative representative, and a truancy officer. TDP judges are volunteer community legal professionals (i.e., judges or attorneys).

TDP requires youth to attend the meetings each week as well as keep daily attendance logs and report weekly progress reports are signed by their teachers. The judge can also require youth to keep a daily planner, attend tutoring, or engage in various other activities that may benefit their academic performance or increase their attendance. Each week, youth make goals for themselves and problem-solve ways to ensure their goals are met. When youth come to the meeting, they are assigned points by the judge based on their attendance, attitude, completion of their goals, and compliance with their required activities. Youth are eligible for graduation when they have reached 100 points, they are passing their classes, and their attendance is stable. The program typically lasts ten weeks dependent upon one's progress.

At their first meeting, youth and their parent(s)/guardian are given the opportunity to participate in the study. They are informed of the purpose of the study, that their participation is voluntary, and that there is minimal risk or benefit of their participation in the study. If they choose to participate, parent(s)/guardian are asked to sign an informed consent and youth are asked to sign an informed assent to participate in the study. Parent(s)/guardian and youth are then asked to complete a packet of measures focusing on the individual's problematic absenteeism, the family environment, and demographic information. The study lasts approximately 60-90 minutes. Spanish versions of the measures were available to those parent(s)/guardians with a primary language of Spanish. A graduate student researcher or trained undergraduate assistant was present to answer any questions. During the study, if youth or parent(s)/guardians decided they no longer wanted to participate, they could discontinue at any time. Once measures were

complete, parents and youth were thanked. All measures were de-identified, coded anonymously, and stored in a secure location.

***Clark County Family Courts and Services Center.*** The Clark County Truancy Court's purpose was to address and work towards resolving attendance issues in Clark County School District youth who were cited for truancy. Under district policy, youth could be cited for truancy after receiving three truancy notices. The first notice was sent home in the form of a letter to one's parent(s)/guardian when they reached three unexcused absences during a single period or for an entire day. Once youth received a citation, they were required to attend Truancy Court. The court was held three times a week and this is where data were collected. At their first session, youth chose to either plead guilty/not-guilty or allow the judge to sentence them. If one was found to be guilty or pleads guilty, they then became involved in the weekly program. This program required youth to attend court every week and maintain daily attendance logs signed by their teachers. The judge could also require youth to maintain a daily planner and attend tutoring, counseling, or other programs. Each week youth reported to the judge and received points for their attendance, attitude, and compliance with their required activities. When youth received 100 points, they were eligible to graduate from the program. Typically, youth were in the program for ten weeks.

On occasion, community service was required if youth continued to have behavior issues in school or court, violated a court order, or had continued significant absences. In this case, youth and their parent(s)/guardian were given the option to trade two hours of community service for participating in the study. This option required youth to fulfill the remainder of their community service as assigned.

If youth and their parent(s)/guardian agreed to participate in the study, they met privately with a trained undergraduate research assistant and a graduate student researcher who explained the purpose of the study. Youth were asked to sign an informed assent and parent(s)/guardian were asked to sign an informed consent to participate in the study. The study lasted approximately 60-90 minutes. Both youth and parent(s)/guardians completed measures focusing on the one's problematic absenteeism, the family environment, and demographic information. Spanish versions were available if needed. The undergraduate research assistant and researcher were available throughout the entire process to answer questions. If at any time either youth or their parent(s)/guardian decided they no longer wanted to participate, they were free to discontinue participation. If youth no longer wanted to participate, they then needed to complete two hours of community service as assigned by the judge. Once measures were completed, youth and their parents were thanked and, if necessary, provided with proof of participation. All measures were de-identified, coded anonymously, and stored in a secure location.

### **Data Analyses**

The current study broadly aimed to identify subgroups of youth who were at the highest risk of problematic absenteeism based on various family environment and youth psychopathology risk factors. CART is a nonparametric decision tree technique that identifies subgroups of cases with similar outcomes (Markham et al., 2013) based on various risk factors. Despite CART's limitations, the algorithm diminishes many limitations other multivariate methods cannot address including missing data, differing types of variables, simultaneous consideration of multiple risk factors, and multicollinearity. Instead of linearly adding certain variables, CART can identify various, diverse paths to an outcome in a dimensional data set with missing data (Markham et al., 2013).



The tree building process (as described in detail above) begins with the entire sample in one parent node and start splitting or branching the sample into child nodes. Splits are based on family environment or youth psychopathology risk factors identified by the CART algorithm as having the greatest impurity reduction at that particular split. Impurity reductions are calculated by the Gini improvement measure (described above). The Gini improvement measure analyzes all possible splits and selects the split with the greatest impurity reduction (Merkle & Shaffer, 2011). This process continues until stopping criteria is reached. The following CART default settings were utilized as stopping criteria (IBM, 2012). First, if all cases within a child node have the same values on the dependent variable (problematic absenteeism) the node will not be split (IBM, 2012). Second, if all cases within a child node have the same values for every risk factor then the node will not be split (IBM, 2012). Third, if the tree reaches the specified maximum tree depth limit of 5, then the node will not be split (IBM, 2012). Fourth, if the size of a child node is less than the specified minimum node size of 10% of the total sample (37.8), then the node will not be split (IBM, 2012). Fifth, if the split of a child node is less than the specified minimum node size of 5% of the total sample (18.9), then the node will not be split (IBM, 2012). Finally, if the improvement  $\Delta I(s^*, t) = p(t)\Delta i(s^*, t)$  is less than the specified minimum of .0001 for the split  $s^*$  of node  $t$ , then the node will not be split (IBM, 2012). Missing data is handled automatically by the algorithm without imputation techniques (Merkle & Shaffer, 2011) through the utilization of surrogate splits.

CART does not include significance tests and instead relies on generalizability as measures of a tree's predictive power (Merkle & Shaffer, 2011). Various procedures were utilized by the current study to determine the best fit of a tree, including pruning, k-fold cross-validation, misclassification, and SE rule. Splitting uses Gini improvement measures, while the

pruning processes utilize k-fold cross-validation (Merkle & Shaffer, 2011). K-fold cross-validation divides the sample, sequentially builds trees, and calculates the misclassification cost,  $R(T)$ , for each tree. CART standard settings of 10 sample folds were utilized (IBM, 2011). The one-standard-error (SE) rule measure of misclassification cost,  $R(T)$ , was used for selecting pruned trees. The SE rule indicates the selection of the smallest tree with a misclassification cost within one standard error of the tree with the smallest misclassification cost (Breiman et al., 1984). This rule identifies the smallest tree while not sacrificing the tree's predictive ability (Merkle & Shaffer, 2011).

The process results in a final tree-model. Each node in the final tree is based on either a family environment or youth psychopathology risk factor identified as most predictive of problematic absenteeism (dependent variable) at that split. Risk tables and classification tables are generated for the final tree-model. Risk tables measure the variance within a child node for scale dependent variables (IBM, 2011). Classification tables depict the cases correctly and incorrectly classified by each child node for categorical (i.e., nominal & ordinal) dependent variables (IBM, 2011). Finally, selection or classification/prediction rules were utilized to generate "IF-THEN-ELSE" statements for each terminal node.

### **Post-Hoc Analyses**

Several post-hoc analyses based on the derived models were conducted. First, additional cutoff scores (i.e., <1%, 3%, and 5% of full days missed) for problematic absenteeism were utilized to decrease the negative effects of categorizing a continuous variable (Harris, Reeder, & Hyun, 2011), better define the tiers in the MTSS model of school absenteeism, and help to identify the best cutoff for problematic school absenteeism. Second, developmental distinctions (i.e., children and adolescents) were utilized to create individual CART trees for children (i.e.,

between the ages of 5 and 11-years old) and adolescents (i.e., between the ages of 12 and 18-years old) at the 1% and 10% of full school days missed cutoffs. A developmental distinction was utilized to compare the most relevant risk factors between the two groups. Broadly, children tend to have higher rates of anxiety while adolescents have higher rates of depression (Cummings, Caporino, & Kendall, 2014). Past research has pointed towards a difference in the presentation of school refusal behavior in children and adolescents. Early researchers classified children as more likely to be the neurotic type (e.g., sudden onset, anxiety symptoms) while adolescents were more likely to be the characterological type (e.g., gradual onset, depression symptoms; Coolidge, Hahn, & Peck, 1957). The function of school refusal behavior in children is more likely to be the avoidance of stimuli provoking negative affectivity or attention seeking (Kearney & Albano, 2004). On the other hand, the function of school refusal behavior in adolescents is more likely to be to escape aversive social and/or evaluative situations or to pursue tangible rewards (Kearney & Albano, 2004). Third, gender distinctions (i.e., male and female) were also utilized. Trees were created for males and females at the 1% and 10% of full school days missed cutoffs. A gender distinction was used to compare the most relevant risk factors between the two groups. Although there is no difference in the occurrence of school absenteeism between genders, there is a difference in severity of the behavior and related symptomology (McCoy et al., 2007; National Center for Education Statistics, 2016). Males are more likely to miss more days of school, skip school, and drop out of high school than females (McCoy et al., 2007; National Center for Education Statistics, 2016). On the other hand, females are more likely to display fear/anxiety symptoms at school or with the intent to miss school than males (Kearney, 2001). Finally, FES and RCADS subscales were utilized. Trees were created for both FES and

RCADS subscale scores at the 10% of full school days missed cutoffs. This distinction was used to compare the most relevant risk factors between the subscale and item models.

## CHAPTER 4

### RESULTS

The results of the current study are organized by risk factor (e.g., FES or RCADS).

Models for the FES and RCADS are organized in the following manner.

	Hypotheses Models	Summary of Hypotheses Models	Post Hoc Item Analyses	Summary of Post Hoc Item Analyses	Post Hoc Subscale Analyses
FES	pg. 69	pg. 77	pg. 79	pg. 102	pg. 110
RCADS	pg. 114	pg. 120	pg. 121	pg. 140	pg. 146

#### FES Item Models

Hypothesis one of the current study was that splits on the FES items addressing family conflict were expected to produce the greatest impurity reduction of the FES variables in the model, while independence items were expected to produce the second greatest impurity reduction. Hypothesis one utilized both the 1% (i.e., hypothesis 1a) and 10% (i.e., hypothesis 1b) of full school days missed cutoffs.

**Hypothesis 1: FES Item Models.** Hypothesis 1 utilized CART procedures to identify the most relevant family environment risk factors for problematic absenteeism, defined as equal to or greater than 1% (i.e., hypothesis 1a) or 10% (i.e., hypothesis 1b) of full school days missed (Egger et. al., 2003; Department of Education, 2016). Family environment risk factors included all of the FES items. As expected, there was an unequal distribution of group membership in the different cutoff scores with more youth meeting the 1% cutoff than the 10% cutoff. Specifically, the base rates of youth with problematic absenteeism defined as equal to or greater than 1% of days missed was 92.3% ( $n = 347$ ) while the base rates of youth with problematic absenteeism defined as equal to or greater than 10% of days missed was 75.9% ( $n = 287$ ). Prior probabilities were calculated from the data for problematic school absenteeism. Adjustments were made to the misclassification costs in some models to improve the individual model's predictive validity.

**Hypothesis 1a: One Percent Cutoff.** Empirical prior probabilities for problematic school absenteeism defined as equal to or greater than 1% of full school days missed were obtained from base rates and then adjusted (i.e., “Yes” = .99, “No” = .1). Adjustments were based on custom misclassification costs (i.e., “Yes” = 1.00, “No” = 0). The final tree-model identified seven relevant risk factors that best-differentiated youth with problematic school absenteeism (equal to or greater than 1% of full school days missed) from youth with nonproblematic school absenteeism (less than 1% of full school days missed): (1) FES item 28 “We often talk about the religious meaning of Christmas, Passover, or other holidays” (ReligiousTalk), (2) FES item 40 “There are set ways of doing things at home” (SetWays), (3) FES item 44 “There is very little privacy in our family” (LittlePrivacy), (4) FES item 62 “Money and paying bills is openly talked about in our family” (MoneyTalkedAbout), (5) FES item 29 “It’s often hard to find things when you need them in our household” (HardToFindThings), (6) FES item 39 “Being on time is very important in our family” (OnTimeImportant), and (7) FES item 35 “We believe in competition and ‘may the best man win’” (BelieveInCompetition; Figure 4). The final tree-model correctly identified 91.3% of all participants in the sample (i.e., those with problematic versus nonproblematic school absenteeism). The tree-model classified 100.0% (n = 146) of youth with problematic school absenteeism correctly (Table 5a). The tree-model thus demonstrated higher sensitivity (i.e., true positive rate) of youth with problematic school absenteeism classified correctly than specificity (i.e., true negative rate; 0.0% (n = 0)). The cross-validated risk estimate of the overall tree-model was good (r = .000, SE = .000). The tree-model’s accuracy in predicting whether a youth outside this sample will exhibit problematic school absenteeism was approximately 91.3%.

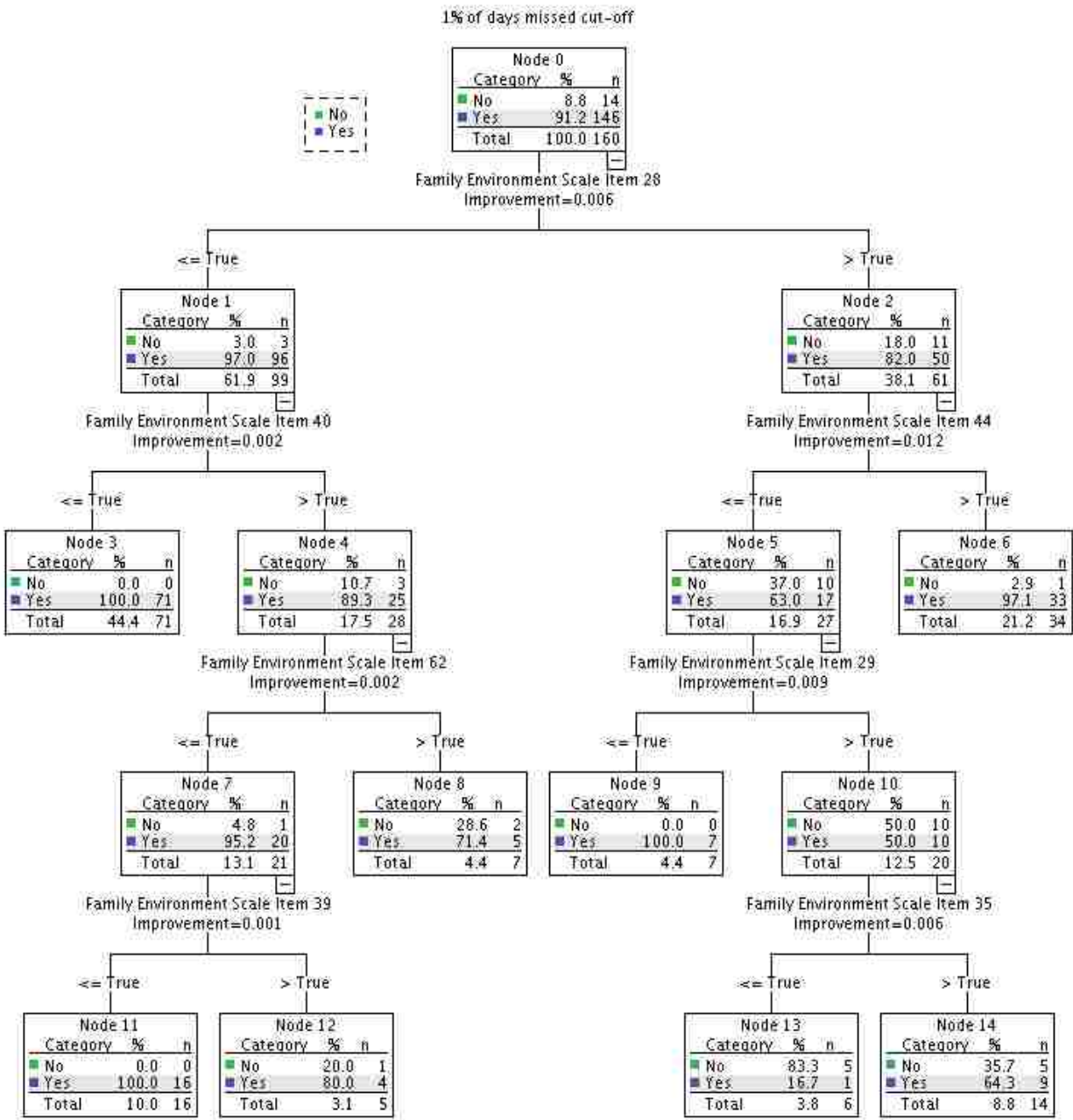


Figure 4. Classification tree of risk factors for problematic school absenteeism defined as  $\geq 1\%$  of full school days missed for FES Items.

Table 5a

*Classification Table for the Final Model of Problematic School Absenteeism Defined as  $\geq 1\%$  of Full School Days Missed for FES Items*

<u>Problematic school absenteeism</u>	<u>Predicted</u>		<u>Percent correct</u>
	No	Yes	
No	0	14	0.0%
Yes	0	146	100.0%
Overall	0.0%	100.0%	91.3%

*Relevant Risk Factors.* Eight subgroups associated with varying risk for problematic school absenteeism emerged. FES item 28 (ReligiousTalk) was the most relevant risk factor for differentiating youth with problematic school absenteeism from youth without problematic school absenteeism (Gini improvement = .006). ReligiousTalk split such that youth who endorsed True exhibited a 97.0% (n = 96) risk for problematic school absenteeism (Node 1). Conversely, youth who endorsed False on ReligiousTalk were at a lower risk for exhibiting problematic school absenteeism (82%; n = 50; Node 2). FES item 40 (SetWays) was the next most relevant risk factor identified for youth in Node 1 (Gini improvement = .002). Youth who endorsed True on SetWays were at a higher risk for exhibiting problematic school absenteeism (100.0%; n = 71; Node 3; Terminal) compared to those who endorsed False on SetWays (89.3%; n = 25; Node 4). For those in Node 4, FES item 62 (MoneyTalkedAbout) was the next most relevant risk factor identified (Gini improvement = .002). Youth who endorsed True on MoneyTalkedAbout were at a 95.2% risk (n = 20; Node 7) for exhibiting problematic school absenteeism. Conversely, youth who endorsed False on MoneyTalkedAbout were at a 71.4% (n = 5; Node 8; Terminal) risk for exhibiting problematic school absenteeism. FES item 39 (OnTimeImportant) score was the next most relevant risk factor identified for youth in Node 7



(Gini improvement = .001). Youth who endorsed True on OnTimeImportant were at a higher risk for exhibiting problematic school absenteeism (100.0%; n = 16; Node 11; Terminal) compared to those who endorsed False on OnTimeImportant (80.0%; n = 4; Node 12; Terminal).

For those youth in Node 2, FES item 44 (LittlePrivacy) was the next most relevant risk factor identified (Gini improvement = .012). Youth who endorsed True on LittlePrivacy were at a 62.0% risk for exhibiting problematic school absenteeism (n = 17; Node 5). Conversely, youth who endorsed False on LittlePrivacy were at a 97.1% (n = 33) risk for exhibiting problematic school absenteeism (Node 6). For those in Node 5, FES item 29 (HardToFindThings) was the next most relevant risk factor identified (Gini improvement = .0029). Youth who endorsed True on HardToFindThings were at a higher risk for exhibiting problematic school absenteeism (100.0%; n = 7; Node 9; Terminal) compared to those who endorsed False on HardToFindThings (50.0%; n = 10; Node 10). For those in Node 10, FES item 35 (BelieveInCompetition) was the next most relevant risk factor identified (Gini improvement = .006). Youth who endorsed True on BelieveInCompetition exhibited a 16.7% (n = 1) risk for problematic school absenteeism (Node 13; Terminal), while youth who endorsed False on BelieveInCompetition exhibited a 64.3% (n = 9) risk for problematic school absenteeism (Node 14; Terminal).

The final tree-model thus identified seven relevant risk factors (FES item 28, FES item 40, FES item 44, FES item 62, FES item 29, FES item, and FES item 35) that best-differentiated youth with problematic school absenteeism (equal to or greater than 1% of full school days missed) from those with nonproblematic school absenteeism (less than 1% of full school days missed). Eight subgroups of youth, each with varying risk for problematic school absenteeism, emerged. Three subgroups were identified as the highest risk subgroup for problematic school absenteeism (i.e., 100.0% risk), (1) youth who endorsed True on ReligiousTalk and True on

SetWays (Node 3); (2) youth who endorsed True on ReligiousTalk, False on SetWays, True on MoneyTalkedAbout, and True on OnTimeImportant (Node 11); (3) youth who endorsed False on ReligiousTalk, True on LittlePrivacy, and True on HardToFindThings (Node 9). The IF-THEN Rules regarding a youth’s probability for exhibiting problematic school absenteeism based on the final tree-model are in Table 5b.

Table 5b

*IF-THEN Rules for the Probability of Exhibiting Problematic School Absenteeism Defined as  $\geq$  1% of Full School Days Missed for FES Items by Risk Probability*

	IF	THEN
Node 3	Endorsed True on ReligiousTalk and True on SetWays	100.0% probability
Node 11	Endorsed True on ReligiousTalk, False on SetWays, True on MoneyTalkedAbout, and True on OnTimeImportant	100.0% probability
Node 9	Endorsed False on ReligiousTalk, True on LittlePrivacy, and True on HardToFindThings	100.0% probability
Node 6	Endorsed False on ReligiousTalk and False on LittlePrivacy	97.1% probability
Node 12	Endorsed True on ReligiousTalk, False on SetWays, True on MoneyTalkedAbout, and False on OnTimeImportant	80.0% probability
Node 8	Endorsed True on ReligiousTalk, False on SetWays, and False on item 62	71.4% probability
Node 14	Endorsed False on ReligiousTalk, True on LittlePrivacy, False on HardToFindThings, and False on BelieveInCompetition	64.3% probability
Node 13	Endorsed False on ReligiousTalk, True on LittlePrivacy, False on HardToFindThings, and True on BelieveInCompetition	16.7% probability

***Hypothesis 1b: Ten Percent Cutoff.*** Prior probabilities were calculated from the data for problematic school absenteeism defined as 10% of full school days missed. No adjustments were made to the misclassification costs; therefore equal costs were used. The final tree-model identified three relevant risk factors that best-differentiated youth with problematic school absenteeism (equal to or greater than 10% of full school days missed) from youth with nonproblematic school absenteeism (less than 10% of full school days missed): (1) FES item 77 “Family members go out a lot” (GoOutALot), (2) FES item 74 “It’s hard to be by yourself without hurting someone’s feelings in our household” (HurtOthersByBeingYourself), and (3) FES item 17 “Friends often come over for dinner or to visit” (DontComeDinner; Figure 5). The final tree-model correctly identified 78.3% of all participants in the sample (i.e., those with problematic versus nonproblematic school absenteeism). The tree-model classified 89.1% (n = 106) of youth with problematic school absenteeism correctly (Table 6a). The tree-model thus demonstrated higher sensitivity (i.e., true positive rate) than specificity (i.e., true negative rate; 47.6% (n = 20) of youth with problematic school absenteeism classified correctly). The risk estimate of the overall tree-model was good ( $r = .217$ ,  $SE = .033$ ). The tree-model’s accuracy in predicting whether a youth outside this sample will exhibit problematic school absenteeism was approximately 78.3%.

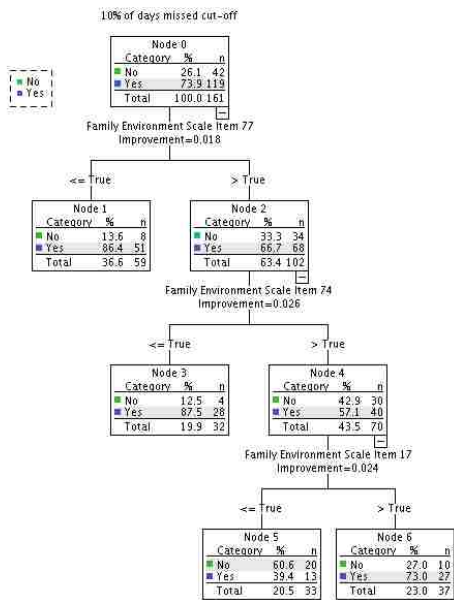


Figure 5. Classification tree of risk factors for problematic school absenteeism defined as  $\geq 10\%$  of full school days missed for FES Items

Table 6a

*Classification Table for the Final Model of Problematic School Absenteeism Defined as  $\geq 10\%$  of Full School Days Missed for FES Items*

<u>Problematic school absenteeism</u>	<u>Predicted</u>		<u>Percent correct</u>
	No	Yes	
No	20	22	47.6%
Yes	13	16	89.1%
Overall	20.5%	79.5%	78.3%

*Relevant Risk Factors.* Four subgroups associated with varying risk for problematic school absenteeism emerged. FES item 77 (GoOutALot) was the most relevant risk factor for differentiating youth with problematic school absenteeism from youth with problematic school absenteeism (Gini improvement = .018). GoOutALot split such that youth who endorsed True exhibited an 86.4% (n = 51) risk for problematic school absenteeism (Node 1; Terminal). Conversely, youth who endorsed False on GoOutALot were at a lower risk for exhibiting problematic school absenteeism (66.7%; n = 68; Node 2). FES item 74 (HurtOthersByBeingYourself) was the next most relevant risk factor identified for youth in Node 2 (Gini improvement = .026). Youth who endorsed True on HurtOthersByBeingYourself were at a higher risk for exhibiting problematic school absenteeism (87.5%; n = 28; Node 3; Terminal) compared to those who endorsed False on HurtOthersByBeingYourself (57.1%; n = 40; Node 4). For those in Node 4, FES item 17 (DontComeDinner) was the next most relevant risk factor identified (Gini improvement = .024). Youth who endorsed True on DontComeDinner were at a 39.4% risk (n = 13; Node 5; Terminal) for exhibiting problematic school absenteeism. Conversely, youth who endorsed False on DontComeDinner were at a 73% (n = 27; Node 6; Terminal) risk for exhibiting problematic school absenteeism.

The final tree-model thus identified three relevant risk factors (FES item, HurtOthersByBeingYourself, and FES item 17) that best-differentiated youth with problematic school absenteeism (equal to or greater than 10% of full school days missed) from those with nonproblematic school absenteeism (less than 10% of full school days missed). Four subgroups of youth, each with varying risk for problematic school absenteeism, emerged. Youth who endorsed False on GoOutALot and True on HurtOthersByBeingYourself were identified as the highest risk subgroup for problematic school absenteeism (87.5%; Node 3). The IF-THEN Rules regarding a youth’s probability for exhibiting problematic school absenteeism based on the final tree-model are in Table 6b.

Table 6b

*IF-THEN Rules for the Probability of Exhibiting Problematic School Absenteeism Defined as  $\geq$  10% of Full School Days Missed for FES Items by Risk Probability*

	IF	THEN
Node 3	Endorsed False on GoOutALot and True on HurtOthersByBeingYourself	87.5% probability
Node 1	Endorsed True on GoOutALot	86.4% probability
Node 6	Endorsed False on GoOutALot, False on HurtOthersByBeingYourself, and False on RarelyLecturesPlaysConcerts	73.0% probability
Node 5	Endorsed False on GoOutALot, False on HurtOthersByBeingYourself, and True on RarelyLecturesPlaysConcerts	39.4% probability

**Summary of Original Tree-Models: FES.**

*Hypothesis 1a.* FES items addressing family conflict and independence were expected to emerge as the most relevant and second most relevant family environment risk factors for problematic school absenteeism, defined as equal to or greater than 1% of full days missed. The final tree-model did not support this hypothesis. Seven relevant risk factors were identified that

best-differentiated youth with problematic school absenteeism (equal to or greater than 1% of full school days missed) from those with nonproblematic school absenteeism (less than 1% of full school days missed; Table 7). Youth’s endorsement (i.e., True) or denial (i.e., False) of a particular item was linked to their level of risk for problematic school absenteeism (Table 7). Three subgroups were identified as the highest risk subgroup for problematic school absenteeism (i.e., 100.0% risk), (1) youth who endorsed True on ReligiousTalk and True on SetWays (Node 3); (2) youth who endorsed True on ReligiousTalk, False on SetWays, True on MoneyTalkedAbout, and True on OnTimeImportant (Node 11); (3) youth who endorsed False on ReligiousTalk, True on LittlePrivacy, and True on HardToFindThings (Node 9).

Table 7

*Level of Risk for Exhibiting Problematic School Absenteeism Defined as  $\geq 1\%$  of Full School*

*Days Missed by FES Item Response*

Item	Subscale	Response Predictive of Higher Risk
FES item 28 “We often talk about the religious meaning of Christmas, Passover, or other holidays”	Moral-Religious Emphasis	True
FES item 40 “There are set ways of doing things at home”	Control	True
FES item 44 “There is very little privacy in our family”	Independence	False
FES item 62 “Money and paying bills is openly talked about in our family”	Expressiveness	True
FES item 29 “It’s often hard to find things when you need them in our household”	Organization	True
FES item 39 “Being on time is very important in our family”	Organization	True
FES item 35 “We believe in competition and ‘may the best man win’”	Achievement Orientation	False

**Hypothesis 1b.** FES items addressing family conflict and independence were expected to emerge as the most relevant and second most relevant family environment risk factors for problematic school absenteeism, defined as 10% of full days missed. The final tree-model partially supported this hypothesis. Three relevant risk factors were identified that best-differentiated youth with problematic school absenteeism (equal to or greater than 10% of full school days missed) from those with nonproblematic school absenteeism (less than 10% of full school days missed; Table 8). Youth’s endorsement (i.e., True) or denial (i.e., False) of a particular item was linked to their level of risk for problematic school absenteeism (Table 8). Youth who endorsed False on GoOutALot and True on HurtOthersByBeingYourself were identified as the highest risk subgroup for problematic school absenteeism (87.5%; Node 3).

Table 8

*Level of Risk for Exhibiting Problematic School Absenteeism Defined as  $\geq$  10% of Full School Days Missed by FES Item Response*

Item	Subscale	Response Predictive of Higher Risk
FES item 77 “Family members go out a lot”	Active-Recreational Orientation	True
FES item 74 “It’s hard to be by yourself without hurting someone’s feelings in our household”	Independence	True
FES item 17 “Friends often come over for dinner or to visit”	Active-Recreational Orientation	False

**Post Hoc Analyses: FES Item Models.** Due to the exploratory nature of CART, several post-hoc analyses were conducted. Two additional cutoff scores for problematic absenteeism (i.e., 3% and 5%) were utilized to identify different risk factors for youth who meet varying levels of problematic absenteeism. A cutoff score of less than 1% of full school days missed was



also utilized to identify predictors for youth who display nonproblematic absenteeism. There was an unequal distribution of group membership in the different cutoff scores with the most youth meeting the 3% of full school days missed cutoff and the least meeting the less than 1% of full school days missed cutoff. The base rates of youth with nonproblematic absenteeism defined as less than 1% of full school days missed was 10.3% ( $n = 39$ ). The base rates of youth with problematic absenteeism defined as 3% of full school days missed was 84.4% ( $n = 319$ ). The base rates of youth with problematic absenteeism defined as 5% of full school days missed was 78% ( $n = 295$ ). The sample was also split by gender (i.e., male and female) and developmental (i.e., Children and Adolescent) distinctions at the 10% cutoff. There was an unequal distribution of group membership in the different groups. There were more males (215; 56.9%) in the sample, compared to females (161; 42.6%). The sample also had more adolescents (243; 64.3%), defined as between the ages of 12 and 18-years old, compared to children (131; 34.7%), defined as between the ages of 5 and 11-years old. Prior probabilities were calculated from the data for problematic school absenteeism. Adjustments were made to the misclassification costs in some models to improve the individual model's predictive validity.

***Less Than One Percent Cutoff.*** CART was utilized to identify the most relevant risk factors for youth with nonproblematic absenteeism defined as less than 1% of full school days missed (i.e., less than 1.8 full school days missed). Prior probabilities were calculated from the data for nonproblematic school absenteeism defined as less than 1% of full school days missed. Adjustments were made to the misclassification costs based on custom misclassification costs (i.e., "Yes" = 2.00, "No" = 1.00). The final tree-model identified eight relevant risk factors that best-differentiated youth with nonproblematic school absenteeism (less than 1% of full school days missed) from those with problematic absenteeism (greater than or equal to 1% of full school

days missed): (1) FES item 28 “We often talk about the religious meaning of Christmas, Passover, or other holidays” (ReligiousTalk), (2) FES item 59 “Family members make sure their rooms are neat” (RoomsNeat), (3) FES item 44 “There is very little privacy in our family” (LittlePrivacy), (4) FES item 15 “Getting ahead in life is very important in our family” (GettingAheadImportant), (5) FES item 9 “Activities in our family are pretty carefully planned” (CarefullyPlannedActivities), (6) FES item 29 “It’s often hard to find things when you need them in our household” (HardToFindThings), (7) FES item 13 “Family members rarely become openly angry” (RarelyOpenlyAngry), and (8) FES item 35 “We believe in competition and “may the best man win” (BelieveInCompetition; Figure 6). The final tree-model correctly identified 87.6% of all participants in the sample (i.e., those with nonproblematic absenteeism versus problematic school absenteeism). The tree-model classified 76.2% (n = 16) of youth with nonproblematic school absenteeism correctly (Table 9a). The tree-model thus demonstrated higher specificity (i.e., true negative rate; 89.3%; n = 125) of youth without nonproblematic school absenteeism classified correctly than sensitivity (i.e., true positive rate). The cross-validated risk estimate of the overall tree-model was adequate ( $r = .360$ ,  $SE = .055$ ). The tree-model’s accuracy in predicting whether a youth outside this sample will exhibit nonproblematic school absenteeism was approximately 87.6%.

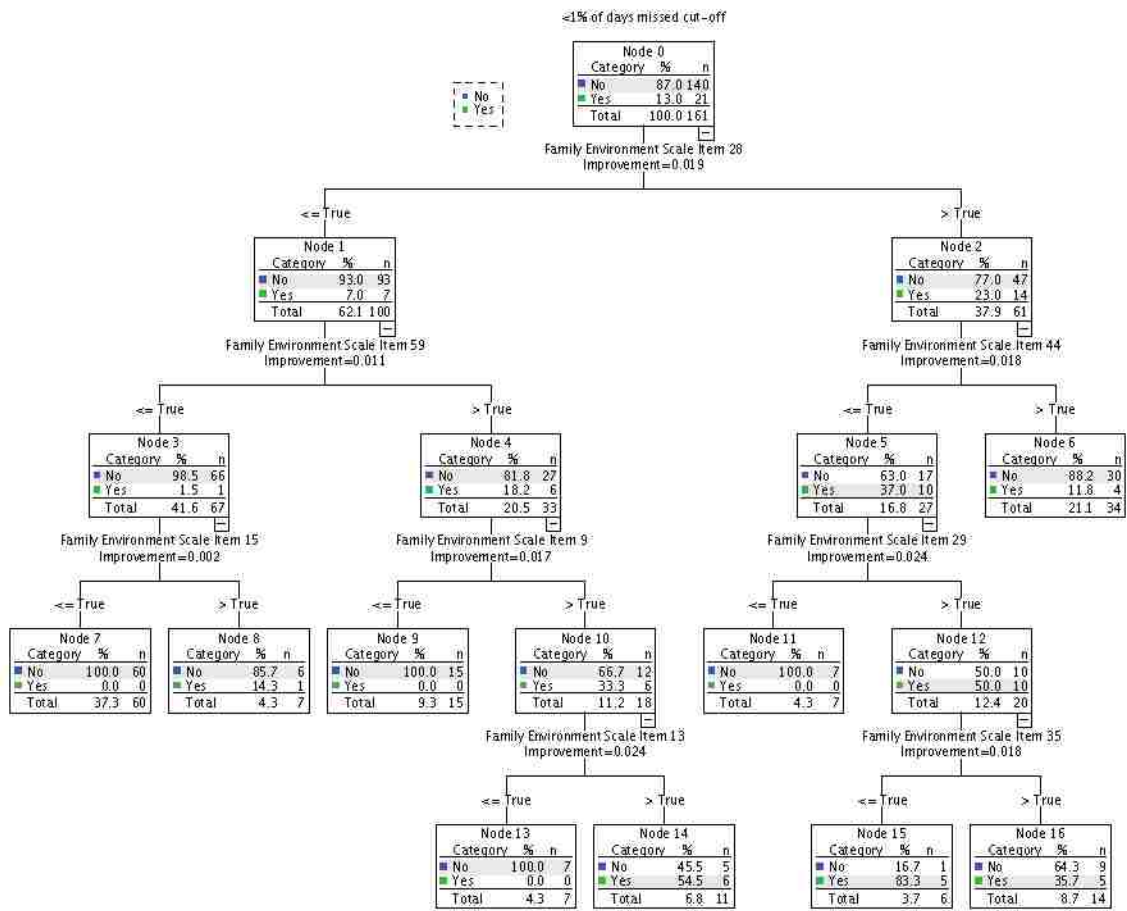


Figure 6. Classification tree of risk factors for nonproblematic school absenteeism defined as < 1% of full school days missed for FES items.

Table 9a

*Classification Table for the Final Model of Nonproblematic School Absenteeism Defined as <*

*1% of Full School Days Missed for FES Items*

<u>Nonproblematic school absenteeism</u>	<u>Predicted</u>		<u>Percent correct</u>
	No	Yes	
No	12	15	89.3%
Yes	5	16	76.2%
Overall	80.7%	19.3%	87.6%

The final tree-model thus identified eight relevant risk factors (FES item 28, FES item 59, FES item 44, FES item, FES item 9, FES item 29, FES item 13, and FES item 35) that best-differentiated youth with nonproblematic school absenteeism (less than 1% of full school days missed) from those with problematic school absenteeism (equal to or greater than 1% of full school days missed). Nine subgroups of youth, each with varying risk for nonproblematic school absenteeism, emerged. Youth who endorsed False on ReligiousTalk, True on LittlePrivacy, False on HardToFindThings, and True on BelieveInCompetition (83.3%; Node 15) were identified as the highest risk subgroup for nonproblematic school absenteeism. The IF-THEN Rules regarding a youth’s probability for exhibiting nonproblematic school absenteeism based on the final tree-model are in Table 9b.

Table 9b

*IF-THEN Rules for the Probability of Exhibiting Nonproblematic School Absenteeism Defined as*

*<1% of Full School Days Missed for FES Items by Risk Probability*

	<u>IF</u>	<u>THEN</u>
Node 15	Endorsed False on ReligiousTalk, True on LittlePrivacy, False on HardToFindThings, and True on BelieveInCompetition	83.3% probability

Node 14	Endorsed True on ReligiousTalk, False on RoomsNeat, False on CarefullyPlannedActivities, and False on RarelyOpenlyAngry	54.5% probability
Node 16	Endorsed False on ReligiousTalk, True on LittlePrivacy, False on HardToFindThings, and False on BelieveInCompetition	35.7% probability
Node 8	Endorsed True on ReligiousTalk, True on RoomsNeat, and False on GettingAheadImportant	14.3% probability
Node 6	Endorsed False on ReligiousTalk and False on LittlePrivacy	11.8% probability
Node 7	Endorsed True on ReligiousTalk, True on RoomsNeat, and True on GettingAheadImportant	0.0% probability
Node 9	Endorsed True on ReligiousTalk, False on RoomsNeat, and True on CarefullyPlannedActivities	0.0% probability
Node 11	Endorsed False on ReligiousTalk, True on LittlePrivacy, and True on HardToFindThings	0.0% probability
Node 13	Endorsed True on ReligiousTalk, False on RoomsNeat, False on CarefullyPlannedActivities, and True on RarelyOpenlyAngry	0.0% probability

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**Three Percent Cutoff.** CART was utilized to identify the most relevant risk factors for youth with problematic absenteeism defined as  $\geq 3\%$  of full school days missed (i.e., equal to or greater than 5.4 full school days missed). Prior probabilities were calculated from the data for problematic school absenteeism defined as  $\geq 3\%$  of full school days missed. Adjustments were made to the misclassification costs based on custom misclassification costs (i.e., “Yes” = 2.00, “No” = 1.00). The final tree-model identified ten relevant risk factors that best-differentiated youth with problematic school absenteeism (equal to or greater than 3% of full school days missed) from those with nonproblematic absenteeism (less than 3% of full school days missed):

(1) FES item 25 “How much money a person makes is not very important to us” (SalaryNotImportant), (2) FES item 2 “Family members often keep their feelings to themselves” (KeepFeelingsToSelf), (3) FES item 31 “There is a feeling of togetherness in our family” (TogethernessFeeling), (4) FES item 5 “We feel it is important to be best at whatever you do” (ImportantBeBest), (5) FES item 86 “Family members really like music, art and literature” (LikeMusicArtLit), (6) FES item 89 “Dishes are usually done immediately after eating” (DishesDoneImmediately), (7) FES item 53 “Family members sometimes hit each other” (HitEachother), (8) FES item 14 “In our family, we are strongly encouraged to be independent” (IndependenceEncouraged), (9) FES item 90 “You can’t get away with much in our family” (Don’tGetAwayWithMuch), and (10) FES item 80 “Rules are pretty inflexible in our household” (InflexibleRules; Figure 7). The final tree-model correctly identified 85.7% of all participants in the sample (i.e., those with problematic versus nonproblematic school absenteeism). The tree-model classified 98.5% (n = 131) of youth with problematic school absenteeism correctly (Table 10a). The tree-model thus demonstrated higher sensitivity (i.e., true positive rate) of youth with problematic school absenteeism classified correctly than specificity (i.e., true negative rate; 25.0%; n = 7). The cross-validated risk estimate of the overall tree-model was good ( $r = .286$ ,  $SE = .044$ ). The tree-model’s accuracy in predicting whether a youth outside this sample will exhibit problematic school absenteeism was approximately 85.7%.

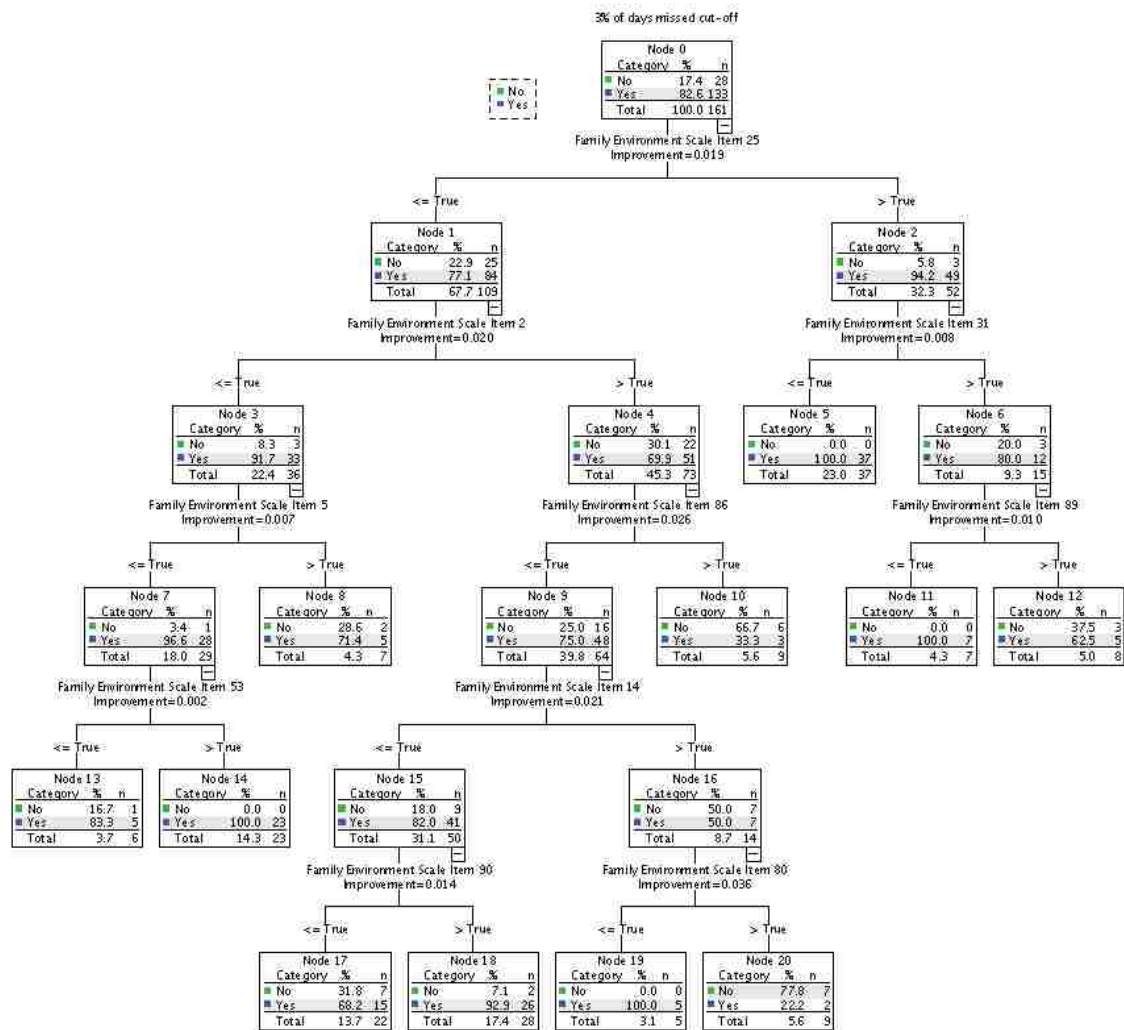


Figure 7. Classification tree of risk factors for problematic school absenteeism defined as  $\geq 3\%$  of full school days missed for FES items.

Table 10a

*Classification Table for the Final Model of Problematic School Absenteeism Defined as  $\geq 3\%$  of Full School Days Missed for FES Items*

<u>Problematic school absenteeism</u>	<u>Predicted</u>		<u>Percent correct</u>
	No	Yes	
No	7	21	25.0%
Yes	2	131	98.5%
Overall	5.6%	94.4%	85.7%

The final tree-model thus identified eight relevant risk factors (FES item 25, FES item 2, FES item 31, FES item 5, FES item 86, FES item, FES item 53, and FES item 14) that best-differentiated youth with problematic school absenteeism (greater than or equal to 3% of full school days missed) from those with nonproblematic school absenteeism (less than 3% of full school days missed). Eleven subgroups of youth, each with varying risk for problematic school absenteeism, emerged. Four subgroups of youth were identified as the highest risk subgroup for problematic school absenteeism, (1) youth who endorsed False on SalaryNotImportant and True on TogethernessFeeling (100.0%; Node 5); (2) youth who endorsed False on SalaryNotImportant, False on TogethernessFeeling, and True on DishesDoneImmediately (100.0%; Node 11); (3) youth who endorsed True on SalaryNotImportant, True on KeepFeelingsToSelf, True on ImportantBeBest, and False on HitEachother (100.0%; Node 14); and (4) youth who Endorsed True on SalaryNotImportant, False on KeepFeelingsToSelf, True on LikeMusicArtLit, False on IndependenceEncouraged, and True on InflexibleRules (100.0%; Node 19). The IF-THEN Rules regarding a youth's probability for exhibiting problematic school absenteeism based on the final tree-model are in Table 10b.

Table 10b



*IF-THEN Rules for the Probability of Exhibiting Problematic School Absenteeism Defined as  $\geq$  3% of Full School Days Missed for FES Items by Risk Probability*

	IF	THEN
Node 5	Endorsed False on SalaryNotImportant and True on TogethernessFeeling	100.0% probability
Node 11	Endorsed False on SalaryNotImportant, False on TogethernessFeeling, and True on DishesDoneImmediately	100.0% probability
Node 14	Endorsed True on SalaryNotImportant, True on KeepFeelingsToSelf, True on ImportantBeBest, and False on HitEachother	100.0% probability
Node 19	Endorsed True on SalaryNotImportant, False on KeepFeelingsToSelf, True on LikeMusicArtLit, False on IndependenceEncouraged, and True on InflexibleRules	100.0% probability
Node 18	Endorsed True on SalaryNotImportant, False on KeepFeelingsToSelf, True on LikeMusicArtLit, True on IndependenceEncouraged, and False on Don'tGetAwayWithMuch	92.9% probability
Node 13	Endorsed True on SalaryNotImportant, True on KeepFeelingsToSelf, True on ImportantBeBest, and True on HitEachother	83.3% probability
Node 8	Endorsed True on SalaryNotImportant, True on KeepFeelingsToSelf, and False on ImportantBeBest	71.4% probability
Node 17	Endorsed True on SalaryNotImportant, False on KeepFeelingsToSelf, True on LikeMusicArtLit, True on IndependenceEncouraged, and True on Don'tGetAwayWithMuch	68.2% probability
Node 12	Endorsed False on SalaryNotImportant, False on TogethernessFeeling, and False on DishesDoneImmediately	62.5% probability

Node 10	Endorsed True on SalaryNotImportant, False on KeepFeelingsToSelf, and False on LikeMusicArtLit	33.3% probability
Node 20	Endorsed True on SalaryNotImportant, False on KeepFeelingsToSelf, True on LikeMusicArtLit, False on IndependenceEncouraged, and False on InflexibleRules	22.2% probability

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**Five Percent Cutoff.** CART was utilized to identify the most relevant risk factors for youth with problematic absenteeism defined as  $\geq 5\%$  of full school days missed (i.e., equal to or greater than nine full school days missed). Prior probabilities were calculated from the data for problematic school absenteeism defined as  $\geq 5\%$  of full school days missed. Adjustments were made to the misclassification costs based on custom misclassification costs (i.e., “Yes” = 3.00, “No” = 1.00). The final tree-model identified ten relevant risk factors that best-differentiated youth with problematic school absenteeism (equal to or greater than 3% of full school days missed) from those with nonproblematic absenteeism (less than 3% of full school days missed): (1) FES item 77 “Family members go out a lot” (GoOutALot), (2) FES item 56 “Someone in our family plays a musical instrument” (PlayInstrument), (3) FES item 74 “It’s hard to be by yourself without hurting someone’s feelings in our household” (HurtOthersByBeingYourself), (4) FES item 27 “Nobody in our family is active in sports, Little League, bowling, etc.” (NotActiveInSports), (5) FES item 51 “Family members really back each other up” (BackEachotherUp), (6) FES item 45 “We always strive to do things just a little better the next time” (StriveLittleBetter), (7) FES item 17 “Friends often come over for dinner or to visit” (DontComeDinner), (8) FES item 34 “We come and go as we want to in our family” (ComeAndGoFreely), (9) FES item 16 “We rarely go to lectures, plays or concerts” (RarelyLecturesPlaysConcerts), (10) FES item 29 “It’s often hard to find things when you need

them in our household” (HardToFindThings; Figure 8). The final tree-model correctly identified 74.5% of all participants in the sample (i.e., those with problematic versus nonproblematic school absenteeism). The tree-model classified 100.0% ( $n = 120$ ) of youth with problematic school absenteeism correctly (Table 11a). The tree-model thus demonstrated higher sensitivity (i.e., true positive rate) of youth with problematic school absenteeism classified correctly than specificity (i.e., true negative rate; 0.0%;  $n = 0$ ). The cross-validated risk estimate of the overall tree-model was adequate ( $r = .391$ ,  $SE = .060$ ). The tree-model’s accuracy in predicting whether a youth outside this sample will exhibit problematic school absenteeism was approximately 74.5%.

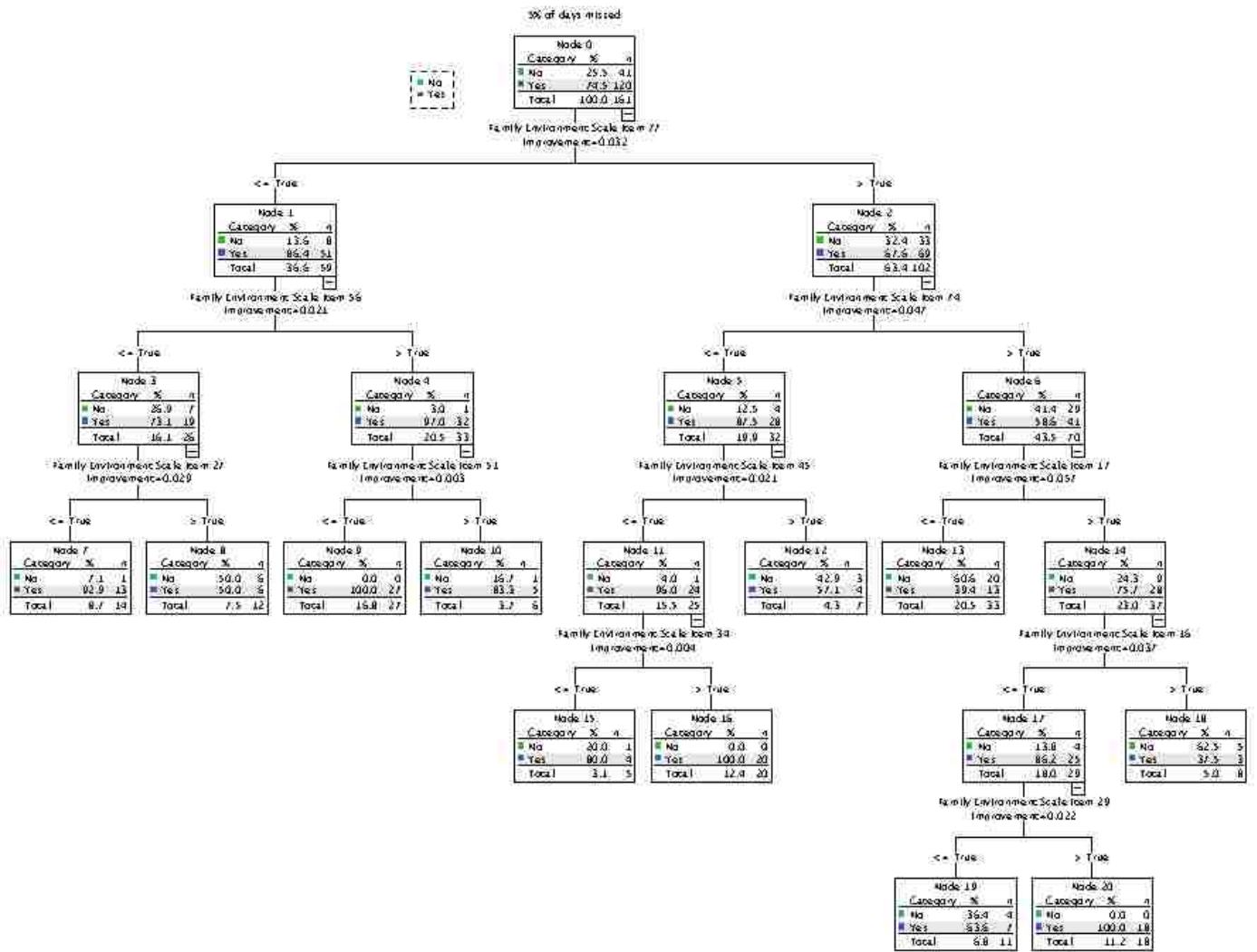


Figure 8. Classification tree of risk factors for problematic school absenteeism defined as  $\geq 5\%$  of full school days missed for FES items.

Table 11a

*Classification Table for the Final Model of Problematic School Absenteeism Defined as  $\geq 5\%$  of Full School Days Missed for FES Items*

<u>Problematic school absenteeism</u>	<u>Predicted</u>		<u>Percent correct</u>
	No	Yes	
No	0	41	0.0%
Yes	0	120	100.0%
Overall	0.0%	100.0%	74.5%

The final tree-model thus identified ten relevant risk factors (FES item 77, FES item 56, FES item 74, FES item 27, FES item 51, FES item 45, FES item 17, FES item, FES item 16, and FES item 29) that best-differentiated youth with problematic school absenteeism (greater than or equal to 5% of full school days missed) from those with nonproblematic school absenteeism (less than 5% of full school days missed). Eleven subgroups of youth, each with varying risk for problematic school absenteeism, emerged. Three subgroups of youth were identified as the highest risk subgroup for problematic school absenteeism, (1) youth who endorsed True on GoOutALot, False on PlayInstrument, and True on BackEachotherUp (100.0%; Node 9); (2) youth who endorsed False on GoOutALot, True on HurtOthersByBeingYourself, True on StriveLittleBetter, and False on ComeAndGoFreely (100.0%; Node 16); and (3) youth who endorsed False on GoOutALot, False on HurtOthersByBeingYourself, False on DontComeDinner, True on Item 16, and False on HardToFindThings (100.0%; Node 20). The IF-THEN Rules regarding a youth’s probability for exhibiting problematic school absenteeism based on the final tree-model are in Table 11b.

Table 11b

*IF-THEN Rules for the Probability of Exhibiting Problematic School Absenteeism Defined as  $\geq$*

*5% of Full School Days Missed for FES Items by Risk Probability*

	IF	THEN
Node 9	Endorsed True on GoOutALot, False on PlayInstrument, and True on BackEachotherUp	100.0% probability
Node 16	Endorsed False on GoOutALot, True on HurtOthersByBeingYourself, True on StriveLittleBetter, and False on ComeAndGoFreely	100.0% probability
Node 20	Endorsed False on GoOutALot, False on HurtOthersByBeingYourself, False on DontComeDinner, True on Item 16, and False on HardToFindThings	100.0% probability
Node 7	Endorsed True on GoOutALot, True on PlayInstrument, and True on NotActiveInSports	92.9% probability
Node 10	Endorsed True on GoOutALot, False on PlayInstrument, and False on BackEachotherUp	88.3% probability
Node 15	Endorsed False on GoOutALot, True on HurtOthersByBeingYourself, True on StriveLittleBetter, and True on ComeAndGoFreely	80.0% probability
Node 19	Endorsed False on GoOutALot, False on HurtOthersByBeingYourself, False on DontComeDinner, True on Item 16, and True on HardToFindThings	63.6% probability
Node 12	Endorsed False on GoOutALot, True on HurtOthersByBeingYourself, and False on StriveLittleBetter	57.1% probability
Node 8	Endorsed True on GoOutALot, True on PlayInstrument, and False on NotActiveInSports	50.0% probability
Node 13	Endorsed False on GoOutALot, False on HurtOthersByBeingYourself, and True on DontComeDinner	39.4% probability

Node 18	Endorsed False on GoOutALot, False on HurtOthersByBeingYourself, False on DontComeDinner, and False on Item 16	37.5% probability
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**Males: Ten Percent Cutoff.** CART was utilized to identify the most relevant risk factors for male youth with problematic absenteeism defined as  $\geq 10\%$  of full school days missed (i.e., equal to or greater than 18 full school days missed). Prior probabilities were calculated from the data for problematic school absenteeism defined as  $\geq 10\%$  of full school days missed. Adjustments were made to the misclassification costs based on custom misclassification costs (i.e., “Yes” = 2.00, “No” = 1.00). The final tree-model identified five relevant risk factors that best-differentiated male youth with problematic school absenteeism (equal to or greater than 10% of full school days missed) from those with nonproblematic absenteeism (less than 10% of full school days missed): (1) FES item 2 “Family members often keep their feelings to themselves” (FeelingsToSelf), (2) FES item 18 “We don’t say prayers in our family” (DontSayPrayers), (3) FES item 27 “Nobody in our family is active in sports, Little League, bowling, etc.” (NotActiveInSports), (4) FES item 73 “Family members often try to one-up or out-do each other” (OneUpEachother), (5) FES item 49 “People change their minds often in our family” (ChangeMindsOften; Figure 9). The final tree-model correctly identified 80.5% of all participants in the sample (i.e., those with problematic versus nonproblematic school absenteeism). The tree-model classified 96.7% ( $n = 58$ ) of male youth with problematic school absenteeism correctly (Table 12a). The tree-model thus demonstrated higher sensitivity (i.e., true positive rate) of male youth with problematic school absenteeism classified correctly than specificity (i.e., true negative rate; 36.4%;  $n = 8$ ). The cross-validated risk estimate of the overall tree-model was adequate ( $r = .390$ ,  $SE = .068$ ). The tree-model’s accuracy in predicting whether

a male youth outside this sample will exhibit problematic school absenteeism was approximately 80.5%.



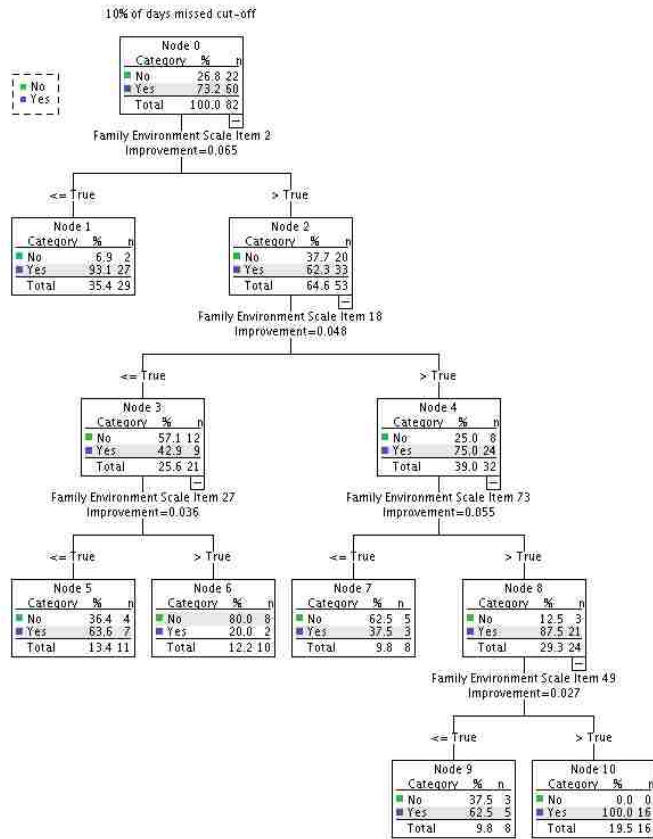


Figure 9. Classification tree of risk factors for males with problematic school absenteeism defined as  $\geq 10\%$  of full school days missed for FES items.

Table 12a

*Classification Table for the Final Model of Males with Problematic School Absenteeism Defined*

*as  $\geq$  10% of Full School Days Missed for FES Items*

<u>Problematic school absenteeism</u>	<u>Predicted</u>		<u>Percent correct</u>
	No	Yes	
No	8	14	36.4%
Yes	2	58	96.7%
Overall	12.2%	87.8%	80.5%

The final tree-model thus identified five relevant risk factors (FES item 2, FES item 18, FES item 27, FES item 73, and FES item 49) that best-differentiated male youth with problematic school absenteeism (greater than or equal to 10% of full school days missed) from those with nonproblematic school absenteeism (less than 10% of full school days missed). Six subgroups of male youth, each with varying risk for problematic school absenteeism, emerged. Male youth who endorsed False on KeepFeelingsToSelf, False on DontSayPrayers, False on OneUpEachother, and False on ChangeMindsOften were identified as the highest risk subgroup for problematic school absenteeism (100.0%; Node 10). The IF-THEN Rules regarding a male youth’s probability for exhibiting problematic school absenteeism based on the final tree-model are in Table 12b.

Table 12b

*IF-THEN Rules for the Probability of Males Exhibiting Problematic School Absenteeism Defined*

*as  $\geq$  10% of Full School Days Missed for FES Items by Risk Probability*

	<u>IF</u>	<u>THEN</u>
Node 10	Endorsed False on KeepFeelingsToSelf, False on DontSayPrayers, False on	100.0% probability

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	OneUpEachother, and False on ChangeMindsOften	
Node 1	Endorsed True on KeepFeelingsToSelf	93.1% probability
Node 5	Endorsed False on KeepFeelingsToSelf, True on DontSayPrayers, and True on NotActiveInSports	63.6% probability
Node 9	Endorsed False on KeepFeelingsToSelf, False on DontSayPrayers, False on OneUpEachother, and True on ChangeMindsOften	62.5% probability
Node 7	Endorsed False on KeepFeelingsToSelf, False on DontSayPrayers, and True on OneUpEachother	37.5% probability
Node 6	Endorsed False on KeepFeelingsToSelf, True on DontSayPrayers, and False on NotActiveInSports	20.0% probability

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**Females: Ten Percent Cutoff.** CART was utilized to identify the most relevant risk factors for female youth with problematic absenteeism defined as  $\geq 10\%$  of full school days missed (i.e., equal to or greater than 18 full school days missed). Prior probabilities were calculated from the data for problematic school absenteeism defined as  $\geq 10\%$  of full school days missed. Adjustments were made to the misclassification costs based on custom misclassification costs (i.e., “Yes” = 2.00, “No” = 1.00). The final tree-model identified four relevant risk factors that best-differentiated female youth with problematic school absenteeism (equal to or greater than 10% of full school days missed) from those with nonproblematic absenteeism (less than 10% of full school days missed): (1) FES item 56 “Someone in our family plays a musical instrument” (PlayInstrument), (2) FES item 4 “We don’t do things on our own very often in our family” (DontDoThingsAlone), (3) FES item 49 “People change their minds often in our family” (ChangeMindsOften), and (4) FES item 57 “Family members are not very involved in recreational activities outside work and school” (NotInvolvedInRecreational; Figure 10). The

final tree-model correctly identified 74.7% of all participants in the sample (i.e., those with problematic versus nonproblematic school absenteeism). The tree-model classified 100.0% (n = 59) of female youth with problematic school absenteeism correctly (Table 13a). The tree-model thus demonstrated higher sensitivity (i.e., true positive rate) of female youth with problematic school absenteeism classified correctly than specificity (i.e., true negative rate; 0.0%; n = 0). The cross-validated risk estimate of the overall tree-model was adequate ( $r = .380$ ,  $SE = .070$ ). The tree-model's accuracy in predicting whether a female youth outside this sample will exhibit problematic school absenteeism was approximately 74.7%.

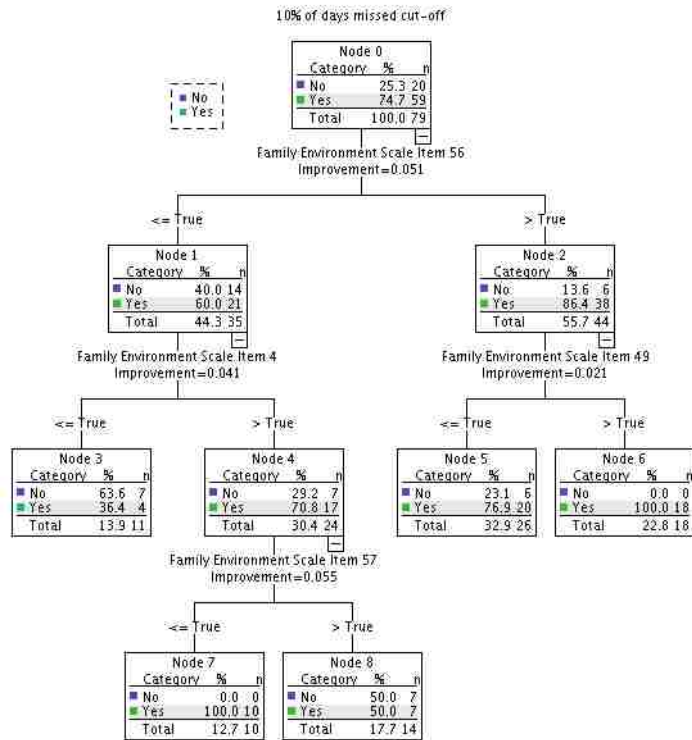


Figure 10. Classification tree of risk factors for females with problematic school absenteeism defined as  $\geq 10\%$  of full school days missed for FES items.

Table 13a

*Classification Table for the Final Model of Females with Problematic School Absenteeism*

*Defined as  $\geq 10\%$  of Full School Days Missed for FES Items*

<u>Problematic school absenteeism</u>	<u>Predicted</u>		<u>Percent correct</u>
	No	Yes	
No	0	20	0.0%
Yes	0	59	100.0%
Overall	0.0%	100.0%	74.7%

The final tree-model thus identified four relevant risk factors (FES item 56, FES item 4, FES item 49, and FES item 57) that best-differentiated female youth with problematic school absenteeism (greater than or equal to 10% of full school days missed) from those with nonproblematic school absenteeism (less than 10% of full school days missed). Five subgroups of female youth, each with varying risk for problematic school absenteeism, emerged. Two subgroups of female youth were identified as the highest risk for problematic absenteeism, (1) female youth who endorsed False on PlayInstrument and False on ChangeMindsOften (100.0%; Node 6), and (2) female youth who endorsed True on PlayInstrument, False on KeepFeelingsToSelf, and True on NotInvolvedInRecreational (100.0%; Node 7). The IF-THEN Rules regarding a female youth’s probability for exhibiting problematic school absenteeism based on the final tree-model are in Table 13b.

Table 13b

*IF-THEN Rules for the Probability of Females Exhibiting Problematic School Absenteeism*

*Defined as  $\geq 10\%$  of Full School Days Missed for FES Items by Risk Probability*

<u>IF</u>	<u>THEN</u>
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Node 6	Endorsed False on PlayInstrument and False on ChangeMindsOften	100.0
Node 7	Endorsed True on PlayInstrument, False on KeepFeelingsToSelf, and True on NotInvolvedInRecreational	100.0
Node 5	Endorsed False on PlayInstrument and True on ChangeMindsOften	76.9
Node 8	Endorsed True on PlayInstrument, False on KeepFeelingsToSelf, and False on NotInvolvedInRecreational	50.0
Node 3	Endorsed True on PlayInstrument and True on KeepFeelingsToSelf	36.4

**Children: Ten Percent Cutoff.** CART was utilized to identify the most relevant risk factors for youth defined as children (i.e., between the ages of 5 and 11-years old) with problematic absenteeism defined as  $\geq 10\%$  of full school days missed (i.e., equal to or greater than 18 full school days missed). Prior probabilities were calculated from the data for problematic school absenteeism defined as  $\geq 10\%$  of full school days missed. Adjustments were made to the misclassification costs based on custom misclassification costs (i.e., “Yes” = 1.00, “No” = 0.00). The final tree-model identified two relevant risk factors that best-differentiated children with problematic school absenteeism (equal to or greater than 10% of full school days missed) from those with nonproblematic absenteeism (less than 10% of full school days missed): (1) FES item 85 “Family members are often compared with others as to how well they are doing at work or school” (ComparedToEachother), and (2) FES item 49 “People change their minds often in our family” (ChangeMindsOften; Figure 11). The final tree-model correctly identified 46.2% of all participants in the sample (i.e., those with problematic versus nonproblematic school absenteeism). The tree-model classified 100.0% (n = 18) of children with problematic school absenteeism correctly (Table 14a). The tree-model thus demonstrated higher sensitivity

(i.e., true positive rate) of children with problematic school absenteeism classified correctly than specificity (i.e., true negative rate; 0.0%;  $n = 0$ ). The cross-validated risk estimate of the overall tree-model was good ( $r = .000$ ,  $SE = .000$ ). The tree-model's accuracy in predicting whether a child outside this sample will exhibit problematic school absenteeism was approximately 46.2%.



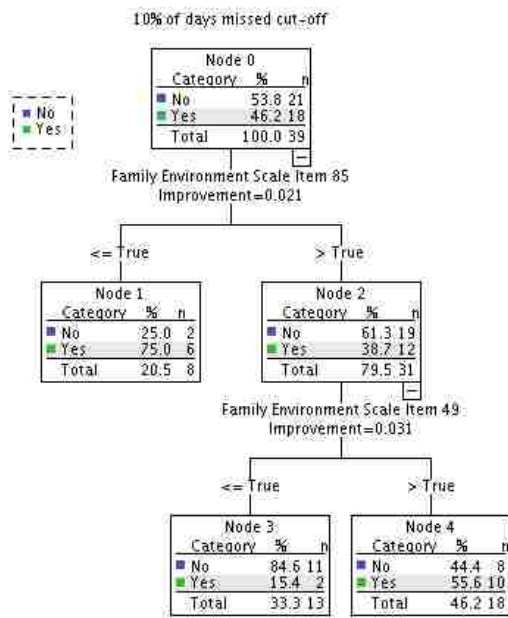


Figure 11. Classification tree of risk factors for children with problematic school absenteeism defined as  $\geq 10\%$  of full school days missed for FES items.

Table 14a

*Classification Table for the Final Model of Children with Problematic School Absenteeism*

*Defined as  $\geq 10\%$  of Full School Days Missed for FES Items*

<u>Problematic school absenteeism</u>	<u>Predicted</u>		<u>Percent correct</u>
	No	Yes	
No	0	21	0.0%
Yes	0	18	100.0%
Overall	0.0%	100.0%	46.2%

The final tree-model thus identified two relevant risk factors (FES item and FES item 49) that best-differentiated children with problematic school absenteeism (greater than or equal to 10% of full school days missed) from those with nonproblematic school absenteeism (less than 10% of full school days missed). Three subgroups of children, each with varying risk for problematic school absenteeism, emerged. Children who endorsed True on ComparedToEachother were identified as the highest risk subgroup for problematic absenteeism (75.0%; Node 1). The IF-THEN Rules regarding a child’s probability for exhibiting problematic school absenteeism based on the final tree-model are in Table 14b.

Table 14b

*IF-THEN Rules for the Probability of Children Exhibiting Problematic School Absenteeism*

*Defined as  $\geq 10\%$  of Full School Days Missed for FES Items by Risk Probability*

	<u>IF</u>	<u>THEN</u>
Node 1	Endorsed True on ComparedToEachother	75.0% probability
Node 4	Endorsed False on ComparedToEachother and False on ChangeMindsOften	55.6% probability
Node 3	Endorsed False on ComparedToEachother and True on ChangeMindsOften	15.4% probability

***Adolescents: Ten Percent Cutoff.*** CART was utilized to identify the most relevant risk factors for youth defined as adolescents (i.e., between the ages of 12 and 18-years old) with problematic absenteeism defined as  $\geq 10\%$  of full school days missed (i.e., equal to or greater than 18 full school days missed). Prior probabilities were calculated from the data for problematic school absenteeism defined as  $\geq 10\%$  of full school days missed. Adjustments were made to the misclassification costs based on custom misclassification costs (i.e., “Yes” = 2.00, “No” = 1.00). The final tree-model identified three relevant risk factors that best-differentiated adolescents with problematic school absenteeism (equal to or greater than 10% of full school days missed) from those with nonproblematic absenteeism (less than 10% of full school days missed): (1) FES item 56 “Someone in our family plays a musical instrument” (PlayInstrument), (2) FES item 76 “Watching T.V. is more important than reading in our family” (WatchingTV>Reading), and (3) FES item 90 “You can’ get away with much in our family” (Don’tGetAwayWithMuch; Figure 12). The final tree-model correctly identified 82.8% of all participants in the sample (i.e., those with problematic versus nonproblematic school absenteeism). The tree-model classified 100.0% (n = 101) of adolescents with problematic school absenteeism correctly (Table 15a). The tree-model thus demonstrated higher sensitivity (i.e., true positive rate) of adolescents with problematic school absenteeism classified correctly than specificity (i.e., true negative rate; 0.0%; n = 0). The cross-validated risk estimate of the overall tree-model was good (r = .172, SE = .034). The tree-model’s accuracy in predicting whether an adolescent outside this sample will exhibit problematic school absenteeism was approximately 82.8%.

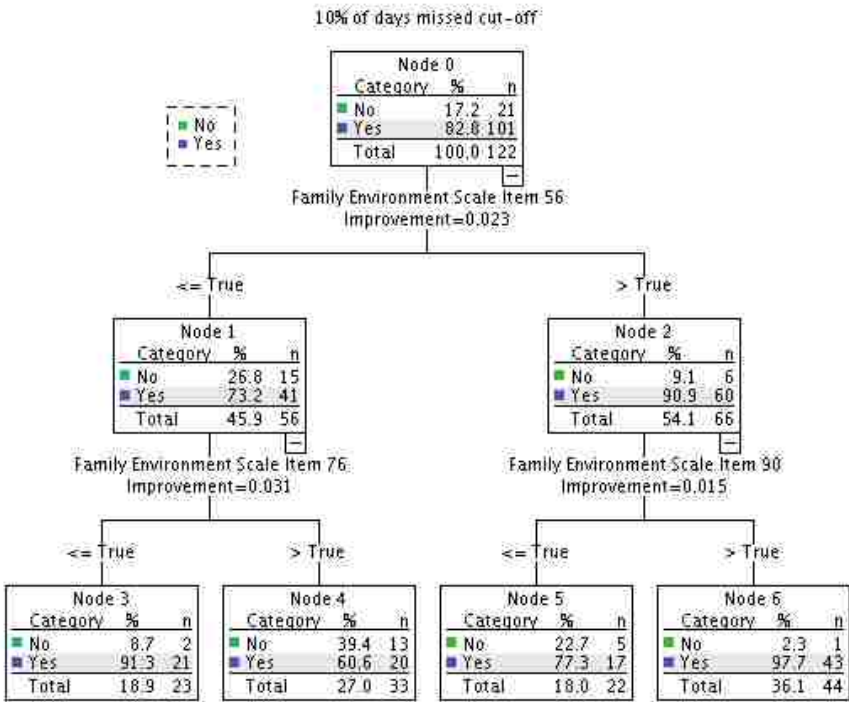


Figure 12. Classification tree of risk factors for adolescents with problematic school absenteeism defined as  $\geq 10\%$  of full school days missed for FES items.

Table 15a

*Classification Table for the Final Model of Adolescents with Problematic School Absenteeism*

*Defined as  $\geq 10\%$  of Full School Days Missed for FES Items*

<u>Problematic school absenteeism</u>	<u>Predicted</u>		<u>Percent correct</u>
	No	Yes	
No	0	21	0.0%
Yes	0	101	100.0%
Overall	0.0%	100.0%	82.8%

The final tree-model thus identified three relevant risk factors (FES item 56, FES item 76, and FES item 90) that best-differentiated adolescents with problematic school absenteeism (greater than or equal to 10% of full school days missed) from those with nonproblematic school absenteeism (less than 10% of full school days missed). Four subgroups of adolescents, each with varying risk for problematic school absenteeism, emerged. Adolescents who endorsed False on PlayInstrument and False on Don'tGetAwayWithMuch were identified as the highest risk subgroup for problematic absenteeism (97.7%; Node 6). The IF-THEN Rules regarding an adolescent's probability for exhibiting problematic school absenteeism based on the final tree-model are in Table 15b.

Table 15b

*IF-THEN Rules for the Probability of Adolescents Exhibiting Problematic School Absenteeism*

*Defined as  $\geq 10\%$  of Full School Days Missed for FES Items by Risk Probability*

	<u>IF</u>	<u>THEN</u>
Node 6	Endorsed False on PlayInstrument and False on Don'tGetAwayWithMuch	97.7% probability
Node 3	Endorsed True on PlayInstrument and True on WatchingTV>Reading	91.3% probability

Node 5	Endorsed False on PlayInstrument and True on Don'tGetAwayWithMuch	77.3% probability
Node 4	Endorsed True on PlayInstrument and False on WatchingTV>Reading	60.6% probability

**Summary of Post Hoc Analyses: FES Item Models.**

*Less Than One Percent Cutoff.* CART was utilized to identify the most relevant risk factors for youth with nonproblematic absenteeism defined as less than 1% of full school days missed (i.e., less than 1.8 full school days missed). Eight relevant risk factors were identified that best-differentiated youth with nonproblematic school absenteeism (less than 1% of full school days missed) from those with problematic school absenteeism (equal to or greater than 1% of full school days missed; Table 16). Youth’s endorsement (i.e., True) or denial (i.e., False) of a particular item was linked to their level of risk for nonproblematic school absenteeism (Table 16). Youth who endorsed False on ReligiousTalk, True on LittlePrivacy, False on HardToFindThings, and True on BelieveInCompetition (83.3%; Node 15) were identified as the highest risk subgroup for nonproblematic school absenteeism.

Table 16

*Level of Risk for Exhibiting Nonproblematic School Absenteeism Defined as < 1% of Full School Days Missed by FES Item Response*

Item	Subscale	Response Predictive of Higher Risk
FES item 28 “We often talk about the religious meaning of Christmas, Passover, or other holidays”	Moral-Religious Emphasis	False
FES item 59 “Family members make sure their rooms are neat”	Organization	False
FES item 44 “There is very little privacy in our family”	Independence	True

FES item 15 “Getting ahead in life is very important in our family”	Achievement Orientation	False
FES item 9 “Activities in our family are pretty carefully planned”	Organization	False
FES item 29 “It’s often hard to find things when you need them in our household”	Organization	False
FES item 13 “Family members rarely become openly angry”	Conflict	False
FES item 35 “We believe in competition and “may the best man win”	Achievement Orientation	True

**Three Percent Cutoff.** CART was utilized to identify the most relevant risk factors for youth with problematic absenteeism defined as  $\geq 3\%$  of full school days missed (i.e., equal to or greater than 5.4 full school days missed). Ten relevant risk factors were identified that best-differentiated youth with problematic school absenteeism (equal to or greater than 3% of full school days missed) from those with nonproblematic school absenteeism (less than 3% of full school days missed; Table 17). Youth’s endorsement (i.e., True) or denial (i.e., False) of a particular item was linked to their level of risk for problematic school absenteeism (Table 17). Four subgroups of youth were identified as the highest risk subgroup (i.e., 100.0%) for problematic school absenteeism, (1) youth who endorsed False on SalaryNotImportant and True on TogethernessFeeling (Node 5); (2) youth who endorsed False on SalaryNotImportant, False on TogethernessFeeling, and True on DishesDoneImmediately (Node 11); (3) youth who endorsed True on SalaryNotImportant, True on KeepFeelingsToSelf, True on ImportantBeBest, and False on HitEachother (Node 14); and (4) youth who Endorsed True on SalaryNotImportant, False on KeepFeelingsToSelf, True on LikeMusicArtLit, False on IndependenceEncouraged, and True on InflexibleRules (Node 19).

Table 17

*Level of Risk for Exhibiting Problematic School Absenteeism Defined as  $\geq 3\%$  of Full School*

*Days Missed by FES Item Response*

Item	Subscale	Response Predictive of Higher Risk
FES item 25 “How much money a person makes is not very important to us”	Achievement Orientation	False
FES item 2 “Family members often keep their feelings to themselves”	Expressiveness	True
FES item 31 “There is a feeling of togetherness in our family”	Cohesion	True
FES item 5 “We feel it is important to be best at whatever you do”	Achievement Orientation	True
FES item 86 “Family members really like music, art and literature”	Intellectual-Cultural Orientation	True
FES item 89 “Dishes are usually done immediately after eating”	Organization	True
FES item 53 “Family members sometimes hit each other”	Conflict	False
FES item 14 “In our family, we are strongly encouraged to be independent”	Independence	True
FES item 90 “You can’t get away with much in our family”	Control	False
FES item 80 “Rules are pretty inflexible in our household”	Control	True

**Five Percent Cutoff.** CART was utilized to identify the most relevant risk factors for youth with problematic absenteeism defined as  $\geq 5\%$  of full school days missed (i.e., equal to or greater than nine full school days missed). Ten relevant risk factors were identified that best-differentiated youth with problematic school absenteeism (equal to or greater than 5% of full school days missed) from those with nonproblematic school absenteeism (less than 5% of full school days missed; Table 18). Youth’s endorsement (i.e., True) or denial (i.e., False) of a



particular item was linked to their level of risk for problematic school absenteeism (Table 18).

Three subgroups of youth were identified as the highest risk subgroup (i.e., 100.0%) for problematic school absenteeism, (1) youth who endorsed True on GoOutALot, False on PlayInstrument, and True on BackEachotherUp (Node 9); (2) youth who endorsed False on GoOutALot, True on HurtOthersByBeingYourself, True on StriveLittleBetter, and False on ComeAndGoFreely (Node 16); and (3) youth who endorsed False on GoOutALot, False on HurtOthersByBeingYourself, False on DontComeDinner, True on Item 16, and False on HardToFindThings (Node 20).

Table 18

*Level of Risk for Exhibiting Problematic School Absenteeism Defined as  $\geq 5\%$  of Full School*

*Days Missed by FES Item Response*

Item	Subscale	Response Predictive of Higher Risk
FES item 77 “Family members go out a lot”	Active-Recreational Orientation	True
FES item 56 “Someone in our family plays a musical instrument”	Intellectual-Cultural Orientation	False
FES item 74 “It’s hard to be by yourself without hurting someone’s feelings in our household”	Independence	True
FES item 27 “Nobody in our family is active in sports, Little League, bowling, etc.”	Active-Recreational Orientation	True
FES item 51 “Family members really back each other up”	Cohesion	True
FES item 45 “We always strive to do things just a little better the next time”	Achievement Orientation	True

FES item 17 “Friends often come over for dinner or to visit”	Active-Recreational Orientation	False
FES item 34 “We come and go as we want to in our family”	Independence	False
FES item 16 “We rarely go to lectures, plays or concerts”	Intellectual-Cultural Orientation	True
FES item 29 “It’s often hard to find things when you need them in our household”	Organization	False

**Males: Ten Percent Cutoff.** CART was utilized to identify the most relevant risk factors for male youth with problematic absenteeism defined as  $\geq 10\%$  of full school days missed (i.e., equal to or greater than 18 full school days missed). Five relevant risk factors were identified that best-differentiated male youth with problematic school absenteeism (equal to or greater than 10% of full school days missed) from those with nonproblematic school absenteeism (less than 10% of full school days missed; Table 19). Male youth’s endorsement (i.e., True) or denial (i.e., False) of a particular item was linked to their level of risk for problematic school absenteeism (Table 19). Male youth who endorsed False on KeepFeelingsToSelf, False on DontSayPrayers, False on OneUpEachother, and False on ChangeMindsOften were identified as the highest risk subgroup for problematic school absenteeism (100.0%; Node 10).

Table 19

*Level of Risk for Males Exhibiting Problematic School Absenteeism Defined as  $\geq 10\%$  of Full*

*School Days Missed by FES Item Response*

Item	Subscale	Response Predictive of Higher Risk
FES item 2 “Family members often keep their feelings to themselves”	Expressiveness	True

FES item 18 “We don’t say prayers in our family”	Moral-Religious Orientation	False
FES item 27 “Nobody in our family is active in sports, Little League, bowling, etc.”	Active-Recreational Orientation	True
FES item 73 “Family members often try to one-up or out-do each other”	Conflict	False
FES item 49 “People change their minds often in our family”	Organization	False

**Females: Ten Percent Cutoff.** CART was utilized to identify the most relevant risk factors for female youth with problematic absenteeism defined as  $\geq 10\%$  of full school days missed (i.e., equal to or greater than 18 full school days missed). Four relevant risk factors were identified that best-differentiated female youth with problematic school absenteeism (equal to or greater than 10% of full school days missed) from those with nonproblematic school absenteeism (less than 10% of full school days missed; Table 20). Female youth’s endorsement (i.e., True) or denial (i.e., False) of a particular item was linked to their level of risk for problematic school absenteeism (Table 20). Two subgroups of female youth were identified as the highest risk (i.e., 100.0%) for problematic absenteeism, (1) youth who endorsed False on PlayInstrument and False on ChangeMindsOften (Node 6), and (2) youth who endorsed True on PlayInstrument, False on KeepFeelingsToSelf, and True on NotInvolvedInRecreational (Node 7).

Table 20

*Level of Risk for Females Exhibiting Problematic School Absenteeism Defined as  $\geq 10\%$  of Full School Days Missed by FES Item Response*

Item	Subscale	Response Predictive of Higher Risk
FES item 56 “Someone in our family plays a musical instrument”	Intellectual-Cultural Orientation	False

FES item 4 “We don’t do things on our own very often in our family”	Independence	False
FES item 49 “People change their minds often in our family”	Organization	False
FES item 57 “Family members are not very involved in recreational activities outside work and school”	Active-Recreational Orientation	True

**Children: Ten Percent Cutoff.** CART was utilized to identify the most relevant risk factors for youth defined as children (i.e., between the ages of 5 and 11-years old) with problematic absenteeism defined as  $\geq 10\%$  of full school days missed (i.e., equal to or greater than 18 full school days missed). Two relevant risk factors were identified that best-differentiated children with problematic school absenteeism (equal to or greater than 10% of full school days missed) from those with nonproblematic school absenteeism (less than 10% of full school days missed; Table 21). Children’s endorsement (i.e., True) or denial (i.e., False) of a particular item was linked to their level of risk for problematic school absenteeism (Table 21). Children who endorsed True on ComparedToEachother were identified as the highest risk subgroup for problematic absenteeism (75.0%; Node 1).

Table 21

*Level of Risk for Children Exhibiting Problematic School Absenteeism Defined as  $\geq 10\%$  of Full*

*School Days Missed by FES Item Response*

Item	Subscale	Response Predictive of Higher Risk
FES item 85 “Family members are often compared with others as to how well they are doing at work or school”	Achievement Orientation	True
FES item 49 “People change their minds often in our family”	Organization	False

***Adolescents: Ten Percent Cutoff.*** CART was utilized to identify the most relevant risk factors for youth defined as adolescents (i.e., between the ages of 12 and 18-years old) with problematic absenteeism defined as  $\geq 10\%$  of full school days missed (i.e., equal to or greater than 18 full school days missed). Three relevant risk factors were identified that best-differentiated adolescents with problematic school absenteeism (equal to or greater than 10% of full school days missed) from those with nonproblematic school absenteeism (less than 10% of full school days missed; Table 22). Adolescent’s endorsement (i.e., True) or denial (i.e., False) of a particular item was linked to their level of risk for problematic school absenteeism (Table 22). Adolescents who endorsed False on PlayInstrument and False on Don’tGetAwayWithMuch were identified as the highest risk subgroup for problematic absenteeism (97.7%; Node 6).

Table 22

*Level of Risk for Adolescents Exhibiting Problematic School Absenteeism Defined as  $\geq 10\%$  of Full School Days Missed by FES Item Response*

Item	Subscale	Response Predictive of Higher Risk
FES item 56 “Someone in our family plays a musical instrument”	Intellectual-Cultural Orientation	False
FES item 76 “Watching T.V. is more important than reading in our family”	Intellectual-Cultural Orientation	True
FES item 90 “You can’t get away with much in our family”	Control	False

**Post Hoc Analyses: FES Subscale Models**

Due to the exploratory nature of CART, additional post-hoc analyses were conducted. Subscale scores were utilized at the 10% of full school days missed cutoff scores. This

distinction was used to compare the most relevant risk factors between the subscale and item models.

**Ten Percent Cutoff.** Prior probabilities were calculated from the data for problematic school absenteeism defined as 10% of full school days missed. No adjustments were made to the misclassification costs; therefore equal costs were used. The final tree-model identified four relevant risk factors that best-differentiated youth with problematic school absenteeism (equal to or greater than 10% of full school days missed) from youth with nonproblematic school absenteeism (less than 10% of full school days missed): (1) FES Intellectual-Cultural Orientation Score, (2) FES Conflict Score, (3) FES Control Score, and (4) FES Active-Recreation Orientation Score (Figure 13). The final tree-model correctly identified 82.2% of all participants in the sample (i.e., those with problematic versus nonproblematic school absenteeism). The tree-model classified 96.9% ( $n = 219$ ) of youth with problematic school absenteeism correctly (Table 23a). The tree-model thus demonstrated higher sensitivity (i.e., true positive rate) than specificity (i.e., true negative rate; 36.1% ( $n = 26$ ) of youth with problematic school absenteeism classified correctly). The risk estimate of the overall tree-model was good ( $r = .178$ ,  $SE = .022$ ). The tree-model's accuracy in predicting whether a youth outside this sample will exhibit problematic school absenteeism was approximately 82.2%.

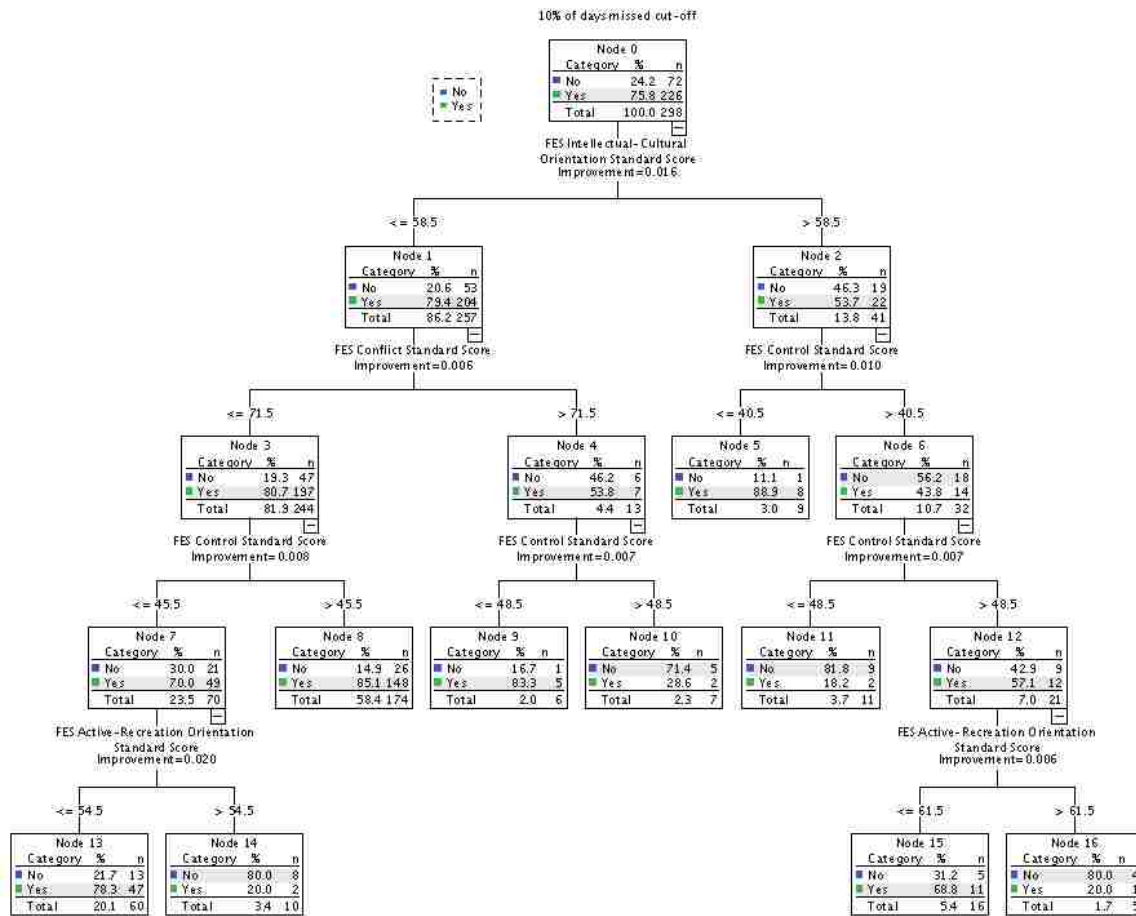


Figure 13. Classification tree of risk factors for problematic school absenteeism defined as  $\geq$  10% of full school days missed for FES Subscales

Table 23a

*Classification Table for the Final Model of Problematic School Absenteeism Defined as  $\geq 10\%$  of Full School Days Missed for FES Subscales*

<u>Problematic school absenteeism</u>	<u>Predicted</u>		<u>Percent correct</u>
	No	Yes	
No	26	46	36.1%
Yes	7	219	96.9%
Overall	11.1%	88.9%	82.2%

The final tree-model thus identified three relevant risk factors (FES Intellectual-Cultural Orientation Score, FES Conflict Score, FES Control Score, and FES Active-Recreation Orientation Score) that best-differentiated youth with problematic school absenteeism (equal to or greater than 10% of full school days missed) from those with nonproblematic school absenteeism (less than 10% of full school days missed). Nine subgroups of youth, each with varying risk for problematic school absenteeism, emerged. Youth who endorsed an FES Intellectual-Cultural Orientation Score of greater than 58.5 and an FES Control Score of less than or equal to 40.5 were identified as the highest risk subgroup for problematic school absenteeism (88.9%; Node 5). The IF-THEN Rules regarding a youth’s probability for exhibiting problematic school absenteeism based on the final tree-model are in Table 23b.

Table 23b

*IF-THEN Rules for the Probability of Exhibiting Problematic School Absenteeism Defined as  $\geq 10\%$  of Full School Days Missed for FES Subscales by Risk Probability*

	<u>IF</u>	<u>THEN</u>
Node 5	Endorsed an FES Intellectual-Cultural Orientation Score of greater than 58.5 AND an FES Control Score of less than or equal to 40.5	88.9% probability



Node 8	Endorsed an FES Intellectual-Cultural Orientation Score of less than or equal to 58.5 AND an FES Conflict Score of less than or equal to 71.5 AND an FES Control Score of greater than 45.5	85.1% probability
Node 9	Endorsed an FES Intellectual-Cultural Orientation Score of less than or equal to 58.5 AND an FES Conflict Score of greater than 71.5 AND FES Control Score of less than or equal to 48.5	83.3% probability
Node 13	Endorsed an FES Intellectual-Cultural Orientation Score of less than or equal to 58.5 AND an FES Conflict Score of less than or equal to 71.5 AND an FES Control Score of less than or equal to 45.5 AND an FES Active-Recreation Orientation Score of less than or equal to 54.5	78.3% probability
Node 15	Endorsed an FES Intellectual-Cultural Orientation Score of greater than 58.5 AND an FES Control Score of greater than 40.5 AND an FES Control Score of greater than 48.5 AND an FES Active-Orientation Score of less than or equal to 61.5	68.8% probability
Node 10	Endorsed an FES Intellectual-Cultural Orientation Score of less than or equal to 58.5 AND an FES Conflict Score of greater than 71.5 AND FES Control Score of greater than 48.5	28.6% probability
Node 14	Endorsed an FES Intellectual-Cultural Orientation Score of less than or equal to 58.5 AND an FES Conflict Score of less than or equal to 71.5 AND an FES Control Score of less than or equal to 45.5 AND an FES Active-Recreation Orientation Score of greater than 54.5	20.0% probability
Node 16	Endorsed an FES Intellectual-Cultural Orientation Score of greater than 58.5 AND an FES Control Score of greater than 40.5 AND an FES Control Score of greater than 48.5 AND an FES Active-Orientation Score of greater than 61.5	20.0% probability

Node 11	Endorsed an FES Intellectual-Cultural Orientation Score of greater than 58.5 AND an FES Control Score of greater than 40.5 AND an FES Control Score of less than or equal to 48.5	18.2% probability
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### RCADS Item Models

Hypothesis two of the current study was that splits on the RCADS items addressing generalized anxiety were expected to produce the greatest impurity reduction of the RCADS variables in the model, while major depression items were expected to produce the second greatest impurity reduction. Hypothesis two utilized both the 1% (i.e., hypothesis 2a) and 10% (i.e., hypothesis 2b) of full school days missed cutoffs.

**Hypothesis 2: RCADS Item Models.** Hypothesis 2 utilized CART procedures to identify the most relevant youth psychopathology risk factors for problematic absenteeism, defined as equal to or greater than 1% (i.e., hypothesis 2a) or 10% (i.e., hypothesis 2b) of full school days missed (Egger et. al., 2003; Department of Education, 2016). Youth psychopathology risk factors included all of the RCADS item scores. As expected, there was an unequal distribution of group membership in the different cutoff scores with more youth meeting the 1% cutoff than the 10% cutoff. Specifically, the base rates of youth with problematic absenteeism defined as equal to or greater than 1% of days missed was 92.3% ( $n = 347$ ) while the base rates of youth with problematic absenteeism defined as 10% of days missed was 75.9% ( $n = 287$ ). Prior probabilities were calculated from the data for problematic school absenteeism. Adjustments were made to the misclassification costs in some models to improve the individual model's predictive validity.

**Hypothesis 2a: One Percent Cutoff.** Prior probabilities were calculated from the data for problematic school absenteeism defined as equal to or greater than 1% of full school days

missed. Adjustments were made to the misclassification costs based on custom misclassification costs (i.e., “Yes” = 2.00, “No” = 1.00). The final tree-model identified two relevant risk factors that best-differentiated youth with problematic school absenteeism (equal to or greater than 1% of full school days missed) from youth with nonproblematic school absenteeism (less than 1% of full school days missed): (1) RCADS item 6 “Nothing is much fun anymore” (NothingFunAnymore), and (2) RCADS item 46 “I would feel scared if I had to stay away from home overnight.” (ScaredAwayFromHomeOvernight; Figure 14). The final tree-model correctly identified 95.7% of all participants in the sample (i.e., those with problematic versus nonproblematic school absenteeism). The tree-model classified 100.0% (n = 132) of youth with problematic school absenteeism correctly (Table 24a). The tree-model thus demonstrated higher sensitivity (i.e., true positive rate) than specificity (i.e., true negative rate) 0.0% (n = 0) of youth with problematic school absenteeism classified correctly. The cross-validated risk estimate of the overall tree-model was good ( $r = .043$ ,  $SE = .017$ ). The tree-model’s accuracy in predicting whether a youth outside this sample will exhibit problematic school absenteeism was approximately 95.7%.

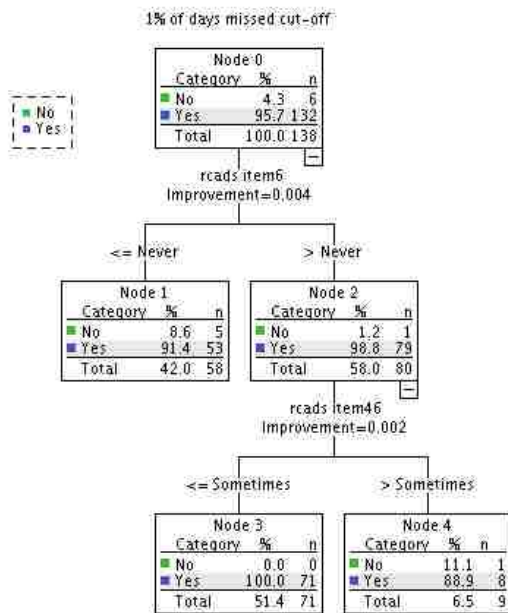


Figure 14. Classification tree of risk factors for problematic school absenteeism defined as  $\geq 1\%$  of full school days missed for RCADS Items

Table 24a

*Classification Table for the Final Model of Problematic School Absenteeism Defined as  $\geq 1\%$  of Full School Days Missed for RCADS items*

<u>Problematic school absenteeism</u>	<u>Predicted</u>		<u>Percent correct</u>
	No	Yes	
No	0	6	0.0%
Yes	0	132	100.0%
Overall	0.0%	100.0%	95.75%

*Relevant Risk Factors.* Three subgroups associated with varying risk for problematic school absenteeism emerged. RCADS item 6 (NothingFunAnymore) was the most relevant risk factor for differentiating youth with problematic school absenteeism from youth with nonproblematic school absenteeism (Gini improvement = .004). NothingFunAnymore split such that youth who endorsed Never on NothingFunAnymore exhibited a 91.4% (n = 53) risk for problematic school absenteeism (Node 1; Terminal). Conversely, youth who endorsed Sometimes, Often, and Always on NothingFunAnymore were at a higher risk for exhibiting problematic school absenteeism (98.8%; n = 79; Node 2). For those in Node 2, RCADS item 46 (ScaredAwayFromHomeOvernight) was the next most relevant risk factor identified (Gini improvement = .002). Youth who endorsed Never or Sometimes on ScaredAwayFromHomeOvernight were at a higher risk for exhibiting problematic school absenteeism (100.0%; n = 71; Node 3; Terminal) compared to those who endorsed Often or Always on ScaredAwayFromHomeOvernight (88.9%; n = 8; Node 4; Terminal).

The final tree-model thus identified two relevant risk factors (RCADS item 6 and RCADS item 46) that best-differentiated youth with problematic school absenteeism (equal to or greater than 1% of full school days missed) from those with nonproblematic school absenteeism

(less than 1% of full school days missed). Three subgroups of youth, each with varying risk for problematic school absenteeism, emerged. Youth who endorsed Sometimes, Often or Always on NothingFunAnymore and Never or Sometimes on ScaredAwayFromHomeOvernight were identified as the highest risk subgroup for problematic school absenteeism (100.0% probability; Node 3). The IF-THEN Rules regarding a youth’s probability for exhibiting problematic school absenteeism based on the final tree-model are in Table 24b.

Table 24b

*IF-THEN Rules for the Probability of Exhibiting Problematic School Absenteeism Defined as  $\geq$  1% of Full School Days Missed for RCADS items by Risk Probability*

	IF	THEN
Node 3	Endorsed Sometimes, Often or Always on NothingFunAnymore and Never or Sometimes on ScaredAwayFromHomeOvernight	100.0% probability
Node 1	Endorsed Never on NothingFunAnymore	91.4% probability
Node 4	Sometimes, Often, or Always on NothingFunAnymore and Often or Always on ScaredAwayFromHomeOvernight	88.9% probability

**Hypothesis 2b: Ten Percent Cutoff.** Prior probabilities were calculated from the data for problematic school absenteeism defined as 10% of full school days missed. No adjustments were made to the misclassification costs; therefore equal costs were used. The final tree-model identified two relevant risk factors that best-differentiated youth with problematic school absenteeism (equal to or greater than 10% of full school days missed) from youth with nonproblematic school absenteeism (less than 10% of full school days missed): (1) RCADS item 17 “I feel scared if I have to sleep on my own” (ScaredSleepAlone), and (2) RCADS item 6 “Nothing is much fun anymore” (NothingFunAnymore; Figure 15). The final tree-model correctly identified 84.2% of % of all participants in the sample (i.e., those with problematic

versus nonproblematic school absenteeism). The tree-model classified 99.1% ( $n = 109$ ) of youth with problematic school absenteeism correctly (Table 25a). The tree-model thus demonstrated higher sensitivity (i.e., true positive rate) than specificity (i.e., true negative rate; 27.6% ( $n = 8$ ) of youth with problematic school absenteeism classified correctly). The risk estimate of the overall tree-model was good ( $r = .158$ ,  $SE = .031$ ). The tree-model's accuracy in predicting whether a youth outside this sample will exhibit problematic school absenteeism was approximately 84.2%.

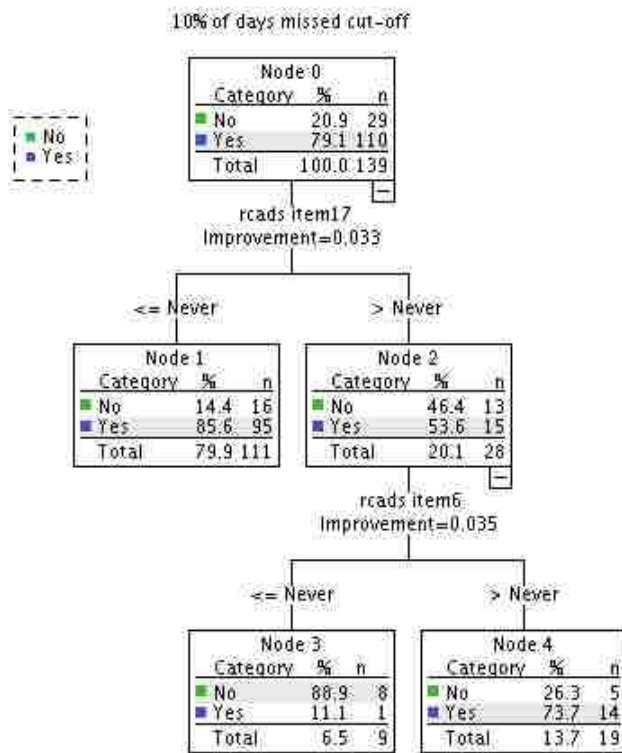


Figure 15. Classification tree of risk factors for problematic school absenteeism defined as  $\geq$  10% of full school days missed for *RCADS items*



Table 25a

*Classification Table for the Final Model of Problematic School Absenteeism Defined as  $\geq 10\%$  of Full School Days Missed for RCADS items*

<u>Problematic school absenteeism</u>	<u>Predicted</u>		<u>Percent correct</u>
	No	Yes	
No	8	21	27.6%
Yes	1	109	99.1%
Overall	6.5%	93.5%	84.2%

*Relevant Risk Factors.* Three subgroups associated with varying risk for problematic school absenteeism emerged. RCADS item 17 (ScaredSleepAlone) was the most relevant risk factor for differentiating youth with problematic school absenteeism from youth with nonproblematic school absenteeism (Gini improvement = .033). ScaredSleepAlone split such that youth who endorsed Never on ScaredSleepAlone exhibited an 85.6% (n = 95) risk for problematic school absenteeism (Node 1; Terminal). Conversely, youth who endorsed Sometimes, Often, or Always on ScaredSleepAlone were at a lower risk for exhibiting problematic school absenteeism (53.6%; n = 15; Node 2). RCADS item 6 (NothingFunAnymore) was the next most relevant risk factor identified (Gini improvement = .035). For youth in Node 2, those who endorsed Never on ScaredSleepAlone exhibited an 11.1% (n = 1) risk for problematic school absenteeism (Node 3; Terminal). However, youth who endorsed Sometimes, Often, or Always on NothingFunAnymore were more likely to exhibit problematic school absenteeism (73.7%; n = 14; Node 4; Terminal).

The final tree-model thus identified two relevant risk factors (RCADS item 17 and RCADS item 6) that best-differentiated youth with problematic school absenteeism (equal to or greater than 10% of full school days missed) from those with nonproblematic school absenteeism

(less than 10% of full school days missed). Three subgroups of youth, each with varying risk for problematic school absenteeism, emerged. Youth who endorsed Never on ScaredSleepAlone were identified as the highest risk subgroup for problematic school absenteeism (85.6%; Node 1). The IF-THEN Rules regarding a youth’s probability for exhibiting problematic school absenteeism based on the final tree-model are in Table 25b.

Table 25b

*IF-THEN Rules for the Probability of Exhibiting Problematic School Absenteeism Defined as  $\geq$  10% of Full School Days Missed for RCADS items by Risk Probability*

	IF	THEN
Node 1	Endorsed Never on ScaredSleepAlone	85.6% probability
Node 4	Endorsed Sometimes, Often, or Always on ScaredSleepAlone and Sometimes, Often, or Always on NothingFunAnymore	73.7% probability
Node 3	Endorsed Sometimes, Often, or Always on ScaredSleepAlone and Never on NothingFunAnymore	11.1% probability

**Summary of Original Tree-Models: RCADS.**

*Hypothesis 2a.* RCADS items addressing generalized anxiety and major depression were expected to emerge as the most relevant and second most relevant youth psychopathology risk factors for problematic school absenteeism, defined as equal to or greater than 1% of full days missed. The final tree-model partially supported this hypothesis. Two relevant risk factors were identified that best-differentiated youth with problematic school absenteeism (equal to or greater than 1% of full school days missed) from those with nonproblematic school absenteeism (less than 1% of full school days missed; Table 26). Youth’s level of endorsement (i.e., Never, Sometimes, Often, or Always) of a particular item was linked to their level of risk for problematic school absenteeism (Table 26). Youth who endorsed Sometimes, Often or Always

on NothingFunAnymore and Never or Sometimes on ScaredAwayFromHomeOvernight were identified as the highest risk subgroup for problematic school absenteeism (100.0% probability; Node 3).

Table 26

*Level of Risk for Exhibiting Problematic School Absenteeism Defined as  $\geq 1\%$  of Full School*

*Days Missed by RCADS Item Response*

Item	Subscale	Response Predictive of Higher Risk
RCADS item 6 “Nothing is much fun anymore”	Major Depression	Sometimes, Often, or Always
RCADS item 46 “I would feel scared if I had to stay away from home overnight”	Separation Anxiety	Never or Sometimes

**Hypothesis 2b.** RCADS items addressing generalized anxiety and major depression were expected to emerge as the most relevant and second most relevant youth psychopathology risk factors for problematic school absenteeism, defined as 10% of full days missed. The final tree-model partially supported this hypothesis. Two relevant risk factors were identified that best-differentiated youth with problematic school absenteeism (equal to or greater than 10% of full school days missed) from those with nonproblematic school absenteeism (less than 10% of full school days missed; Table 27). Youth’s level of endorsement (i.e., Never, Sometimes, Often, or Always) of a particular item was linked to their level of risk for problematic school absenteeism (Table 27). Youth who endorsed Never on ScaredSleepAlone were identified as the highest risk subgroup for problematic school absenteeism (85.6%; Node 1).

Table 27

*Level of Risk for Exhibiting Problematic School Absenteeism Defined as  $\geq 10\%$  of Full School*

*Days Missed by RCADS Item Response*

Item	Subscale	Response Predictive of Higher Risk
RCADS item 17 “I feel scared if I have to sleep on my own”,	Separation Anxiety	Never
RCADS item 6 “Nothing is much fun anymore”	Major Depression	Sometimes, Often, or Always

**Post Hoc Analyses: RCADS Item Models.** Due to the exploratory nature of CART, several post-hoc analyses were conducted. Two additional cutoff scores for problematic absenteeism (i.e., 3% and 5%) were utilized to identify different risk factors for youth who meet varying levels of problematic absenteeism. A cutoff score of less than 1% of full school days missed was also utilized to identify predictors for youth who display nonproblematic absenteeism. There was an unequal distribution of group membership in the different cutoff scores with the most youth meeting the 3% of full school days missed cutoff and the least meeting the less than 1% of full school days missed cutoff. The base rates of youth with nonproblematic absenteeism defined as less than 1% of full school days missed was 10.3% ( $n = 39$ ). The base rates of youth with problematic absenteeism defined as 3% of full school days missed was 84.4% ( $n = 319$ ). The base rates of youth with problematic absenteeism defined as 5% of full school days missed was 78% ( $n = 295$ ). The sample was also split by gender (i.e., male and female) and developmental (i.e., children and adolescent) distinctions at the 10% cutoff. There was an unequal distribution of group membership in the different groups. There were more males (215; 56.9%) in the sample, compared to females (161; 42.6%). The sample also had more adolescents (243; 64.3%), defined as between the ages of 12 and 18-years old, compared to children (131; 34.7%), defined as between the ages of 5 and 11-years old. Prior probabilities were calculated from the data for problematic school absenteeism. Adjustments

were made to the misclassification costs in some models to improve the individual model's predictive validity.

***Less Than One Percent Cutoff.*** CART was utilized to identify the most relevant risk factors for youth with nonproblematic absenteeism defined as less than 1% of full school days missed (i.e., less than 1.8 full school days missed). Final models were identified using either FES item or RCADS items scores. Prior probabilities were calculated from the data for nonproblematic school absenteeism defined as less than 1% of full school days missed. Adjustments were made to the misclassification costs based on custom misclassification costs (i.e., “Yes” = 2.00, “No” = 1.00). The final tree-model identified two relevant risk factors that best-differentiated youth with nonproblematic school absenteeism (less than 1% of full school days missed) from those with problematic absenteeism (greater than or equal to 1% of full school days missed): (1) RCADS item 6 “Nothing is much fun anymore” (NothingFunAnymore), and (2) RCADS item 46 “I would feel scared if I had to stay away from home overnight” (ScaredAwayFromHomeOvernight; Figure 16). The final tree-model correctly identified 92.8% of all participants in the sample (i.e., those with nonproblematic absenteeism versus problematic school absenteeism). The tree-model classified 0.0% (n = 0) of youth with nonproblematic school absenteeism correctly (Table 28a). The tree-model thus demonstrated higher specificity (i.e., true negative rate; 100.0%; n = 129) of youth without nonproblematic school absenteeism classified correctly than sensitivity (i.e., true positive rate). The cross-validated risk estimate of the overall tree-model was good (r = .144, SE = .044). The tree-model's accuracy in predicting whether a youth outside this sample will exhibit nonproblematic school absenteeism was approximately 92.8%.

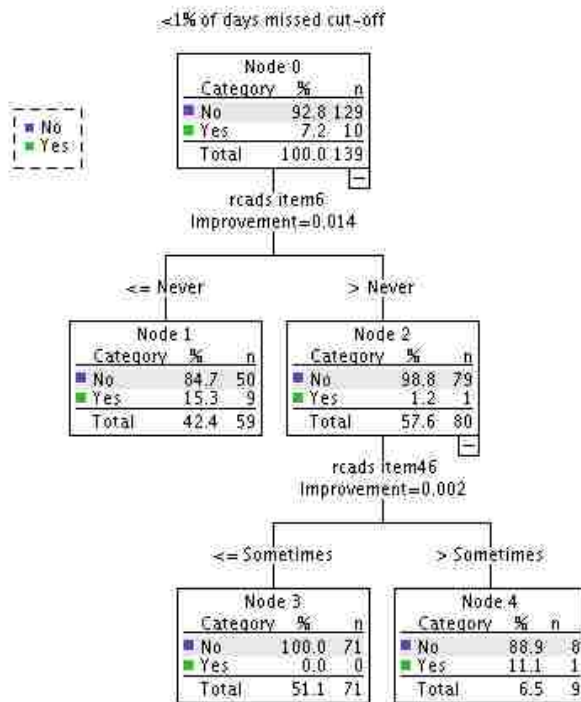


Figure 16. Classification tree of risk factors for nonproblematic school absenteeism defined as < 1% of full school days missed for RCADS items.

Table 28a

*Classification Table for the Final Model of Nonproblematic School Absenteeism Defined as <*

*1% of Full School Days Missed for RCADS Items*

<u>Nonproblematic school absenteeism</u>	<u>Predicted</u>		<u>Percent correct</u>
	No	Yes	
No	129	0	100.0%
Yes	10	0	0.0%
Overall	100.0%	0.0%	92.8%

The final tree-model thus identified two relevant risk factors (RCADS item 7 and RCADS item 45) that best-differentiated youth with nonproblematic school absenteeism (less than 1% of full school days missed) from those with problematic school absenteeism (equal to or greater than 1% of full school days missed). Three subgroups of youth, each with varying risk for nonproblematic school absenteeism, emerged. Youth who endorsed Never on NothingFunAnymore (15.3%; Node 1) were identified as the highest risk subgroup for nonproblematic school absenteeism. The IF-THEN Rules regarding a youth’s probability for exhibiting nonproblematic school absenteeism based on the final tree-model are in Table 28b.

Table 28b

*IF-THEN Rules for the Probability of Exhibiting Nonproblematic School Absenteeism Defined as*

*< 1% of Full School Days Missed for RCADS Items by Risk Probability*

	<u>IF</u>	<u>THEN</u>
Node 1	Endorsed Never on NothingFunAnymore	15.3% probability
Node 4	Endorsed Sometimes, Often, or Always on NothingFunAnymore and ENDORSED Often or Always on ScaredAwayFromHomeOvernight	11.1% probability

Node 3	Endorsed Sometimes, Often, or Always on NothingFunAnymore and ENDORSED Never or Sometimes on ScaredAwayFromHomeOvernight	0.0% probability
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**Three Percent Cutoff.** CART was utilized to identify the most relevant risk factors for youth with problematic absenteeism defined as  $\geq 3\%$  of full school days missed (i.e., equal to or greater than 5.4 full school days missed). Prior probabilities were calculated from the data for problematic school absenteeism defined as  $\geq 3\%$  of full school days missed. Adjustments were made to the misclassification costs based on custom misclassification costs (i.e., “Yes” = 2.00, “No” = 1.00). The final tree-model identified four relevant risk factors that best-differentiated youth with problematic school absenteeism (equal to or greater than 3% of full school days missed) from those with nonproblematic absenteeism (less than 3% of full school days missed): (1) RCADS item 6 “Nothing is much fun anymore” (NothingFunAnymore), (2) RCADS item 17 “I feel scared if I have to sleep on my own” (ScaredSleepAlone), (3) RCADS item 38 “I feel afraid if I have to talk in front of my class” (ScaredTalkInClass), and (4) RCADS item 46 “I would feel scared if I had to stay away from home overnight” (ScaredAwayFromHomeOvernight; Figure 17). The final tree-model correctly identified 92.1% of all participants in the sample (i.e., those with problematic versus nonproblematic school absenteeism). The tree-model classified 98.4% ( $n = 121$ ) of youth with problematic school absenteeism correctly (Table 29a). The tree-model thus demonstrated higher sensitivity (i.e., true positive rate) of youth with problematic school absenteeism classified correctly than specificity (i.e., true negative rate; 43.8%;  $n = 7$ ). The cross-validated risk estimate of the overall tree-model was good ( $r = .094$ ,  $SE = .029$ ). The tree-model’s accuracy in predicting whether a youth outside this sample will exhibit problematic school absenteeism was approximately 92.1%.



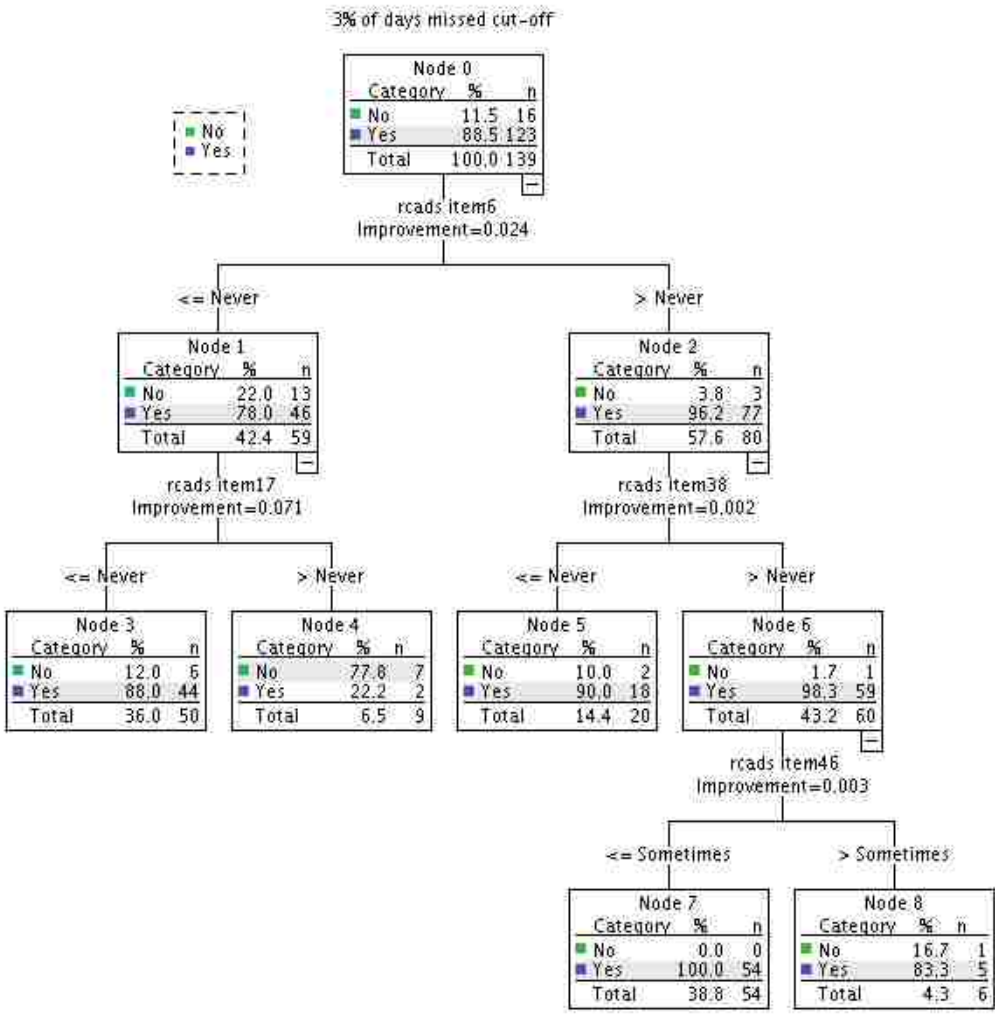


Figure 17. Classification tree of risk factors for problematic school absenteeism defined as  $\geq 3\%$  of full school days missed for RCADS items.

Table 29a

*Classification Table for the Final Model of Problematic School Absenteeism Defined as  $\geq 3\%$  of Full School Days Missed for RCADS Items*

<u>Problematic school absenteeism</u>	<u>Predicted</u>		<u>Percent correct</u>
	No	Yes	
No	7	9	43.8%
Yes	2	121	98.4%
Overall	6.5%	93.5%	92.1%

The final tree-model thus identified four relevant risk factors (RCADS item 6, RCADS item 17, RCADS item 38, and RCADS item 46) that best-differentiated youth with problematic school absenteeism (greater than or equal to 3% of full school days missed) from those with nonproblematic school absenteeism (less than 3% of full school days missed). Five subgroups of youth, each with varying risk for problematic school absenteeism, emerged. Youth who endorsed Sometimes, Often, or Always on NothingFunAnymore, Sometimes, Often, or Always on ScaredTalkInClass, and Never or Sometimes on ScaredAwayFromHomeOvernight were identified as the highest risk subgroup for problematic school absenteeism (100.0%; Node 7). The IF-THEN Rules regarding a youth’s probability for exhibiting problematic school absenteeism based on the final tree-model are in Table 29b.

Table 29b

*IF-THEN Rules for the Probability of Exhibiting Problematic School Absenteeism Defined as  $\geq 3\%$  of Full School Days Missed for RCADS Items by Risk Probability*

	IF	THEN
Node 7	Endorsed Sometimes, Often, or Always on NothingFunAnymore, Sometimes, Often, or Always on ScaredTalkInClass, and	100.0% probability

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	Never or Sometimes on ScaredAwayFromHomeOvernight	
Node 5	Endorsed Sometimes, Often, or Always on NothingFunAnymore and Never on ScaredTalkInClass	90.0% probability
Node 3	Endorsed Never on NothingFunAnymore and Never on ScaredSleepAlone	88.0% probability
Node 8	Endorsed Sometimes, Often, or Always on NothingFunAnymore, Sometimes, Often, or Always on ScaredTalkInClass, and Often or Always on ScaredAwayFromHomeOvernight	83.3% probability
Node 4	Endorsed Never on NothingFunAnymore and Sometimes, Often, or Always on ScaredSleepAlone	22.2% probability

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**Five Percent Cutoff.** CART was utilized to identify the most relevant risk factors for youth with problematic absenteeism defined as  $\geq 5\%$  of full school days missed (i.e., equal to or greater than nine full school days missed). Prior probabilities were calculated from the data for problematic school absenteeism defined as  $\geq 5\%$  of full school days missed. Adjustments were made to the misclassification costs based on custom misclassification costs (i.e., “Yes” = 2.00, “No” = 1.00). The final tree-model identified four relevant risk factors that best-differentiated youth with problematic school absenteeism (equal to or greater than 5% of full school days missed) from those with nonproblematic absenteeism (less than 5% of full school days missed): (1) RCADS item 17 “I feel scared if I have to sleep on my own” (ScaredSleepAlone), (2) RCADS item 24 “When I have a problem, my heart beats really fast” (HeartBeatsDuringProblems), (3) RCADS item 6 “Nothing is much fun anymore” (NothingFunAnymore), and (4) RCADS item 31 “I have to think of special thoughts (like numbers or words) to stop bad things from happening” (SpecialThoughtsStopBadThings; Figure 18). The final tree-model correctly identified 84.9% of all participants in the sample (i.e., those

with problematic versus nonproblematic school absenteeism). The tree-model classified 99.1% (n = 110) of youth with problematic school absenteeism correctly (Table 30a). The tree-model thus demonstrated higher sensitivity (i.e., true positive rate) of youth with problematic school absenteeism classified correctly than specificity (i.e., true negative rate; 28.6%; n = 8). The cross-validated risk estimate of the overall tree-model was good ( $r = .201$ ,  $SE = .040$ ). The tree-model's accuracy in predicting whether a youth outside this sample will exhibit problematic school absenteeism was approximately 84.9%.

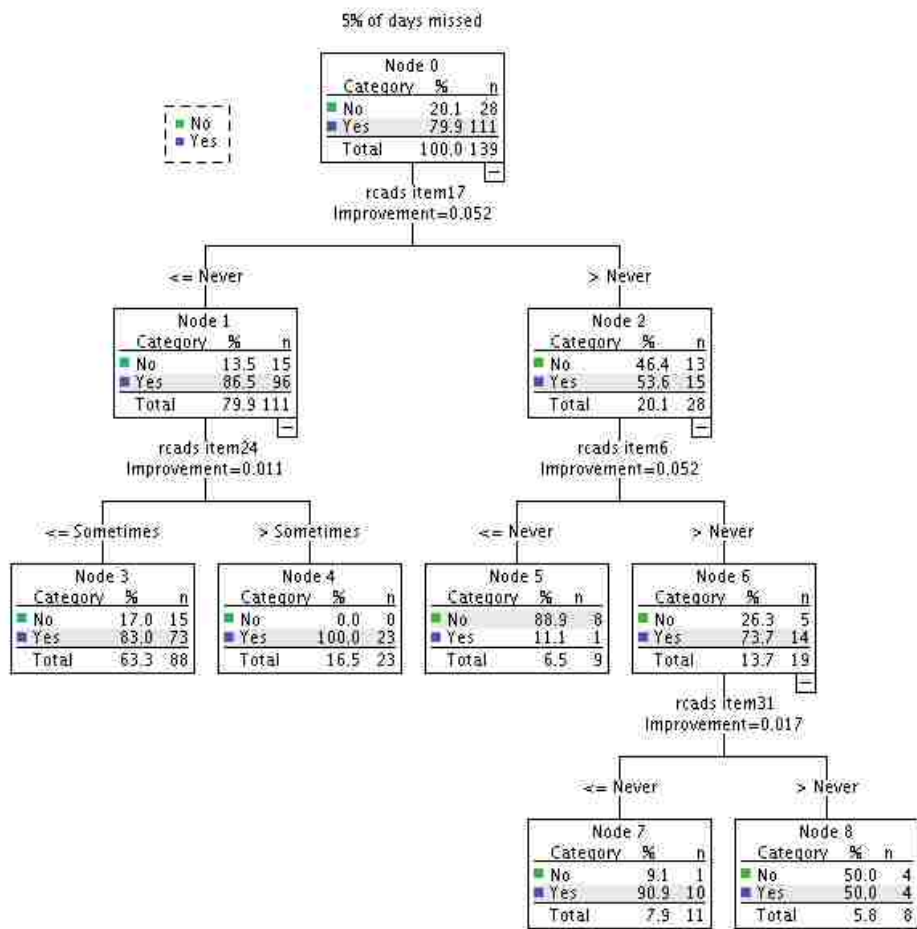


Figure 18. Classification tree of risk factors for problematic school absenteeism defined as  $\geq 5\%$  of full school days missed for RCADS items.

Table 30a

*Classification Table for the Final Model of Problematic School Absenteeism Defined as  $\geq$  5% of Full School Days Missed for RCADS Items*

<u>Problematic school absenteeism</u>	<u>Predicted</u>		<u>Percent correct</u>
	No	Yes	
No	8	20	28.6%
Yes	1	110	99.1%
Overall	6.5%	93.5%	84.9%

The final tree-model thus identified four relevant risk factors (RCADS item 17, RCADS item 24, RCADS item 6, and RCADS item 31) that best-differentiated youth with problematic school absenteeism (greater than or equal to 5% of full school days missed) from those with nonproblematic school absenteeism (less than 5% of full school days missed). Five subgroups of youth, each with varying risk for problematic school absenteeism, emerged. Youth who endorsed Never on ScaredSleepAlone and Often or Always on HeartBeatsDuringProblems were identified as the highest risk subgroup for problematic school absenteeism (100.0%; Node 4). The IF-THEN Rules regarding a youth’s probability for exhibiting problematic school absenteeism based on the final tree-model are in Table 30b.

Table 30b

*IF-THEN Rules for the Probability of Exhibiting Problematic School Absenteeism Defined as  $\geq$  5% of Full School Days Missed for RCADS Items by Risk Probability*

	<u>IF</u>	<u>THEN</u>
Node 4	Endorsed Never on ScaredSleepAlone and Often or Always on HeartBeatsDuringProblems	100.0% probability
Node 7	Endorsed Sometimes, Often, or Always on ScaredSleepAlone, Sometimes, Often, or	90.9% probability

	Always on NothingFunAnymore, and Never on SpecialThoughtsStopBadThings	
Node 3	Endorsed Never on ScaredSleepAlone and Never or Sometimes on HeartBeatsDuringProblems	83.0% probability
Node 8	Endorsed Sometimes, Often, or Always on ScaredSleepAlone, Sometimes, Often, or Always on NothingFunAnymore, and Sometimes, Often, or Always on SpecialThoughtsStopBadThings	50.0% probability
Node 5	Endorsed Sometimes, Often, or Always on ScaredSleepAlone and Never on NothingFunAnymore	11.1% probability

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**Males: Ten Percent Cutoff.** CART was utilized to identify the most relevant risk factors for male youth with problematic absenteeism defined as  $\geq 10\%$  of full school days missed (i.e., equal to or greater than 18 full school days missed). Prior probabilities were calculated from the data for problematic school absenteeism defined as  $\geq 10\%$  of full school days missed. Adjustments were made to the misclassification costs based on custom misclassification costs (i.e., “Yes” = 2.00, “No” = 1.00). The final tree-model identified five relevant risk factors that best-differentiated male youth with problematic school absenteeism (equal to or greater than 10% of full school days missed) from those with nonproblematic absenteeism (less than 10% of full school days missed): (1) RCADS item 12 “I worry that I will do badly at my school work” (WorryBadlyAtSchool), (2) RCADS item 17 “I feel scared if I have to sleep on my own” (ScaredSleepAlone), (3) RCADS item 30 “I worry about making mistakes” (WorryMakingMistakes), (4) RCADS item 8 “I feel worried when I think someone is angry with me” (WorriedWhenOthersAngry), and (5) RCADS item 9 “I worry about being away from my parents” (WorryAwayFromParents; Figure 19). The final tree-model correctly identified 81.8% of all participants in the sample (i.e., those with problematic versus nonproblematic school

absenteeism). The tree-model classified 98% ( $n = 50$ ) of male youth with problematic school absenteeism correctly (Table 31a). The tree-model thus demonstrated higher sensitivity (i.e., true positive rate) of male youth with problematic school absenteeism classified correctly than specificity (i.e., true negative rate; 26.7%;  $n = 4$ ). The cross-validated risk estimate of the overall tree-model was good ( $r = .227$ ,  $SE = .052$ ). The tree-model's accuracy in predicting whether a male youth outside this sample will exhibit problematic school absenteeism was approximately 81.8%.



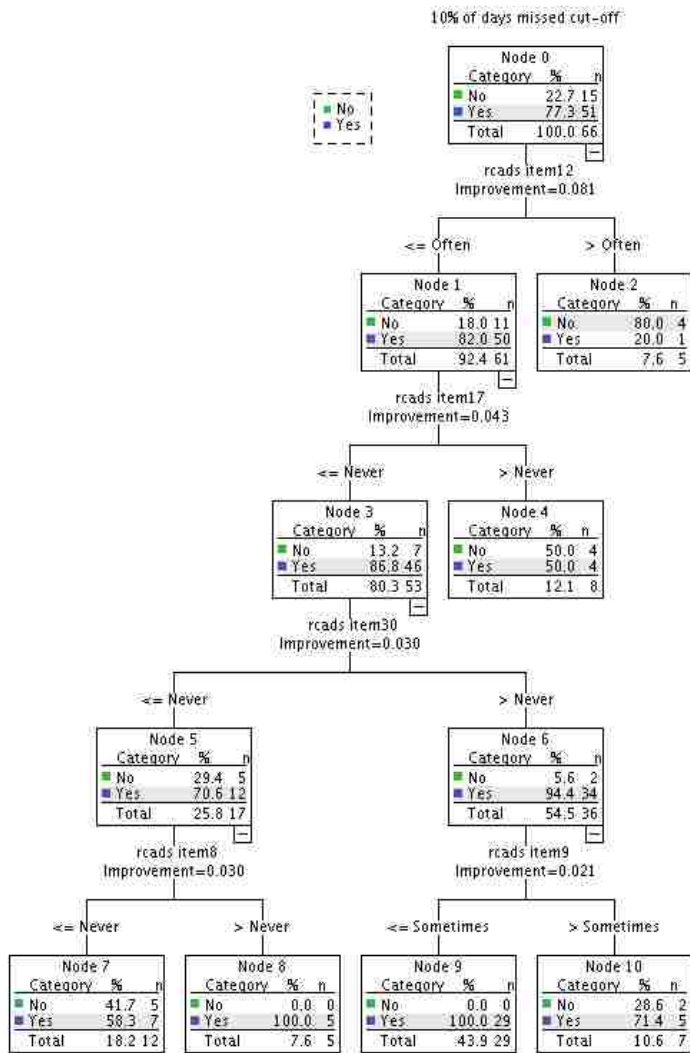


Figure 19. Classification tree of risk factors for males with problematic school absenteeism defined as  $\geq 10\%$  of full school days missed for RCADS items.

Table 31a

*Classification Table for the Final Model of Males with Problematic School Absenteeism Defined**as  $\geq$  10% of Full School Days Missed for RCADS Items*

<u>Problematic school absenteeism</u>	<u>Predicted</u>		<u>Percent correct</u>
	No	Yes	
No	4	11	26.7%
Yes	1	50	98%
Overall	7.6%	92.4%	81.8%

The final tree-model thus identified five relevant risk factors (RCADS item 12, RCADS item 17, RCADS item 30, RCADS item 8, and RCADS item 9) that best-differentiated male youth with problematic school absenteeism (greater than or equal to 10% of full school days missed) from those with nonproblematic school absenteeism (less than 10% of full school days missed). Six subgroups of male youth, each with varying risk for problematic school absenteeism, emerged. Two subgroups of male youth were identified as the highest risk for problematic school absenteeism, (1) male youth who endorsed Never, Sometimes, or Often on WorryBadlyAtSchool, Never on ScaredSleepAlone, Never on WorryMakingMistakes, and Sometimes, Often, or Always on WorriedWhenOthersAngry (Node 8; 100.0%), and (2) male youth who endorsed Never, Sometimes, or Often on WorryBadlyAtSchool, Never on ScaredSleepAlone, Sometimes, Often, or Always on WorryMakingMistakes, and Never or Sometimes on WorryAwayFromParents (Node 9; 100.0%). The IF-THEN Rules regarding a male youth's probability for exhibiting problematic school absenteeism based on the final tree-model are in Table 31b.

Table 31b

*IF-THEN Rules for the Probability of Males Exhibiting Problematic School Absenteeism Defined*

*as ≥ 10% of Full School Days Missed for RCADS Items by Risk Probability*

	IF	THEN
Node 8	Endorsed Never, Sometimes, or Often on WorryBadlyAtSchool, Never on ScaredSleepAlone, Never on WorryMakingMistakes, and Sometimes, Often, or Always on WorriedWhenOthersAngry	100.0% probability
Node 9	Endorsed Never, Sometimes, or Often on WorryBadlyAtSchool, Never on ScaredSleepAlone, Sometimes, Often, or Always on WorryMakingMistakes, and Never or Sometimes on WorryAwayFromParents	100.0% probability
Node 10	Endorsed Never, Sometimes, or Often on WorryBadlyAtSchool, Never on ScaredSleepAlone, Sometimes, Often, or Always on WorryMakingMistakes, and Often or Always on WorryAwayFromParents	71.4% probability
Node 7	Endorsed Never, Sometimes, or Often on WorryBadlyAtSchool, Never on ScaredSleepAlone, Never on WorryMakingMistakes, and Never on WorriedWhenOthersAngry	58.3% probability
Node 4	Endorsed Never, Sometimes, or Often on WorryBadlyAtSchool and Sometimes, Often, or Always on ScaredSleepAlone	50.0% probability
Node 2	Endorsed Always on WorryBadlyAtSchool	20.0% probability

***Females: Ten Percent Cutoff.*** CART was utilized to identify the most relevant risk factors for female youth with problematic absenteeism defined as  $\geq 10\%$  of full school days missed (i.e., equal to or greater than 18 full school days missed). Prior probabilities were calculated from the data for problematic school absenteeism defined as  $\geq 10\%$  of full school days missed. Adjustments were made to the misclassification costs based on custom misclassification

costs (i.e., “Yes” = 2.00, “No” = 1.00). The final tree-model identified one relevant risk factor that best-differentiated female youth with problematic school absenteeism (equal to or greater than 10% of full school days missed) from those with nonproblematic absenteeism (less than 10% of full school days missed): (1) RCADS item 38 “I feel afraid if I have to talk in front of my class” (ScaredTalkInClass; Figure 20). The final tree-model correctly identified 80.8% of all participants in the sample (i.e., those with problematic versus nonproblematic school absenteeism). The tree-model classified 100.0% (n = 59) of female youth with problematic school absenteeism correctly (Table 32a). The tree-model thus demonstrated higher sensitivity (i.e., true positive rate) of female youth with problematic school absenteeism classified correctly than specificity (i.e., true negative rate; 0.0%; n = 0). The cross-validated risk estimate of the overall tree-model was good (r = .192, SE = .046). The tree-model’s accuracy in predicting whether a female youth outside this sample will exhibit problematic school absenteeism was approximately 80.8%.

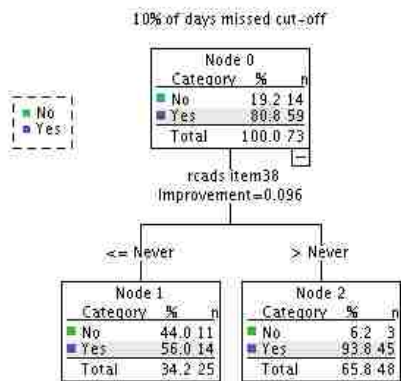


Figure 20. Classification tree of risk factors for females with problematic school absenteeism defined as  $\geq 10\%$  of full school days missed for RCADS items.

Table 32a

*Classification Table for the Final Model of Females with Problematic School Absenteeism*

*Defined as  $\geq 10\%$  of Full School Days Missed for RCADS Items*

<u>Problematic school absenteeism</u>	<u>Predicted</u>		<u>Percent correct</u>
	No	Yes	
No	0	14	0.0%
Yes	0	59	100.0%
Overall	0.0%	100.0%	80.8%

The final tree-model thus identified one relevant risk factor (RCADS item 38) that best-differentiated female youth with problematic school absenteeism (greater than or equal to 10% of full school days missed) from those with nonproblematic school absenteeism (less than 10% of full school days missed). Two subgroups of female youth, each with varying risk for problematic school absenteeism, emerged. Female youth who endorsed Sometimes, Often, or Always on ScaredTalkInClass were identified as the highest risk subgroup for problematic school absenteeism (Node 2; 93.8%). The IF-THEN Rules regarding a female youth’s probability for exhibiting problematic school absenteeism based on the final tree-model are in Table 32b.

Table 32b

*IF-THEN Rules for the Probability of Females Exhibiting Problematic School Absenteeism*

*Defined as  $\geq 10\%$  of Full School Days Missed for RCADS Items by Risk Probability*

	<u>IF</u>	<u>THEN</u>
Node 2	Endorsed Sometimes, Often, or Always on ScaredTalkInClass	93.8% probability
Node 1	Endorsed Never on ScaredTalkInClass	56% probability

**Children: Ten Percent Cutoff.** CART was utilized to identify the most relevant risk factors for youth defined as children (i.e., between the ages of 5 and 11-years old) with problematic absenteeism defined as  $\geq 10\%$  of full school days missed (i.e., equal to or greater than 18 full school days missed). Prior probabilities were calculated from the data for problematic school absenteeism defined as  $\geq 10\%$  of full school days missed. Adjustments were made to the misclassification costs based on custom misclassification costs (i.e., “Yes” = 1.00, “No” = 0.00). The final tree-model identified one relevant risk factor that best-differentiated children with problematic school absenteeism (equal to or greater than 10% of full school days missed) from those with nonproblematic absenteeism (less than 10% of full school days missed): (1) RCADS item 17 “I feel scared if I have to sleep on my own” (ScaredSleepAlone; Figure 21). The final tree-model correctly identified 56.5% of all participants in the sample (i.e., those with problematic versus nonproblematic school absenteeism). The tree-model classified 100.0% (n = 13) of children with problematic school absenteeism correctly (Table 33a). The tree-model thus demonstrated higher sensitivity (i.e., true positive rate) of children with problematic school absenteeism classified correctly than specificity (i.e., true negative rate; 0.0%; n = 0). The cross-validated risk estimate of the overall tree-model was good ( $r = .000$ ,  $SE = .000$ ). The tree-model’s accuracy in predicting whether a child outside this sample will exhibit problematic school absenteeism was approximately 56.5%.

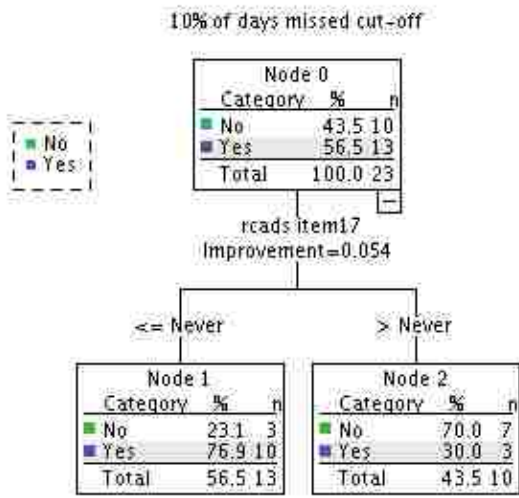


Figure 21. Classification tree of risk factors for children with problematic school absenteeism defined as  $\geq 10\%$  of full school days missed for RCADS items.



Table 33a

*Classification Table for the Final Model of Children with Problematic School Absenteeism**Defined as  $\geq 10\%$  of Full School Days Missed for RCADS Items*

<u>Problematic school absenteeism</u>	<u>Predicted</u>		<u>Percent correct</u>
	No	Yes	
No	0	10	0.0%
Yes	0	13	100.0%
Overall	0.0%	100.0%	56.5%

The final tree-model thus identified one relevant risk factor (RCADS item 17) that best-differentiated children with problematic school absenteeism (greater than or equal to 10% of full school days missed) from those with nonproblematic school absenteeism (less than 10% of full school days missed). Two subgroups of children, each with varying risk for problematic school absenteeism, emerged. Children who endorsed Never on ScaredSleepAlone were identified as the highest risk subgroup for problematic school absenteeism (Node 1; 76.9%). The IF-THEN Rules regarding a child's probability for exhibiting problematic school absenteeism based on the final tree-model are in Table 33b.

Table 33b

*IF-THEN Rules for the Probability of Children Exhibiting Problematic School Absenteeism**Defined as  $\geq 10\%$  of Full School Days Missed for RCADS Items by Risk Probability*

	<u>IF</u>	<u>THEN</u>
Node 1	Endorsed Never on ScaredSleepAlone	76.9% probability
Node 2	Endorsed Sometimes, Often, or Always on ScaredSleepAlone	30% probability

**Adolescents: Ten Percent Cutoff.** CART was utilized to identify the most relevant risk factors for youth defined as adolescents (i.e., between the ages of 12 and 18-years old) with

problematic absenteeism defined as  $\geq 10\%$  of full school days missed (i.e., equal to or greater than 18 full school days missed). Prior probabilities were calculated from the data for problematic school absenteeism defined as  $\geq 10\%$  of full school days missed. Adjustments were made to the misclassification costs based on custom misclassification costs (i.e., “Yes” = 2.00, “No” = 1.00). The final tree-model identified one relevant risk factor that best-differentiated adolescents with problematic school absenteeism (equal to or greater than 10% of full school days missed) from those with nonproblematic absenteeism (less than 10% of full school days missed): (1) RCADS item 38 “I feel afraid if I have to talk in front of my class” (ScaredTalkInClass; Figure 22). The final tree-model correctly identified 83.3% of all participants in the sample (i.e., those with problematic versus nonproblematic school absenteeism). The tree-model classified 100.0% ( $n = 95$ ) of adolescents with problematic school absenteeism correctly (Table 34a). The tree-model thus demonstrated higher sensitivity (i.e., true positive rate) of adolescents with problematic school absenteeism classified correctly than specificity (i.e., true negative rate; 0.0%;  $n = 0$ ). The cross-validated risk estimate of the overall tree-model was good ( $r = .167$ ,  $SE = .035$ ). The tree-model’s accuracy in predicting whether an adolescent outside this sample will exhibit problematic school absenteeism was approximately 83.3%.

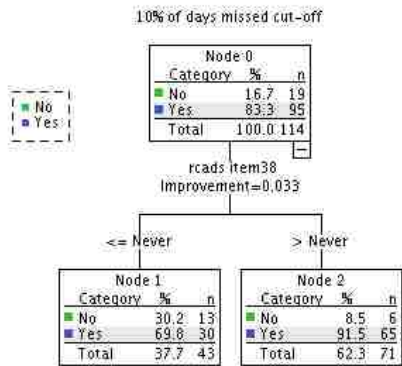


Figure 22. Classification tree of risk factors for adolescents with problematic school absenteeism defined as  $\geq 10\%$  of full school days missed for RCADS items.

Table 34a

*Classification Table for the Final Model of Adolescents with Problematic School Absenteeism*

*Defined as  $\geq 10\%$  of Full School Days Missed for RCADS Items*

<u>Problematic school absenteeism</u>	<u>Predicted</u>		<u>Percent correct</u>
	No	Yes	
No	0	19	0.0%
Yes	0	95	100.0%
Overall	0.0%	100.0%	83.3%

The final tree-model thus identified one relevant risk factor (RCADS item 38) that best-differentiated adolescents with problematic school absenteeism (greater than or equal to 10% of full school days missed) from those with nonproblematic school absenteeism (less than 10% of full school days missed). Two subgroups of adolescents, each with varying risk for problematic school absenteeism, emerged. Adolescents who endorsed Sometimes, Often, or Always on ScaredTalkInClass were identified as the highest risk subgroup for problematic school absenteeism (Node 2; 91.5%). The IF-THEN Rules regarding an adolescent’s probability for exhibiting problematic school absenteeism based on the final tree-model are in Table 34b.

Table 34b

*IF-THEN Rules for the Probability of Adolescents Exhibiting Problematic School Absenteeism*

*Defined as  $\geq 10\%$  of Full School Days Missed for RCADS Items by Risk Probability*

	<u>IF</u>	<u>THEN</u>
Node 2	Endorsed Sometimes, Often, or Always on ScaredTalkInClass	91.5% probability
Node 1	Endorsed Never on ScaredTalkInClass	69.8% probability

**Summary of Post Hoc Analyses: RCADS Item Models.**

**Less Than One Percent Cutoff.** CART was utilized to identify the most relevant risk factors for youth with nonproblematic absenteeism defined as less than 1% of full school days missed (i.e., less than 1.8 full school days missed). Two relevant risk factors were identified that best-differentiated youth with nonproblematic school absenteeism (less than 1% of full school days missed) from those with problematic school absenteeism (equal to or greater than 1% of full school days missed; Table 35). Youth’s level of endorsement (i.e., Never, Sometimes, Often, or Always) of a particular item was linked to their level of risk for problematic school absenteeism (Table 35). Youth who endorsed Never on NothingFunAnymore (15.3%; Node 1) were identified as the highest risk subgroup for nonproblematic school absenteeism.

Table 35

*Level of Risk for Exhibiting Nonproblematic School Absenteeism Defined as < 1% of Full School Days Missed by RCADS Item Response*

Item	Subscale	Response Predictive of Higher Risk
RCADS item 6 “Nothing is much fun anymore”	Major Depression	Never
RCADS item 46 “I would feel scared if I had to stay away from home overnight”	Separation Anxiety	Sometimes, Often, or Always

**Three Percent Cutoff.** CART was utilized to identify the most relevant risk factors for youth with problematic absenteeism defined as  $\geq 3\%$  of full school days missed (i.e., equal to or greater than 5.4 full school days missed). Four relevant risk factors were identified that best-differentiated youth with problematic school absenteeism (equal to or greater than 3% of full school days missed) from those with nonproblematic school absenteeism (less than 3% of full school days missed; Table 36). Youth’s level of endorsement (i.e., Never, Sometimes, Often, or Always) of a particular item was linked to their level of risk for problematic school absenteeism (Table 36). Youth who endorsed Sometimes, Often, or Always on NothingFunAnymore,

Sometimes, Often, or Always on ScaredTalkInClass, and Never or Sometimes on ScaredAwayFromHomeOvernight were identified as the highest risk subgroup for problematic school absenteeism (100.0%; Node 7).

Table 36

*Level of Risk for Exhibiting Problematic School Absenteeism Defined as  $\geq$  3% of Full School*

*Days Missed by RCADS Item Response*

Item	Subscale	Response Predictive of Higher Risk
RCADS item 6 “Nothing is much fun anymore”	Major Depression	Sometimes, Often, or Always
RCADS item 17 “I feel scared if I have to sleep on my own”	Separation Anxiety	Never
RCADS item 38 “I feel afraid if I have to talk in front of my class”	Social Phobia	Sometimes, Often, or Always
RCADS item 46 “I would feel scared if I had to stay away from home overnight”	Separation Anxiety	Never or Sometimes

**Five Percent Cutoff.** CART was utilized to identify the most relevant risk factors for youth with problematic absenteeism defined as  $\geq$  5% of full school days missed (i.e., equal to or greater than nine full school days missed). Four relevant risk factors were identified that best-differentiated youth with problematic school absenteeism (equal to or greater than 5% of full school days missed) from those with nonproblematic school absenteeism (less than 5% of full school days missed; Table 37). Youth’s level of endorsement (i.e., Never, Sometimes, Often, or Always) of a particular item was linked to their level of risk for problematic school absenteeism (Table 37). Youth who endorsed Never on ScaredSleepAlone and Often or Always on HeartBeatsDuringProblems were identified as the highest risk subgroup for problematic school absenteeism (100.0%; Node 4).

Table 37

*Level of Risk for Exhibiting Problematic School Absenteeism Defined as  $\geq$  5% of Full School*

*Days Missed by RCADS Item Response*

Item	Subscale	Response Predictive of Higher Risk
RCADS item 17 “I feel scared if I have to sleep on my own”	Separation Anxiety	Never
RCADS item 24 “When I have a problem, my heart beats really fast”	Panic Disorder	Often or Always
RCADS item 6 “Nothing is much fun anymore”	Major Depression	Sometimes, Often, or Always
RCADS item 31 “I have to think of special thoughts (like numbers or words) to stop bad things from happening”	Obsessive-Compulsive	Never

**Males: Ten Percent Cutoff.** CART was utilized to identify the most relevant risk factors for male youth with problematic absenteeism defined as  $\geq$  10% of full school days missed (i.e., equal to or greater than 18 full school days missed). Five relevant risk factors were identified that best-differentiated male youth with problematic school absenteeism (equal to or greater than 10% of full school days missed) from those with nonproblematic school absenteeism (less than 10% of full school days missed; Table 38). Male youth’s level of endorsement (i.e., Never, Sometimes, Often, or Always) of a particular item was linked to their level of risk for problematic school absenteeism (Table 38). Two subgroups of male youth were identified as the highest risk (i.e., 100.0%) for problematic school absenteeism, (1) youth who endorsed Never, Sometimes, or Often on WorryBadlyAtSchool, Never on ScaredSleepAlone, Never on WorryMakingMistakes, and Sometimes, Often, or Always on WorriedWhenOthersAngry (Node 8) and (2) youth who endorsed Never, Sometimes, or Often on WorryBadlyAtSchool, Never on ScaredSleepAlone, Sometimes, Often, or Always on WorryMakingMistakes, and Never or Sometimes on WorryAwayFromParents (Node 9).

Table 38

*Level of Risk for Males Exhibiting Problematic School Absenteeism Defined as  $\geq 10\%$  of Full*

*School Days Missed by RCADS Item Response*

Item	Subscale	Response Predictive of Higher Risk
RCADS item 12 “I worry that I will do badly at my school work”	Social Phobia	Never, Sometimes, or Often
RCADS item 17 “I feel scared if I have to sleep on my own”	Separation Anxiety	Never
RCADS item 30 “I worry about making mistakes”	Social Phobia	Sometimes, Often, or Always
RCADS item 8 “I feel worried when I think someone is angry with me”	Social Phobia	Sometimes, Often, or Always
RCADS item 9 “I worry about being away from my parents”	Separation Anxiety	Never or Sometimes

***Females: Ten Percent Cutoff:*** CART was utilized to identify the most relevant risk factors for female youth with problematic absenteeism defined as  $\geq 10\%$  of full school days missed (i.e., equal to or greater than 18 full school days missed). One relevant risk factor was identified that best-differentiated female youth with problematic school absenteeism (equal to or greater than 10% of full school days missed) from those with nonproblematic school absenteeism (less than 10% of full school days missed; Table 39). Female youth’s level of endorsement (i.e., Never, Sometimes, Often, or Always) of a particular item was linked to their level of risk for problematic school absenteeism (Table 39). Youth who endorsed Sometimes, Often, or Always on ScaredTalkInClass were identified as the highest risk subgroup for problematic school absenteeism (Node 2; 93.8%).

Table 39

*Level of Risk for Females Exhibiting Problematic School Absenteeism Defined as  $\geq 10\%$  of Full*



*School Days Missed by RCADS Item Response*

Item	Subscale	Response Predictive of Higher Risk
RCADS item 38 “I feel afraid if I have to talk in front of my class”	Social Phobia	Sometimes, Often, or Always

**Children: Ten Percent Cutoff.** CART was utilized to identify the most relevant risk factors for youth defined as children (i.e., between the ages of 5 and 11-years old) with problematic absenteeism defined as  $\geq 10\%$  of full school days missed (i.e., equal to or greater than 18 full school days missed). One relevant risk factor was identified that best-differentiated children with problematic school absenteeism (equal to or greater than 10% of full school days missed) from those with nonproblematic school absenteeism (less than 10% of full school days missed; Table 40). Children’s level of endorsement (i.e., Never, Sometimes, Often, or Always) of a particular item was linked to their level of risk for problematic school absenteeism (Table 40). Children who endorsed Never on ScaredSleepAlone were identified as the highest risk subgroup for problematic school absenteeism (Node 1; 76.9%).

Table 40

*Level of Risk for Children Exhibiting Problematic School Absenteeism Defined as  $\geq 10\%$  of Full*

*School Days Missed by RCADS Item Response*

Item	Subscale	Response Predictive of Higher Risk
RCADS item 17 “I feel scared if I have to sleep on my own”	Separation Anxiety	Never

**Adolescents: Ten Percent Cutoff.** CART was utilized to identify the most relevant risk factors for youth defined as adolescents (i.e., between the ages of 12 and 18-years old) with problematic absenteeism defined as  $\geq 10\%$  of full school days missed (i.e., equal to or greater than 18 full school days missed). One relevant risk factor was identified that best-differentiated

adolescents with problematic school absenteeism (equal to or greater than 10% of full school days missed) from those with nonproblematic school absenteeism (less than 10% of full school days missed; Table 41). Adolescent’s level of endorsement (i.e., Never, Sometimes, Often, or Always) of a particular item was linked to their level of risk for problematic school absenteeism (Table 41). Adolescents who endorsed Sometimes, Often, or Always on ScaredTalkInClass were identified as the highest risk subgroup for problematic school absenteeism (Node 2; 91.5%).

Table 41

*Level of Risk for Adolescents Exhibiting Problematic School Absenteeism Defined as  $\geq 10\%$  of Full School Days Missed by RCADS Item Response*

Item	Subscale	Response Predictive of Higher Risk
RCADS item 38 “I feel afraid if I have to talk in front of my class”	Social Phobia	Sometimes, Often, or Always

**Post Hoc Analyses: RCADS Subscale Models**

Due to the exploratory nature of CART, additional post-hoc analyses were conducted. Subscale scores were utilized at the 10% of full school days missed cutoff scores. This distinction was used to compare the most relevant risk factors between the subscale and item models.

**Ten Percent Cutoff.** Prior probabilities were calculated from the data for problematic school absenteeism defined as 10% of full school days missed. No adjustments were made to the misclassification costs; therefore equal costs were used. The final tree-model identified one relevant risk factor that best-differentiated youth with problematic school absenteeism (equal to or greater than 10% of full school days missed) from youth with nonproblematic school absenteeism (less than 10% of full school days missed): (1) RCADS Depression Subscale T-Score (Figure 23). The final tree-model correctly identified 81.3% of all participants in the

sample (i.e., those with problematic versus nonproblematic school absenteeism). The tree-model classified 95.5% (n = 105) of youth with problematic school absenteeism correctly (Table 42a). The tree-model thus demonstrated higher sensitivity (i.e., true positive rate) than specificity (i.e., true negative rate; 27.6% (n = 8) of youth with problematic school absenteeism classified correctly). The risk estimate of the overall tree-model was good ( $r = .187$ ,  $SE = .033$ ). The tree-model's accuracy in predicting whether a youth outside this sample will exhibit problematic school absenteeism was approximately 81.3%.

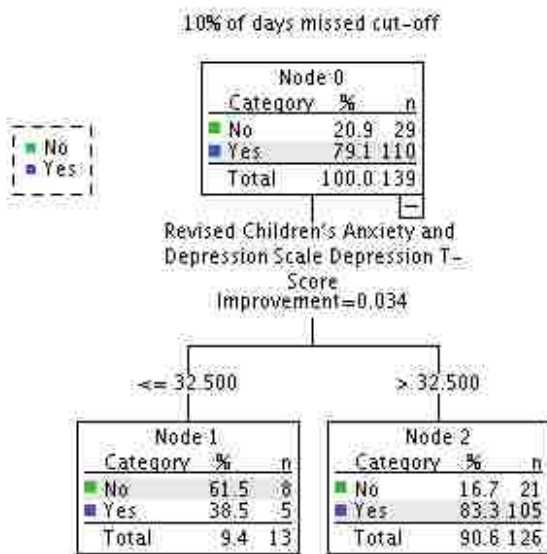


Figure 23. Classification tree of risk factors for problematic school absenteeism defined as  $\geq$  10% of full school days missed for *RCADS Subscales*

Table 42a

*Classification Table for the Final Model of Problematic School Absenteeism Defined as  $\geq 10\%$  of Full School Days Missed for RCADS Subscales*

<u>Problematic school absenteeism</u>	<u>Predicted</u>		<u>Percent correct</u>
	No	Yes	
No	8	21	27.6%
Yes	5	105	95.5%
Overall	9.4%	90.6%	81.3%

The final tree-model thus identified one relevant risk factor (RCADS Depression Subscale T-Score) that best-differentiated youth with problematic school absenteeism (equal to or greater than 10% of full school days missed) from those with nonproblematic school absenteeism (less than 10% of full school days missed). Two subgroups of youth, each with varying risk for problematic school absenteeism, emerged. Youth who endorsed an RCADS Depression Subscale T-Score of greater than 32.5 were identified as the highest risk subgroup for problematic school absenteeism (83.3%; Node 2). The IF-THEN Rules regarding a youth's probability for exhibiting problematic school absenteeism based on the final tree-model are in Table 42b.

Table 42b

*IF-THEN Rules for the Probability of Exhibiting Problematic School Absenteeism Defined as  $\geq 10\%$  of Full School Days Missed for RCADS Subscales by Risk Probability*

	<u>IF</u>	<u>THEN</u>
Node 2	Endorsed an RCADS Depression Subscale T-Score of greater than 32.5	83.3% probability
Node 1	Endorsed an RCADS Depression Subscale T-Score of less than or equal to 32.5	38.5% probability

## CHAPTER 5

### DISCUSSION

The current study aimed to inform the MTSS approach while also contributing to early identification, assessment, and intervention methods for those youth and families at the highest risk of problematic school absenteeism and its negative consequences. Due to the critical roles of family environment (Sacks et al., 2014) and youth psychopathology (McLaughlin, 2016) to youth development, the current study investigated family environment and youth psychopathology risk factors. The current study identified subgroups of youth at the highest risk of problematic absenteeism, defined as equal to or greater than 1% and 10% of full school days missed, based on family environment and youth psychopathology risk factors. The identification of these subgroups, based on multiple risk factors, is important due to the complex processes involved in the development of many diagnoses or symptom clusters, including school refusal behavior (National Institutes of Health (US), 2007).

Various statistical approaches have been used to investigate risk factors for problematic absenteeism. Commonly used parametric approaches include analyses of variance (ANOVA) and logistic regression (Harris et al., 2011; Rizzo et al., 2014). The current study extends the literature by utilizing nonparametric decision tree techniques to identify patterns of risk for problematic school absenteeism. This study also extends the literature by examining the role of the family environment and psychopathology symptoms in school absenteeism severity while further differentiating MTSS tiers.

#### **Relevant Risk Factors**

Classification trees for FES items and RCADS items were conducted at 1% and 10% cutoffs for full school days missed. Post-hoc classification trees were also conducted based on

developmental distinctions (i.e., children and adolescents), gender distinctions (i.e., male and female), additional cutoff scores (i.e., <1%, 3%, and 5% of full days missed), and FES and RCADS subscale scores. Specific family environment and youth psychopathology risk factors were most commonly identified as relevant to the classification tree-models.

**Family Environment Risk Factors.** Two FES subscales were most commonly identified as relevant among the post-hoc subscale level classification tree-models. The Intellectual-Cultural Orientation subscale and the Organization subscale were identified three times among the subscale level models. The Intellectual-Cultural Orientation subscale measures interest in intellectual, cultural, and political issues, while the Organization subscale measures the importance of clear structure and order. Similarly, three FES items were most commonly identified as relevant among the FES item level trees. Two items from the Organization subscale (i.e., FES items 49 and 29) and one item from the Intellectual-Cultural Orientation subscale (i.e., FES item 56) were identified. Each FES item was identified as a relevant risk factor three times among the item level models.

Two items (FES item 29 and 49) from the Organization subscale were identified as relevant within the models. FES item 29 asks “It’s often hard to find things when you need them in our household.” Youth who endorsed “False” exhibited higher rates of problematic school absenteeism, while those youth who endorsed “True” exhibited higher rates of nonproblematic absenteeism. FES item 49 asks “People change their minds often in our family.” Youth who endorsed “False” exhibited higher rates of problematic school absenteeism.

Previous research partially supports these findings. There is a lack of research directly addressing family organization level and youth functioning. Available literature identified low FES organization subscale scores were associated with greater risk for adolescent eating

disorders (Felker & Stivers, 1994) and endorsed by mothers of adolescents with trichotillomania (Keuthen, Fama, Altenburger, Allen, & Pauls, 2013). Similarly, multiple studies found an overrepresentation of families classified as “Structure-Oriented” in mental health clinics and the juvenile justice system (Moos & Moos, 1976; Scoresby & Christensen, 1976). Youth who endorsed “false” to FES items 49 and 29 may be identifying an increased level of control, potentially linked with rigidity and decreased engagement, that is impacting their problematic school absenteeism. Conversely, research has supported the association between high levels of family disorganization and increased youth anxiety (Gregory, Eley, O’Connor, Rijdsdijk, & Plomin, 2005).

One item (FES item 56) from the Intellectual-Cultural Orientation subscale was identified as relevant within the models. FES item 56 asks “Someone in our family plays a musical instrument.” Youth who endorsed “False” exhibited higher rates of problematic school absenteeism. Previous researchers supported an association between extracurricular activities, specifically arts-related activities, and academic aspirations, postsecondary enrollment, academic achievement, and academic outcomes (Martin et al., 2013). Youth who are engaged in school activities or after school programs are less likely to exhibit problematic school absenteeism (Epstein & Sheldon, 2002; South, Haynie, & Bose, 2007). Therefore, youth who endorse false to this item may be identifying a lack of engagement in extracurricular activities, specifically arts-related activities, that is impacting their problematic school absenteeism.

**Youth Psychopathology Risk Factors.** Four RCADS subscales were most commonly identified as relevant among the post-hoc subscale level classification tree-models. The Separation Anxiety and Depression subscales were identified four times as the most relevant risk factors among the subscale level models, while the Panic subscale was identified three times and



the Social Phobia subscale was identified two times. Similarly, four RCADS items were most commonly identified as relevant among the RCADS item level trees. RCADS items 6 and 17 were identified five times as a relevant risk factor among the item level models, while items 38 and 46 were identified three times. Two items from the Separation Anxiety subscale (i.e., RCADS items 46 and 17), one item from the Social Phobia subscale (i.e., RCADS item 38), and one item from the Major Depression subscale (i.e., RCADS item 6) were identified.

First, RCADS item 6 “Nothing is much fun anymore” was identified as a relevant risk factor from the Major Depression subscale. This item was identified as a relevant risk factor at every cutoff utilized (i.e., 1%, 3%, 5%, 10%, and <1% of full school days missed). Youth who endorsed “Sometimes, Often, or Always” exhibited higher rates of problematic school absenteeism, while youth who endorsed “Never” exhibited higher rates of nonproblematic school absenteeism. Multiple studies have supported a link between absenteeism severity and depression (Egger, Costello, & Angold, 2003; Ek & Eriksson, 2013; Hughes et al., 2010; Wimmer, 2010). Further, youth with problematic school absenteeism have been found to meet criteria for depressive diagnoses (Essau, 2003; Haight et al., 2011; Hirschfeld, 2001; Kearney & Albano, 2004).

Second, RCADS item 38 “I feel afraid if I have to talk in front of my class” was identified as a relevant risk from the Social Phobia subscale. This item was identified as particularly relevant for female youth and youth classified as adolescents. Youth who endorsed “Sometimes, Often, or Always” exhibited higher rates of problematic school absenteeism. Previous research supports this finding. Multiple studies have supported a link between absenteeism severity and social anxiety (Egger et al., 2003; Ek & Eriksson, 2013; Hughes, Gullone, Dudley, & Tonge, 2010; Maynard et al., 2015; Wimmer, 2010). Further, youth with

problematic school absenteeism have been found to meet criteria for social anxiety disorder (Kearney & Albano, 2004).

The remaining two items were identified as a relevant risk factor from the Separation Anxiety subscale. Third, RCADS item 17 (ScaredSleepAlone) “I feel scared if I have to sleep on my own” was identified as particularly relevant for youth in the three highest cutoffs utilized (i.e., 3%, 5%, and 10% of full school days missed), male youth, and youth classified as children. Youth who endorsed “Never” exhibited higher rates of problematic school absenteeism. Fourth, Youth who endorsed “Never or Sometimes” on RCADS item 46 (ScaredAwayFromHomeOvernight) “I would feel scared if I had to stay away from home overnight” exhibited higher rates of problematic school absenteeism. Previous research does not directly support these findings as previous research has identified a link between separation anxiety and school refusal behavior (Egger et al., 2003; Ek & Eriksson, 2013; Hughes, Gullone, Dudley, & Tonge, 2010; Maynard et al., 2015; Wimmer, 2010). Youth who endorsed “Never” on ScaredSleepAlone may be addressing an increase in independence, high level of distance in their relationship from their parents, or an avoidant attachment that is impacting their problematic school absenteeism (van Petegem, Vansteenkiste, & Beyers, 2013).

### **Clinical Implications**

The present study has potential clinical, policy, and school implications. Due to the exploratory nature of CART, implications must be considered cautiously. First, this study further reinforces previous findings that absenteeism severity evaluated categorically provides a more accurate understanding of the construct as compared to dimensional evaluations (Skedgell & Kearney, 2016; Skedgell & Kearney, 2018).

Second, the present study has implications for the MTSS approach by contributing to the definition of problematic school absenteeism and the MTSS tiers. Problematic absenteeism was defined at two cutoffs, equal to or greater than 1% and 10% of full school days missed, with additional cutoffs utilized in post-hoc analyses (i.e., <1%, 3%, and 5% of full days missed). As expected, base rates varied among the cutoffs with the most students meeting the equal to or greater than 1% cutoff (92.3%;  $n = 347$ ) and the least students meeting the less than 1% cutoff (10.3%;  $n = 39$ ). The base rates of students who had equal to or greater than 10% of days missed was 75.9% ( $n = 287$ ), 5% of full school days missed was 78% ( $n = 295$ ), and 3% of full school days missed was 84.4% ( $n = 319$ ). Increasing the cutoff score did decrease the number of students in the group though, notably, not by a large number of students. The 1% and 10% of full school days missed cutoffs differed by 60 students. This finding may provide evidence for an increased focus on preventative interventions associated with Tier 1.

Previous research supports the importance of preventative interventions as half of the students who miss 2-4 school days in the first few months of school were found to be chronically absent later in the year (Olson, 2013). Additionally, research has highlighted the negative effects of even a moderate level of absenteeism (Skedgell & Kearney, 2016; Egger et al., 2003; Henry, 2007; Ingul et al., 2012). Constraints to time, resources, and expenses likely make it unreasonable to utilize a 1% cutoff to define Tier 2 (Kearney & Graczyk, 2014; Skedgell & Kearney, 2018), though Tier 1 interventions can be strengthened. The present study also has implications for identifying potential protective factors against school refusal behavior that can be enhanced through Tier 1 interventions. Classification-trees were employed for nonproblematic absenteeism, defined as less than 1% of full days missed. There were two RCADS items and eight FES items identified as the most relevant risk factors for

nonproblematic absenteeism. Of the identified risk factors, RCADS item 6 “Nothing is much fun anymore” was likely the most salient as youth who endorsed “Never” on this item had a decreased risk of displaying problematic school absenteeism while youth who endorsed “Sometimes, Often, or Always” had an increased risk. This finding is supported in the literature (Ek & Eriksson, 2013; Haight et al., 2011) and therefore suggests Tier 1 interventions would benefit from utilizing depression screeners and discussing depression symptoms in school-based mental health programs.

Of the remaining cutoffs (i.e., 3%, 5%, and 10% of full school days missed) utilized to define problematic school absenteeism in the present study, the 3% cutoff may be an appropriate definition for Tier 2. The classification-trees for the 3% and 5% cutoffs differed minimally (i.e., 24 students) in the number of students classified in that group. Despite the relatively small reduction in students between the two cutoffs, the relevant family environment and youth psychopathology risk factors differed substantially. For example, the FES trees for the 3% and 5% cutoffs did not have any overlapping relevant risk factors and the RCADS trees overlapped in only one relevant risk factor (i.e., RCADS item 17). The difference between these two cutoffs may be a meaningful distinction that warrants additional research, or it may be a product of the analyses. Due to the potential difference between the two groups, utilizing the 3% cutoff to define Tier 2 strategies ensures these interventions are applied early enough. As suggested by past research (Balfanz & Byrnes, 2012; National Center for Education Statistics, 2016), the 10% cutoff may be an appropriate definition for Tier 3. The classification-trees for the 5% and 10% cutoffs varied substantially in the type and number of relevant risk factors.

Finally, the present study has implications for the early assessment of youth with school refusal behavior. The findings of the present study underscore the importance of consistent

attendance monitoring by school-based personnel. Previous studies have also highlighted the importance of consistent monitoring (Skedgell & Kearney, 2016; Skedgell & Kearney, 2018). The relevant family environment risk factors identified by the classification-trees potentially suggest the importance of monitoring for family engagement with others, level of organization, and involvement in extracurricular activities. These family factors will likely be most relevant as a student moves into Tier 2 or Tier 3 though, ideally, addressing family influences on student attendance would occur in a preventive manner in Tier 1. For example, educators or clinicians could inform students and their families about factors that impact attendance through flyers or newsletters. On the other hand, the relevant youth psychopathology risk factors suggest the importance of early monitoring for youth depression and anxiety symptoms. These factors may be important at every tier as past research has demonstrated the negative effects, particularly for internalizing symptoms, of even a moderate level of absenteeism (Skedgell & Kearney, 2016; Egger et al., 2003; Henry, 2007; Ingul et al., 2012).

### **Limitations**

Findings of the current study must be considered cautiously due to various limitations and the exploratory nature of CART. CART procedures are meant to generate and not test hypotheses (Markham et al., 2013). Different analyses (e.g., parametric analyses) will be required to test the hypotheses and findings of the current study. Additionally, CART procedures were employed utilizing various cutoffs (i.e., <1%, 1%, 3%, 5%, and 10% of full school days missed) as dichotomous dependent variables. The utilization of these cutoffs may have biased the results of the final classification-tree models.

In addition to the limitations of CART procedures, the data collection process and the sample utilized by the current study may limit the generalizability of the findings. Three distinct

subgroups within the sample (i.e., male vs. female, child vs. adolescent, and clinic vs. community) may impact findings. Previous research supports gender differences in relevant family risk factors as well as severity and symptomology of school refusal behavior (Kearney, 2001; McCoy et. al., 2007; National Center for Education Statistics, 2016). The current study utilized a gender distinction in post-hoc analyses to compare the most relevant risk factors between the two groups. Classification-trees revealed the relevant family environment and youth psychopathology risk factors differed substantially between males and females. Specifically, the FES trees overlapped in only one relevant risk factor (i.e., FES item 49 “People change their minds often in our family.”) and the RCADS trees did not have any overlapping relevant risk factors. The difference between these two groups thus may be a meaningful distinction that warrants additional research.

Developmental differences in severity, function, and symptomology of school refusal behavior are well supported in the literature (Coolidge, Hahn, & Peck, 1957; Cummings, Caporino, & Kendall, 2014; Kearney & Albano, 2004). The current study utilized a developmental distinction (i.e., children and adolescents) in post-hoc analyses to compare the most relevant risk factors between the two groups. Classification-trees revealed the relevant family environment and youth psychopathology risk factors differed substantially between children and adolescents. Specifically, neither the FES or RCADS trees had any overlapping risk factors. The difference between these two groups thus may be a meaningful distinction that warrants additional research.

Race and ethnicity differences in clinical and community samples are also supported in the literature (Kearney, 2001). Despite notable benefits to combining clinic and community samples (described above), it is possible that there would be differences between the two groups

in the relevant risk factors identified by the model. Additional research is warranted to explore the relevant risk factors in these two settings individually. The severity level of the sample may also limit the generalizability of these findings. Specifically, youth in the community sample were recruited from either the TDP or the Clark County Family Courts and Services Center thus the community setting included youth who were already identified as displaying problematic school absenteeism. Similarly, the clinic sample included youth were recruited from the University of Nevada, Las Vegas (UNLV) Child School Refusal and Anxiety Disorders Clinic thus the clinical setting also included youth who were likely already displaying problematic school absenteeism. Thus the findings of the current study may not generalize to a population reflecting the national base rates for problematic school absenteeism.

Finally, the reliability of the data is a potential limitation of the current study.

Absenteeism data were provided by CCSD and is entered by various school personnel. Youth absenteeism data could have been impacted by inconsistent record-keeping. On the other hand, demographic information was provided by parents or caregivers while family environment and psychopathology measures were provided by youth themselves. Responses may have been impacted by forgetfulness, lack of attention, communication barriers, among many other factors. Therefore the results of the current study were likely impacted by participant bias.

### **Recommendations for Future Research**

Future research is warranted to address the limitations and to extend the findings of the current study. Researchers should continue to study appropriate definitions for problematic school absenteeism and the MTSS tiers. The identification of an appropriate definition of problematic school absenteeism would positively impact the literature base by increasing clarity among researchers (Lyon & Cotler, 2007). Similarly, the identification of appropriate definitions

for the MTSS tiers would allow for the more influential application of relevant assessment and intervention approaches.

Additional research is also warranted to evaluate the difference in relevant risk factors between those youth that meet the 3% cutoff and the 5% cutoff for Tier 2. Findings of the current study suggest that, despite a minimal difference in the number of students within the two groups, the relevant risk factors differ substantially between the two cutoffs. Similarly, research is also warranted to evaluate the difference in relevant risk factors between those youth that meet the 10% and 15% cutoff for Tier 3. As previously suggested in the literature (Skedgell & Kearney, 2018), there were differences among these groups that warrant additional research. Future research should also consider evaluating the relevant risk factors as problematic school absenteeism increases in severity (i.e., 20%, 30%). Previous research found youth within the range of 15-60% of full school days missed displayed more internalizing symptoms than youth who were either below 15% or above 60% (Skedgell & Kearney, 2016). This available literature, coupled with the findings of the current study, suggest that further research should work to identify relevant risk factors for more severe school absenteeism.

Future researchers should also work to identify relevant risk factors for problematic absenteeism within subgroups (i.e., gender, developmental, setting, ethnicity). The ability to differentiate the relevant risk factors for individual groups would better inform early assessment interventions. Additional research should extend the findings of the current study by focusing on the FES and RCADS subscales to identify relevant risk factors mirroring the cutoffs (i.e., <1%, 1%, 3%, 5%, and 10%) and distinctions (i.e., gender and developmental) employed in the current study. Finally, additional research is needed to evaluate the impact of peer and community risk factors at various cutoffs and distinctions. Due to the large number of risk factors associated with



problematic school absenteeism, researchers should focus on identifying the interaction of these risk factors to better inform early identification, assessment, and intervention approaches.

In sum, the current study extends the school absenteeism literature base in the following ways by: (1) providing further evidence for an accurate definition of school absenteeism to be utilized by researchers and the MTSS tiers, (2) utilizing nonparametric decision tree techniques (3) identifying subgroups of youth at the highest risk of displaying problematic absenteeism, (4) examining the role of family environment to youth school absenteeism, and (5) examining the role of youth psychopathology to school absenteeism. The results of the current study also provide support for (1) continued research on evaluating school absenteeism categorically to identify an accurate definition of the construct, (2) the importance of consistent attendance monitoring, and (3) the necessity of access to mental health care professionals (i.e., school social workers, counselors, psychologists, etc.) in school systems.

Appendix A  
CCSD IRB Approval

ASSESSMENT, ACCOUNTABILITY, RESEARCH,  
AND SCHOOL IMPROVEMENT

4212 Eucalyptus Avenue • Las Vegas, Nevada 89121 • (702) 799-1041 • FAX (702) 799-5067



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May 12, 2017

Mirae Fornander  
University of Nevada, Las Vegas  
4505 S. Maryland Parkway  
Las Vegas, NV 89154

Dear Mirae:

The Research Review Committee of the Clark County School District has reviewed your requested amendment to your request entitled: *School Refusal Behavior: Las Vegas Truancy Diversion Program & Application #35 (formerly # RRC-17-2015)*. The committee is pleased to inform you that your proposal has been approved with the following provisos:

1. Participation is strictly and solely on a voluntary basis.
2. Provide letter of acceptance from any additional principals who agree to be involved with the study.
3. The project is approved to take place at Desert Pines High School.

This research protocol is approved for a period of one year from the approval date. The expiration of this protocol is 8/15/2018. If the use of human subjects described in the referenced protocol will continue beyond the expiration date, you must provide a letter requesting an extension *one month* prior to the date of expiration. The letter must indicate whether there will be any modifications to the original protocol. If there is any change to the protocol it will be necessary to request additional approval for such change(s) in writing to the Research Review Committee.

**Please provide a copy of your research findings to this office upon completion.** We look forward to the results. If you have any questions or require assistance please do not hesitate to contact this office at (702) 799-1041 Ext. 5269 or e-mail at [kretzl@interact.ccsd.net](mailto:kretzl@interact.ccsd.net).

Sincerely,

A handwritten signature in black ink that reads "Kenneth Retzl". The signature is written in a cursive style and is positioned above the printed name and title.

Kenneth Retzl  
Coordinator III  
Department of Accountability & Research  
Co-Chair, Research Review Committee

Appendix B  
UNLV IRB Approval



**UNLV Social/Behavioral IRB - Expedited Review  
Continuing Review Approved**

**DATE:** April 5, 2017

**TO:** Christopher Kearney, Ph.D.  
**FROM:** UNLV Social/Behavioral IRB

**PROTOCOL TITLE:** [710884-7] School Refusal Behavior: The Effectiveness of a Las Vegas Truancy Diversion Program

**SUBMISSION TYPE:** Continuing Review/Progress Report

**ACTION:** APPROVED

**APPROVAL DATE:** April 5, 2017

**EXPIRATION DATE:** April 4, 2018

**REVIEW TYPE:** Expedited Review

Thank you for submission of Continuing Review/Progress Report materials for this protocol. The UNLV Social/Behavioral IRB has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a protocol design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This IRB action will reset your expiration date for this protocol. The protocol is approved for a period of one year from the date of IRB approval. The new expiration date for this protocol is April 4, 2018.

**PLEASE NOTE:**

Attached with this approval notice is the **official Informed Consent/Assent (IC/A) Form** for this study. Only copies of this official IC/A form may be used when obtaining consent. Please keep the original for your records.

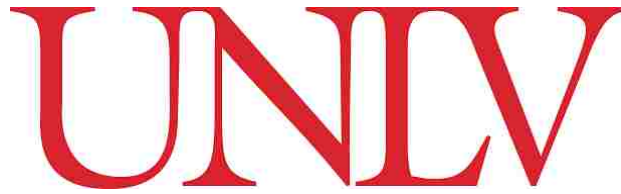
Should there be *any* change to the protocol, it will be necessary to submit a **Modification Form** through ORI - Human Subjects. No changes may be made to the existing protocol until modifications have been approved.

ALL UNANTICIPATED PROBLEMS involving risk to subjects or others and SERIOUS and UNEXPECTED adverse events must be reported promptly to this office. Please use the appropriate reporting forms for this procedure. All FDA and sponsor reporting requirements should also be followed.

All NONCOMPLIANCE issues or COMPLAINTS regarding this protocol must be reported promptly to this office.

This protocol has been determined to be a Minimal Risk protocol. Based on the risks, this protocol requires continuing review by this committee on an annual basis. Submission of the **Continuing Review Request Form** must be received with sufficient time for review and continued approval before the expiration date of April 4, 2018.

If you have questions, please contact the Office of Research Integrity - Human Subjects at [IRB@unlv.edu](mailto:IRB@unlv.edu) or call 702-895-2794. Please include your protocol title and IRBNet ID in all correspondence.



**UNLV Social/Behavioral IRB - Exempt Review  
Exempt Notice**

**DATE:** June 14, 2018  
**TO:** Christopher Kearney, Ph.D.  
**FROM:** Office of Research Integrity - Human Subjects  
**PROTOCOL TITLE:** [1244800-1] Review of clinic data  
**ACTION:** DETERMINATION OF EXEMPT STATUS  
**EXEMPT DATE:** June 14, 2018  
**REVIEW CATEGORY:** Exemption category # 4

Thank you for your submission of New Project materials for this protocol. This memorandum is notification that the protocol referenced above has been reviewed as indicated in Federal regulatory statutes 45CFR46.101(b) and deemed exempt.

We will retain a copy of this correspondence with our records.

**PLEASE NOTE:**

Upon final determination of exempt status, the research team is responsible for conducting the research as stated in the exempt application reviewed by the ORI - HS and/or the IRB which shall include using the most recently submitted Informed Consent/Assent Forms (Information Sheet) and recruitment materials.

If your project involves paying research participants, it is recommended to contact Carisa Shaffer, ORI Program Coordinator at (702) 895-2794 to ensure compliance with the Policy for Incentives for Human Research Subjects.

Any changes to the application may cause this protocol to require a different level of IRB review. Should any changes need to be made, please submit a **Modification Form**. When the above-referenced protocol has been completed, please submit a **Continuing Review/Progress Completion report** to notify ORI - HS of its closure.

If you have questions, please contact the Office of Research Integrity - Human Subjects at [IRB@unlv.edu](mailto:IRB@unlv.edu) or call 702-895-2794. Please include your protocol title and IRBNet ID in all correspondence.

Office of Research Integrity - Human Subjects  
4505 Maryland Parkway . Box 451047 . Las Vegas, Nevada 89154-1047  
(702) 895-2794 . FAX: (702) 895-0805 . [IRB@unlv.edu](mailto:IRB@unlv.edu)

Appendix C  
Information Sheet

1. Child's Age \_\_\_\_\_
2. Child's Gender (circle one)    M        F
3. Child's Ethnicity (circle one)

Asian      African-American      European-American      Hispanic

Multiracial/Biracial      Native American      Other \_\_\_\_\_

4. Did mother/guardian graduate from high school?    Yes    No
5. Did father/guardian graduate from high school?    Yes    No
6. Age (in years) and gender of all siblings:

Age: \_\_\_\_\_ gender: M/F

Age: \_\_\_\_\_ gender: M /F

Age: \_\_\_\_\_ gender: M /F

Age: \_\_\_\_\_ gender: M /F

Age: \_\_\_\_\_ gender: M /F

Age: \_\_\_\_\_ gender: M /F

7. Marital status of parents/guardians currently? (circle one)

Married      Never married      Separated      Divorced      Other \_\_\_\_\_

8. Parent/guardian completing packet (circle one):

Mother      Father      Guardian/Other

## Appendix D

### Family Environment Scale

**There are 90 statements. They are statements about families. You are to decide which of these statements are true of your family and which are false. If you think the statement is *True* or mostly *True* of your family, make an X in the box labeled true. If you think the statement is *False* or mostly *False* of your family, make and X in the box labeled false.**

**You may feel that some of the statements are true for some family members and false for others. Mark True if the statement is true for most members. Mark False if the statement is false for most family members. If the members are evenly divided, decide what is the stronger overall impression and answer accordingly.**

**Remember, we would like to know what your family seems like to you. So *do not* try to figure out how other members see your family, but *do* give us your general impression of your family for each statement.**

- |  |                               |                                |
|--|-------------------------------|--------------------------------|
| 1. Family members really help and support one another.                     | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 2. Family members often keep their feelings to themselves.                 | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 3. We fight a lot in our family.   | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 4. We don't do things on our own very often in our family.                 | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 5. We feel it is important to be best at whatever you do.                  | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 6. We often talk about political and social problems.                      | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 7. We spend most weekends and evenings at home.                            | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 8. Family members attend church, synagogue, or Sunday school fairly often. | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 9. Activities in our family are pretty carefully planned.                  | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 10. Family members are rarely ordered around.                              | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 11. We often seem to be killing time at home.                              | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 12. We say anything we want to around home.                                | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 13. Family members rarely become openly angry.                             | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 14. In our family, we are strongly encouraged to be independent.           | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 15. Getting ahead in life is very important in our family.                 | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 16. We rarely go to lectures, plays or concerts.                           | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 17. Friends often come over for dinner or to visit.                        | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 18. We don't say prayers in our family.                                    | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 19. We are generally very neat and orderly.                                | <input type="checkbox"/> True | <input type="checkbox"/> False |

- |   |                               |                                |
|---|-------------------------------|--------------------------------|
| 20. There are very few rules to follow in our family.                                       | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 21. We put a lot of energy into what we do at home.   | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 22. It's hard to "blow off steam" at home without upsetting somebody.                       | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 23. Family members sometimes get so angry they throw things.                                | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 24. We think things out for ourselves in our family.  | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 25. How much money a person makes is not very important to us.                              | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 26. Learning about new and different things is very important in our family.                | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 27. Nobody in our family is active in sports, Little League, bowling, etc.                  | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 28. We often talk about the religious meaning of Christmas, Passover, or other holidays.    | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 29. It's often hard to find things when you need them in our household.                     | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 30. There is one family member who makes most of the decisions.                             | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 31. There is a feeling of togetherness in our family.                                       | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 32. We tell each other about our personal problems.   | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 33. Family members hardly ever lose their tempers.  | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 34. We come and go as we want to in our family.   | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 35. We believe in competition and "may the best man win."                                   | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 36. We are not that interested in cultural activities.                                      | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 37. We often go to movies, sports events, camping, etc.                                     | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 38. We don't believe in heaven or hell.   | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 39. Being on time is very important in our family.  | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 40. There are set ways of doing things at home.   | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 41. We rarely volunteer when something has to be done at home.                              | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 42. If we feel like doing something on the spur of the moment we often just pick up and go. | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 43. Family members often criticize each other.  | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 44. There is very little privacy in our family.   | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 45. We always strive to do things just a little better the next time.                       | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 46. We rarely have intellectual discussions.  | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 47. Everyone in our family has a hobby or two.  | <input type="checkbox"/> True | <input type="checkbox"/> False |
| 48. Family members have strict ideas about what is right and wrong.                         | <input type="checkbox"/> True | <input type="checkbox"/> False |

49. People change their minds often in our family.  True  False
50. There is a strong emphasis on following rules in our family.  True  False
51. Family members really back each other up.  True  False
52. Someone usually gets upset if you complain in our family.  True  False
53. Family members sometimes hit each other.  True  False
54. Family members almost always rely on themselves when a problem comes up.  True  False
55. Family members rarely worry about job promotions, school grades, etc.  True  False
56. Someone in our family plays a musical instrument.  True  False
57. Family members are not very involved in recreational activities outside work and school.  True  False
58. We believe there are some things you just have to take on faith.  True  False
59. Family members make sure their rooms are neat.  True  False
60. Everyone has an equal say in family decisions.  True  False
61. There is very little group spirit in our family.  True  False
62. Money and paying bills is openly talked about in our family.  True  False
63. If there's a disagreement in our family, we try hard to smooth things over and keep the peace.  True  False
64. Family members strongly encourage each other to stand up for their rights.  True  False
65. In our family, we don't try that hard to succeed.  True  False
66. Family members often go to the library.  True  False
67. Family members sometimes attend courses or take lessons for some hobby or interest (outside of school).  True  False
68. In our family each person has different ideas about what is right and wrong.  True  False
69. Each person's duties are clearly defined in our family.  True  False
70. We can do whatever we want to in our family.  True  False
71. We really get along well with each other.  True  False
72. We are usually careful about what we say to each other.  True  False
73. Family members often try to one-up or out-do each other.  True  False
74. It's hard to be by yourself without hurting someone's feelings in our household.  True  False



75. “Work before play” is the rule in our family.  True  False
76. Watching T.V. is more important than reading in our family.  True  False
77. Family members go out a lot.  True  False
78. The Bible is a very important book in our home.  True  False
79. Money is not handled very carefully in our family.  True  False
80. Rules are pretty inflexible in our household.  True  False
81. There is plenty of time and attention for everyone in our family.  True  False
82. There are a lot of spontaneous discussions in our family.  True  False
83. In our family, we believe you don’t ever get anywhere by raising your voice.  True  False
84. We are not really encouraged to speak up for ourselves in our family.  True  False
85. Family members are often compared with others as to how well they are doing at work or school.  True  False
86. Family members really like music, art and literature.  True  False
87. Our main form of entertainment is watching T.V. or listening to the radio.  True  False
88. Family members believe that if you sin you will be punished.  True  False
89. Dishes are usually done immediately after eating.  True  False
90. You can’ get way with much in our family.  True  False

Appendix E

Item Code Names

Family Environment Scale

<b>Item</b>	<b>Question</b>	<b>Code Name</b>
FES 2	“Family members often keep their feelings to themselves”,	FeelingsToSelf
FES 4	“We don’t do things on our own very often in our family”,	DontDoThingsAlone
FES 5	“We feel it is important to be best as whatever you do”	ImportantBeBest
FES 9	“Activities in our family are pretty carefully planned”	CarefullyPlannedActivities
FES 13	“Family members rarely become openly angry”,	RarelyOpenlyAngry
FES 14	“In our family, we are strongly encouraged to be independent”	IndependenceEncouraged
FES 15	“Getting ahead in life is very important in our family”	GettingAheadImportant
FES 16	“We rarely go to lectures, plays or concerts”,	RarelyLecturesPlaysConcerts
FES 17	“Friends often come over for dinner or to visit”	DontComeDinner
FES 18	“We don’t say prayers in our family”	DontSayPrayers
FES 25	“How much money a person makes is not very important to us”	SalaryNotImportant
FES 27	“Nobody in our family is active in sports, Little League, bowling, etc.”,	NotActiveInSports
FES 28	“We often talk about the religious meaning of Christmas, Passover, or other holidays”	ReligiousTalk
FES 29	“It’s often hard to find things when you need them in our household”,	HardToFindThings
FES 31	“There is a feeling of togetherness in our family”	TogethernessFeeling
FES 34	“We come and go as we want to in our family”,	ComeAndGoFreely
FES 35	“We believe in competition and ‘may the best man win’”	BelieveInCompetition
FES 39	“Being on time is very important in our family”	OnTimeImportant
FES 40	“There are set ways of doing things at home”	SetWays
FES 44	“There is very little privacy in our family”,	LittlePrivacy
FES 45	“We always strive to do things just a little better the next time”,	StriveLittleBetter
FES 49	“People change their minds often in our family”	ChangeMindsOften
FES 51	“Family members really back each other up”,	BackEachotherUp
FES 53	“Family members sometimes hit each other”,	HitEachother
FES 56	“Someone in our family plays a musical instrument”,	PlayInstrument
FES 57	“Family members are not very involved in recreational activities outside work and school”	NotInvolvedInRecreational
FES 59	“Family members make sure their rooms are neat”,	RoomsNeat
FES 62	“Money and paying bills is openly talked about in our family”,	MoneyTalkedAbout
FES 73	“Family members often try to one-up or out-do each other”	OneUpEachother
FES 74	“It’s hard to be by yourself without hurting someone’s feelings in our household”,	HurtOthersByBeingYourself
FES 76	“Watching T.V. is more important than reading in our family”,	WatchingTV>Reading
FES 77	“Family members go out a lot”,	GoOutALot
FES 80	“Rules are pretty inflexible in our household”	InflexibleRules

FES 85	“Family members are often compared with others as to how well they are doing at work or school”,	ComparedToEachother
FES 86	“Family members really like music, art and literature”,	LikeMusicArtLit
FES 89	“Dishes are usually done immediately after eating”,	DishesDoneImmediately
FES 90	“You can’t get away with much in our family”	Don’tGetAwayWithMuch

Revised Children’s Anxiety & Depression Scale

<b>Item</b>	<b>Question</b>	<b>Code Name</b>
RCADS 6	“Nothing is much fun anymore”,	NothingFunAnymore
RCADS 8	“I feel worried when I think someone is angry with me”	WorriedWhenOthersAngry
RCADS 9	“I worry about being away from my parents”	WorryAwayFromParents
RCADS 12	“I worry that I will do badly at my school work”,	WorryBadlyAtSchool
RCADS 17	“I feel scared if I have to sleep on my own”	ScaredSleepAlone
RCADS 24	“When I have a problem, my heart beats really fast”,	HeartBeatsDuringProblems
RCADS 30	“I worry about making mistakes”	WorryMakingMistakes
RCADS 31	“I have to think of special thoughts (like numbers or words) to stop bad things from happening”	SpecialThoughtsStopBadThings
RCADS 38	“I feel afraid if I have to talk in front of my class”,	ScaredTalkInClass
RCADS 46	“I would feel scared if I had to stay away from home overnight.”	ScaredAwayFromHomeOvernight

## REFERENCES

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Springer Series in Statistics. doi:10.1007/978-1-4419-6824-1

Curriculum Vitae

Mirae J. Fornander

Formerly Mirae J. Nakouzi

EDUCATION

University of Nevada, Las Vegas Las Vegas, NV August 2015-Present
Doctoral Student in Clinical Psychology
Academic Adviser: Christopher A. Kearney, Ph.D.
Expected Graduation May 2021
Current GPA: 3.82

Hastings College Hastings, NE August 2011-May 2015
Bachelor of Arts in Psychology with a Political Science Minor
Academic Adviser: Jeri Thompson, Ph.D.
Graduated May 2015
Cumulative GPA: 3.92

HONORS AND AWARDS

Table with 3 columns: Award Name, Institution, and Year. Includes Lovinger Award, OUMP Mentor Award, Patricia Sastaunik Scholarship, etc.

RESEARCH EXPERIENCE

Kearney Lab August 2015-Present
University of Nevada, Las Vegas
Faculty Advisor: Christopher A. Kearney, Ph.D.
Lab Manager

Duties include managing data collection and analyses; coordinating poster and oral presentations; collaborating with community organizations (e.g., Clark County School District, The Harbour, The PRACTICE, Truancy Diversity Program, etc.); managing lab procedures; and training and supervising up to eighteen undergraduate research assistants and six graduate students.

Selective Mutism Labs December 2017-Present
University of Nevada, Las Vegas



# Mirae J. Fornander

Formerly Mirae J. Nakouzi

Faculty Advisor: Christopher A. Kearney, Ph.D.

*Principal Investigator*

## **Communication and Behavior Factors in a Community Sample of Youth with Selective Mutism**

There is debate in the current selective mutism literature about the typology of youth with selective mutism. Recent studies have pointed towards internalizing, externalizing, behavioral, and communication difficulties in this population. Despite this debate there is a lack of research working to identify symptom profiles in youth with selective mutism. The purpose of this study is to examine parental perception of social, emotional, and behavioral functioning and communication abilities of different children with selective mutism. This study aims to inform current assessment and intervention methods for youth with selective mutism. Data is currently being collected via an online survey, including consent, the Child Behavior Checklist, the Selective Mutism Questionnaire, the Children's Communication Checklist-2, questions adapted from the DSM V selective mutism criteria, and one question regarding the length of time their child has received treatment for selective mutism. Coordination with relevant national organizations, including the Selective Mutism Association, was necessary to disseminate the survey. Data collection is anticipated to end August of 2019. Results may have important implications for the early identification, prevention, and intervention for youth with selective mutism.

## **The UNLV Child School Refusal and Anxiety Disorders Clinic**

University of Nevada, Las Vegas

Faculty Advisor: Christopher A. Kearney, Ph.D.

*Undergraduate McNair Scholars Institute Student Mentor*

March 2018-Present

Provided research mentorship and guidance to one undergraduate McNair Scholars Institute student. The aim of the study was to evaluate the effectiveness of The UNLV Child School Refusal and Anxiety Disorders Clinic selective mutism parent training and child treatment group intervention.

*Principal Investigator*

August 2015-Present

## **Master's Thesis: Identifying Youth at Risk for Problematic School Absenteeism Using Nonparametric Modeling: The Impact of Youth Psychopathology and Family Risk Factors**

The best cutoff to differentiate problematic school absenteeism from nonproblematic school absenteeism has yet to be identified in the literature despite the necessity of defined cutoffs to contemporary classification systems. This study aimed to inform the MTSS approach while also contributing to early identification, assessment, and intervention methods for those youth and families at the highest risk of problematic school absenteeism and its negative consequences. This study identified subgroups of youth at the highest risk of problematic absenteeism defined as 1% and 10% of full school days missed cutoffs. Interactions among family environment and youth psychopathology risk factors were evaluated at each cutoff. Participants included 378 elementary, middle, and high school students and their families from clinic and community settings. Classification and Regression Tree (CART) procedures via SPSS decision tree software were utilized to identify profiles of youth and the most relevant family environment and youth psychopathology risk factors at each cutoff. The first set of hypotheses involved family environment factors that may predict absenteeism severity. Similarly, the second set of hypotheses involved youth psychopathology factors that may predict absenteeism severity. The hypotheses were partially supported. Implications for clinicians, researchers, and educators are discussed.

*Graduate Research Assistant*

August 2015-August 2017

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Conducting research on the effectiveness of a Las Vegas Truancy Diversion Program for youth identified as truant. This study also evaluates truancy rates and environmental, youth, and family risk factors. Participants include approximately 410 middle school and high school youth between the ages of 9 and 19. Duties include conducting assessments, managing databases, executing data analysis via SPSS, conference presentations, collaborating on publications, and training and supervising research assistants. Assessments and data collection are ongoing.

## **Hastings College**

Hastings, NE

Faculty Advisor: Stephanie Furrer, Ph.D.

*Undergraduate Research Assistant*

October 2013-May 2015

Conducted research on the impact of nature on the attention and mood of 5<sup>th</sup> and 6<sup>th</sup> grade students. Duties included designing research studies, developing survey instruments for students and parents, compiling cognitive assessments, recruiting participants, collecting data, coding data, managing databases, executing data analysis via SPSS, and conference presentations.

## **Mary Lanning Healthcare**

Hastings, NE

Advisor: Dani Holtzclaw, M.S.

*Undergraduate Research Intern*

January 2014-May 2014

Initiated research on patient satisfaction of an outpatient clinic. Duties included creating survey instruments, collecting data via an in-house data system, managing databases, analyzing data, presenting data to a quality improvement team and staff. Findings of the study were utilized to suggest policy changes to increase patient satisfaction.

## **South Heartland District Health Department**

Hastings, NE

Advisor: Michele Bever, Ph.D. & Desiree A. Rinne

*Undergraduate Research Intern*

December 2012-May 2013

Conducted research on distracted driving through interviews with parents, middle and high school Students, and law enforcement officers. Duties included collecting data, managing databases, and analyzing data via Excel. Findings of the study were utilized to inform a workshop for high school students and presented at area schools, health fairs, and executive meetings. Additional projects included collecting radon testing data via telephone and coding the data.

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## **CLINICAL EXPERIENCE**

### **Children's Specialty Center of Nevada/Cure 4 The Kids Foundation**

Primary Supervisor: Danielle T. Bello, Ph.D.

*Doctoral Practicum Student*

August 2018-Present

Conducting comprehensive neuropsychological assessments and writing integrated reports in a pediatric hospital setting for children and adolescents with chronic medical conditions. Participating in a multidisciplinary treatment team with medical personnel. Attending weekly grand rounds and bi-monthly

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specialty clinics (i.e., sickle cell) with the multidisciplinary treatment team. Providing brief behavioral, cognitive-behavioral, and parent training interventions to patients and their parents as deemed necessary by the treatment team. Common referrals include oncology, hematology, rheumatology, and genetic disorders. Primary psychological diagnoses include cognitive disabilities, neurodevelopmental disorders, learning disorders, anxiety disorders, and behavioral disorders. Received weekly supervision.

## **The UNLV Child School Refusal and Anxiety Disorders Clinic**

University of Nevada, Las Vegas

Primary Supervisor: Christopher A. Kearney, Ph.D.

### *Selective Mutism Group Leader*

February 2018-May 2018

An evidence-based selective mutism group treatment was adapted and formalized to be utilized in the clinic. The group involved a parent training portion and a child behavioral treatment portion. Services were provided to diverse populations of children between the ages of 4-8 years and their families. Individual intake and post-treatment assessments were conducted for each group member as well as individual sessions with families during treatment as needed. Frequent consultations with school based and medical personnel were coordinated weekly. Six undergraduate research assistants and three fellow doctoral practicum students were trained and supervised weekly. Received weekly supervision.

### *Doctoral Practicum Student*

August 2017-May 2018

Evidence-based manualized interventions were provided to a caseload of 6-9 clients via a cognitive-behavioral orientation emphasizing exposure techniques. Services were provided to diverse populations of children and adolescences between the ages of 6-16 years and their families. Individual and family therapy was utilized. Clients presented with significant school-based anxiety and comorbid diagnoses, including generalized anxiety disorder, social anxiety disorder, selective mutism, major depressive disorder, oppositional defiant disorder, conduct disorder, and adjustment disorder. Evidence-based assessments were provided with an aim to assign diagnoses, develop treatment plans, and refer to relevant providers or services. Frequent consultations with school based and medical personnel was utilized for case management. Six undergraduate research assistants were trained and supervised weekly. Formalized clinic procedures were created to increase clinician organization and client satisfaction. Received weekly supervision.

## **The PRACTICE: A UNLV Community Mental Health Center**

August 2016-August 2017

University of Nevada, Las Vegas

Primary Supervisor: Andrew Freeman, Ph.D.

### *Doctoral Practicum Student*

Provided evidence-based assessment and manualized intervention to a caseload of 5-9 clients. A cognitive-behavioral orientation was utilized along with motivational interviewing and problem-solving techniques. Services were provided to diverse populations. The majority of clients were children and adolescents between the ages of 2-16 years and their families. Diagnoses included both externalizing (attention-deficit/hyperactivity disorder and oppositional defiant disorder) and internalizing (major depressive disorder, persistent depressive disorder, disruptive mood dysregulation disorder, posttraumatic stress disorder, obsessive-compulsive disorder, trichotillomania, generalized anxiety disorder, and social anxiety disorder) disorders. Comprehensive assessments focused on differential diagnosis, developing treatment plans, and providing applicable referrals. Case conceptualization presentations were given during weekly case rounds. Received weekly individual supervision.

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**The UNLV Child School Refusal and Anxiety Disorders Clinic**  
University of Nevada, Las Vegas  
Primary Supervisor: Christopher A. Kearney, Ph.D.

August 2015-May 2016

## *Graduate Assistant*

Assisted doctoral practicum students in providing psychological assessment and treatment to children with school-based anxieties. Provided evidence-based group therapy for parents of children between the ages of 5-7 years old with selective mutism. A cognitive-behavioral orientation was utilized. Received weekly peer to peer supervision.

## **The Lanning Center**

Hastings, NE  
Primary Supervisor: Jeromy Warner, Psy.D.

August 2014-December 2015

## *Intern*

Assisted and observed a neuropsychologist in his daily duties. Duties included assisting with facilitating personality, intelligence, and neuropsychological testing, scoring assessments, reviewing medical records, observing assessment feedback, and observing individual therapy.

## **Hastings Public School District**

Hastings, NE  
Primary Supervisor: Krystal A. Posey, Ed.S. & Rhonda McBride, Ed.S.

August 2014-December 2015

## *Intern*

Shadowed two school psychologists at the high school and elementary level. Duties included assisting with facilitating and scoring intelligence and behavioral assessments, conduct in-class student observations, and attending individualized educational plan meetings.

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## PROFESSIONAL TRAINING

**Fostering Cultural Humility: Expanding Perspectives about Self and Others** Miguel E. Gallardo, Psy.D. April 2018  
1-day training on evidence-based methods to reduce school truancy and juvenile delinquency in Charter Schools

**Charter School Climate Summit** Various Presenters December 2017  
1-day training on evidence-based methods to reduce school truancy and juvenile delinquency in Charter Schools

**Screening, Brief Intervention, Referral to Treatment** Sara Hunt, Ph.D. October 2017  
Brief training sponsored by the Lincy Institute

**Doing Business as a Psychologist** Larry Waldman, Ph.D. September 2017  
1-day training sponsored by the Nevada Psychological Association

**School Justice Partnership Summit** Various Presenters September 2017  
1-day training on evidence-based methods to reduce school truancy and juvenile delinquency

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# Mirae J. Fornander

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**Linear Regression Workshop** Andrew Freeman, Ph.D. May 2017  
4-day training on regression analyses, utilization of R technology, and interpreting results

**Interprofessional Education** Various Presenters March 2017  
1-day training on interprofessional patient care and poverty simulation

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## TEACHING EXPERIENCE

**Graduate Student Online Instructor** August 2018-Present  
University of Nevada, Las Vegas  
*Foundations of Social Psychology PSY 360*

Teaching two sections of an online undergraduate psychology course per semester. Educational goals of the class include familiarizing students with the basic concepts in social psychology, developing critical thinking abilities specifically related to research, familiarize students with practical evaluations of social psychology research, and enhancing library and computer skills. Duties include developing class material, developing examinations, monitoring student conversations, grading, providing student feedback, linking students to applicable services, and providing at least two office hours a week.

**Graduate Student Summer Instructor** July 2018-August 2018  
University of Nevada, Las Vegas  
*General Psychology PSY 101*

Teaching one section of an accelerated undergraduate introductory psychology course. Educational goals of the class included developing an understanding of the discipline of psychology, developing scientific values and skills, fostering personal growth, and enhancing library and computer skills. Duties included developing lecture, lecturing daily, developing examinations, grading, providing student feedback, linking students to applicable services, and providing at least two office hours a week.

**Graduate Student Instructor** August 2017-May 2018  
University of Nevada, Las Vegas  
*General Psychology PSY 101*

Taught two sections of an undergraduate introductory psychology course per semester. Educational goals of the class included developing an understanding of the discipline of psychology, developing scientific values and skills, fostering personal growth, and enhancing library and computer skills. Duties included developing lecture, lecturing weekly, developing examinations, grading, providing student feedback, linking students to applicable services, and providing at least two office hours a week.

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## APPLICABLE TEACHING EXPERIENCE

**Workshop Leader** April 2018 & November 2017  
University of Nevada, Las Vegas  
*Applying to Graduate School*

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Developed and presented a workshop on the nuts and bolts of the graduate school application preparation and completion process focusing on experimental psychology and clinical psychology.

## **Workshop Leader**

December 2017

University of Nevada, Las Vegas  
*Study and Writing Skills*

Developed and presented a workshop on relevant research, study, and writing skills for underrepresented psychology majors within the department.

## **Teaching Assistant**

January 2017-May 2017

University of Nevada, Las Vegas  
Professor: Mary Powell, Ph.D.  
*Motivation and Emotion PSY 412*  
*Personality PSY 435*

Administered exams, grading exams, grading student assignments, and performing miscellaneous administrative duties.

## **Peer Educator**

December 2012-May 2013

Hastings College  
*Campus Acquaintance Rape Educators (CARE)*

C.A.R.E is a college-based peer education group with an aim to educate college students on the prevention of sexual violence, unhealthy relationships, and the promotion of healthy relationships. Duties included providing weekly classes to incoming students and developing educational events throughout the year.

## **Ambassador**

September 2010-May 2012

Hastings College  
*Know How 2 Go*

Know How 2 Go is a campaign launched by the American Council on Education with a purpose to educate high school students on college preparation. Duties included attending training on evidence-based college-readiness initiatives and providing presentations to area high schools.

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## **LEADERSHIP AND SERVICE**

Selective Mutism Association (SMA)

### **Board Member**

2017-Present

The purpose of SMA is to educate the public about selective mutism and related anxiety disorders, promote evidence-based research, advocate for individuals with these diagnoses, and provide support for professionals, individuals, and their families. Duties include planning and attending the SMA national conference, engaging in bi-monthly conference calls, participating in board committees, and engaging in leadership roles throughout the association.

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Outreach Undergraduate Mentoring Program (OUMP)  
University of Nevada, Las Vegas

**Graduate Student Mentor**

2015-Present

The purpose of OUMP is to provide mentorship to undergraduate psychology students from under-represented backgrounds in order to increase student retention and graduate school applications. Duties include one-on-one mentoring, linking students to resources (e.g., faculty, contacts, research experience, etc.), providing CV development, editing application materials, guiding career planning, and attending mentoring training.

Clinical Student Committee (CSC)

University of Nevada, Las Vegas

**President**

2018-2018

**Cohort Representative**

2015-2016, 2016-2017 & 2017-2018

The purpose of the CSC is to be the voice of clinical psychology doctoral students to department faculty and other relevant committees. Duties include attending monthly meetings, planning student events, engaging in additional committees relevant to the purpose of the CSC.

Graduate & Professional Student Association (GPSA)

University of Nevada, Las Vegas

**Psychology Department Representative**

2014-2015

The purpose of GPSA is to advocate for and be the voice of graduate and professional students at UNLV. Duties include attending monthly meetings, advocating for the specific needs of the psychology department, engaging in sub-committees, and relaying relevant information to psychology graduate students.

Model United Nations (MUN)

Hastings College

**Vice President**

2014-2015

The purpose of MUN includes representing an assigned country at a national conference with the goal of engaging in diplomatic negotiations. Duties include obtaining a substantial knowledge of current global issues, writing comprehensive proposals, giving speeches, negotiating and collaborating with others, understanding the rules of procedure, and managing the members of the team.

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## PUBLICATIONS

Kearney, C.A., & **Fornander, M.J.** (2018). School refusal behavior and absenteeism. In R.J.R. Levesque (Ed.), *Encyclopedia of adolescence* (2nd ed.) (pp. 3298-3303). New York: Springer.

Skedgell, K.K., **Fornander, M.**, & Kearney, C.A. (2017). Personalized Individual and Group Therapy for Multifaceted Selective Mutism. *Clinical Case Studies*, *16*(2), 166–181.

# Mirae J. Fornander

Formerly Mirae J. Nakouzi

<https://doi.org/10.1177/1534650116685619>

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## PROFESSIONAL PRESENTATIONS

- Howard, A.N., Velasco, V., **Fornander, M.J.**, Gerthoffer, A., Bacon, V., Kearney, C.A. (Expected 2018, August). Reexperiencing Symptoms in Childhood PTSD Act as a Protective Factor Against Dissociative Symptoms. Poster to be presented at the *American Psychological Association (APA)*, San Francisco, CA.
- Fornander, M.J.**, Lozano, A., Perez, F., Rodriguez, A., Bacon, V., Howard, A., Gerthoffer, A., & Kearney, C.A. (2018, May). School climate risk and protective factors of school refusal behavior. Poster presented at the Nevada Psychological Association (NPA), Las Vegas, NV.
- Velasco, V., Howard, A., **Fornander, M. J.**, Gerthoffer, A., Bacon, V., Kearney, C. (2018, May). PTSD symptom clusters predict dissociative symptoms in maltreated youth. Poster presented at the *Nevada Psychological Association (NPA)*, Las Vegas, NV.
- Fornander, M.J.** (2018, April). Identifying youth at risk for problematic school absenteeism using nonparametric modeling: The impact of youth psychopathology and family environment risk factors. Oral presentation at the University of Nevada, Las Vegas Psychology Department Research Fair, Las Vegas, Nevada.
- Velasco, V., Howard, A., **Fornander, M. J.**, Gerthoffer, A., Bacon, V., Kearney, C. (2018, April). PTSD symptom clusters predict dissociative symptoms in maltreated youth. Poster presented at the *Western Psychological Association (WPA)*, Portland, OR.
- Kearney, C.A., **Fornander, M.J.**, Howard, A., & Bacon, V. (2018, March). *The role of the School Refusal Assessment Scale in an evolving multi-tiered system of supports model*. Oral paper presented at the meeting of the Lorentz Center conference on School absenteeism: Universal problem seeks gold standard solutions, Leiden, Netherlands.
- Kearney, C.A., **Fornander, M.J.**, Howard, A., & Bacon, V. (2018, March). *The short version of a long, troubled history of differentiating among school attendance problems*. Oral paper presented at the meeting of the Lorentz Center conference on School absenteeism: Universal problem seeks gold standard solutions, Leiden, Netherlands.
- Fornander, M.J.**, Howard, A.N., Gerthoffer, A., Skedgell, K.K., Bacon, V., & Kearney, C.A. (2017, November). Youth spoken language and ethnic identity are associated with important protective factors against school refusal behavior. Poster presented at the annual convention for the Association of Behavioral and Cognitive Therapies, San Diego, CA.
- Fornander, M.J.**, Howard, A.N., Gerthoffer, A., Skedgell, K.K., Bacon, V., & Kearney, C.A. (2017, May). Youth spoken language and ethnic identity are associated with important protective factors against school refusal behavior. Poster presented at the Diversity Research & Mentorship Reception, Las Vegas, NV.
- Fornander, M.J.**, Howard, A.N., Gerthoffer, A., Skedgell, K.K., Bacon, V., & Kearney, C.A. (2017,



# Mirae J. Fornander

Formerly Mirae J. Nakouzi

May). Youth spoken language and ethnic identity are associated with important protective factors against school refusal behavior. Poster presented at the Nevada Psychological Association Annual Conference, Las Vegas, NV.

Kearney, C.A., **Fornander, M.J.**, & Howard, A.N. (2017, March). Assessment and intervention for problematic school absenteeism. Oral presentation at the School Social Work Association of America Conference, San Diego, CA.

**Fornander, M.J.**, Sheldon, K.K., & Kearney, C. (2016, October). School refusal. Oral presentation at the Nevada Association of School Psychologists Conference, Las Vegas, NV.

Sheldon, K.K., **Fornander, M.J.**, & Kearney, C. (2016, October). Selective mutism group treatment. Poster presented at the Selective Mutism Group Conference, Manhattan Beach, CA.

Sheldon, K.K., **Fornander, M.**, & Kearney, C. (2016, September). ADHD symptoms in youth who are truant. Poster presented at the Society for Police and Criminal Psychology Conference, Austin, TX.

Burke, M., Delgado, J., **Nakouzi, M.**, & Sharp, M. (2015, March). Does type of activity impact the positive effect of nature on students' attention and mood? Oral presentation at the Great Plains Students' Psychology Convention, Wichita, KS.

**Nakouzi, M.**, Wendland, M., Lee, R., Kemler, J., Gonzales-Hunter, T., & Easter, S. (2015, April) Forging global alliances: Practicing diplomacy at National Model United Nations. Oral presentation at Academic Showcase, Hastings, NE.

Burke, M., Delgado, J., **Nakouzi, M.**, & Sharp, M. (2015, April). Does type of activity impact the positive effect of nature on students' attention and mood? Oral presentation at Academic Showcase, Hastings, NE.

Burke, M., Delgado, J., **Nakouzi, M.**, & Sharp, M. (2014, April). Does type of activity impact the positive effect of nature on students' attention and mood? Oral presentation at Academic Showcase, Hastings, NE.

**Nakouzi, M.**, Wendland, M., Lee, R., Kemler, J., & Gonzales-Hunter, T. (2014, April) Exploring world politics through the National Model United Nations. Oral presentation at Academic Showcase, Hastings, NE.

**Nakouzi, M.** (2014, April). Factors that impact terrorist recruitment. Oral presentation at Midwest Political Science Undergraduate Research Conference, Parkville, MO

**Nakouzi, M.** & Droege, T. (2013, December). Body image awareness week at Hastings College. Poster presented at Active Minds National Conference, Washington D.C.

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## EMPLOYMENT EXPERIENCE

Hastings College Psychology Department  
Hastings, NE

# Mirae J. Fornander

Formerly Mirae J. Nakouzi

**Student Worker** January 2015-May 2015  
Assisted professors with grading, organization, and clerical tasks. Duties also included researching and implementing a mentoring program to increase student retention and satisfaction.

Hastings College Admissions Department  
Hastings, NE

**Tour Guide** August 2011-May 2015  
Duties included recruiting new students, providing tours to prospective students, preparing events, and establishing relationships with prospective students.

Department of Health and Human Services  
Hastings, NE

**Caregiver** October 2013-December 2015  
Assisted and mentored a client with multiple diagnoses by providing transportation, teaching daily living skills, and providing companionship. Duties relied upon rapport building, active listening, and problem-solving to provide the best possible care.

NebraskaLand Days  
North Platte, NE

**Office Assistant** May 2015-June 2015  
Assisted the director with event planning, ticket sales, and customer service for a weeklong celebration of Nebraska history attended by 30,000 people.

Hastings College Student Affairs  
Hastings, NE

**Resident Assistant** April 2012-May 2014  
Assisted students with their transition to college as a mentor and role model. Duties included building relationships with students, enforcing dorm and campus rules, problem-solving student concerns, and managing student crises. Utilized skills learned in trainings, including suicide prevention, cardiopulmonary resuscitation (CPR), automated external defibrillator (AED), and first aid.

West Central District Health Department  
North Platte, NE

**Intern** May 2013-August 2013  
Assisted the director by shadowing employees and documenting their procedures, compiling new hire procedures, creating quality improvement forms, assisting Healthy Families employees, and interacting with teen participants.

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## PROFESSIONAL AFFILIATIONS

Association of Behavioral and Cognitive Therapies (ABCT)	2017-Present
APA Division 2: Society for the Teaching of Psychology (STP)	2017-Present
Association for Psychological Science (APS)	2017-Present
American Psychological Association (APA)	2016-Present
American Psychological Association of Graduate Students (APAGS)	2016-Present
Nevada Psychological Association (NPA)	2016-Present

# Mirae J. Fornander

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Society for Police and Criminal Psychology (SPCP)

2015-2016

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## PROFESSIONAL CERTIFICATIONS

AED Certified	2014-Present
CPR and First Aid	2014-Present
Question, Persuade and Refer Suicide Prevention	2014-Present

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## GRANTS AWARDED

<i>Imagine Grant</i>	<i>Hastings College</i>	<i>\$3,300</i>	<i>October 2013</i>
<i>Student Development Fund</i>	<i>Hastings College</i>	<i>\$500</i>	<i>October 2013</i>
<i>HC Travel and Experiential Learning Fund</i>	<i>Hastings College</i>	<i>\$1,000</i>	<i>October 2014</i>

*References Available Upon Request*