

THE INFLUENCE OF PARENTING FACTORS AND CHILD RESILIENCE  
ON MENTAL HEALTH IN CHILDREN  
WITH TYPE 1 DIABETES

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## DEDICATION

My dissertation thesis is first and foremost dedicated to the more than one million children and adults living with type 1 diabetes and the parents/caregivers who love them. This disease can be viewed as a burden and an obstacle, but it can also be used as a lesson in strength, courage, and an inspiration to create change. My hope is that I can help others realize we are stronger when united and when we are able to lean on each other for support.

This dissertation is also dedicated to my mother, the ultimate caregiver, and my role model for strength and resilience. Thank you for endless advocacy, carb counting, finger pricks, insulin unit counting, insulin shots, late-night juice boxes, phone calls, and doctor visits.

To my father and brother, who taught me that with hard work and persistence, any life adversity can be transformed from an obstacle into a motivating force towards achieving goals I once never thought possible.

Thank you to my husband for your many sacrifices (big and small) and your support and encouragement while I worked towards my degree. I am forever grateful for your unwavering belief in my abilities and for being my advocate. Thank you for your flexibility and allowing me to dedicate time and effort to achieve this goal.

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## ABSTRACT

NICOLE CARROLL, M.S.

### THE INFLUENCE OF PARENTING FACTORS AND CHILD RESILIENCE ON MENTAL HEALTH IN TYPE 1 DIABETIC CHILDREN

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The purpose of this study was to compare parent-reported measures of child resilience, child mental health, parent stress, and parenting self-efficacy between a group of parents of children diagnosed with type 1 diabetes (T1D; ages of 6-12 years old) and a group of parents with typically-developing children without chronic illness (ages of 6-12 years old). The four hypotheses were as follows: 1) Parents of children diagnosed with T1D will have higher levels of stress than parents of children without T1D. 2) Children diagnosed with T1D will have higher levels of parent-reported child mental health issues than children without T1D. If hypothesis 1 is supported, then the influence of parent stress will be included in this analysis. 3) The relationship between a diagnosis of T1D and parent-reported child mental health issues is moderated by the child's level of parent-reported psychological resilience. 4) The relationship between a diagnosis of T1D and parent-reported child mental health issues is moderated by the parent's level of parenting self-efficacy. For Hypotheses 1 and 2, it was found that parents of children with T1D reported significantly higher amounts of both parent stress and parent-reported child mental health issues than comparison group parents. However, once the effect of parent stress and parenting self-efficacy had been accounted for, there was no longer a

significant difference in child mental health issues. For Hypotheses 3 and 4, while the individual predictor of child group status (*type 1 diabetic, comparison group*) significantly affected the outcome variable, neither of the moderating variables of child resilience or parenting self-efficacy significantly influenced the relationship between child group status and amount of child mental health issues. In conclusion, the moderating variables of child resilience and parenting self-efficacy were found to not significantly affect the amount of child mental health issues differently based on whether the child had been diagnosed with type 1 diabetes or had no chronic illness.

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## CHAPTER I

### INTRODUCTION

#### **Statement of The Problem**

Research on the psychosocial development of children with type 1 diabetes (T1D) is essential to the overall health and well-being of this population. T1D is a chronic, autoimmune illness commonly diagnosed in childhood. It is different from type 2 diabetes, because it is not preventable, is irreversible, and has no known cure (American Diabetes Association [ADA], 2012; 2018). In individuals with T1D, the pancreas stops producing insulin, and daily treatment and management of the disease becomes the responsibility of the diabetic. Due to the age at diagnosis, which is most common in childhood, the parent or caregiver is most likely to take on this responsibility for the child with T1D.

A T1D diagnosis of a child and the daily burden of disease management that follows can have profound effects on levels of parental stress and the parents' beliefs about their parenting abilities, as well as the child's psychological resilience and mental health. It is well-documented that parents of children with T1D often have increased levels of stress (Moreira, Frontini, Bullinger, & Canavarro, 2014) and that parent stress can affect the T1D child's mental health status (Lewin et al., 2005). Research has thus far demonstrated that children with T1D have increased likelihood of depression and anxiety (Majidi, Driscoll, & Raymond, 2015; Reynolds & Helgeson, 2011); however, less is known about specific factors that influence the mental health issues in this population.

Research demonstrates that the prevalence of mental health issues, such as depression and anxiety, are high in the T1D population (Buchberger et al., 2016).

Research on the relationship between mental health and this disease is very important, because it has been demonstrated that mental health and disease management in diabetes greatly influence each other (Egede & Dismuke, 2011; Sacco & Bykowski, 2010). However, studies on this relationship have frequently used an adolescent or adult population rather than a childhood population (defined as 12 years of age and younger). The prevalence of T1D is higher in adolescence, in contrast to childhood, due to the nature of T1D diagnosis. Therefore, less is known about the nature of the disease and mental health development in a childhood population. This study will attempt to fill in this gap of research on the topic of T1D and mental health in childhood.

A majority of research on T1D has examined psychological and social concepts which relate specifically to improving diabetes management and treatment adherence, instead of attempting to understand mental health development within this population (Hilliard, Wu, Rausch, Dolan, & Hood, 2013; Wiebe, Berg, Mello, & Kelly, 2018). Studies that make understanding the mental health of a T1D child population a primary priority are rare. It is crucial to broaden the focus of this topic and make the mental health issues of this population a priority.

This study aimed to fill several gaps in the research literature on studies that use a child population with T1D. This study explored the topic of general parenting self-efficacy of T1D parents, the topic of childhood resilience and child mental health, and used a young population with T1D (ages 6-12). Additionally, this study incorporated a comparison group in studying this population.

## **Theoretical Framework**

### **Biopsychosocial Model**

This study used a theoretical framework called the biopsychosocial model, proposed by George Engel (1977; see Figure 1). This model emphasizes that the development of the individual occurs through a complex interaction of biological factors (genetic, health, disease), psychological factors (mental health, personality, behavior), and social factors (parenting, family, socioeconomic, medical). Specifically, Engel proposed that disease and the physical health of the individual are strongly influenced by both psychological and social factors. Additionally, the development of mental health of the individual is influenced by the individual's physical health, such as disease or chronic illness, and social factors such as the influence of family and medical access.

This model has had a large influence on the medical field and research applying to populations with chronic illness. Development of this model was intended to help describe both illnesses and psychological problems (Engel, 1977). The biopsychosocial model has previously been applied to populations with T1D before (Rassart et al., 2016), and serves as an effective framework for a study incorporating both social and psychological aspects of a child population with chronic illness. Parenting factors, such as parenting self-efficacy and parent stress, are considered social factors within the biopsychosocial model for the child's development. The child's individual psychological factors, such as child mental health and child resilience, are heavily influenced by the child's biological factors, such as physical health and T1D.

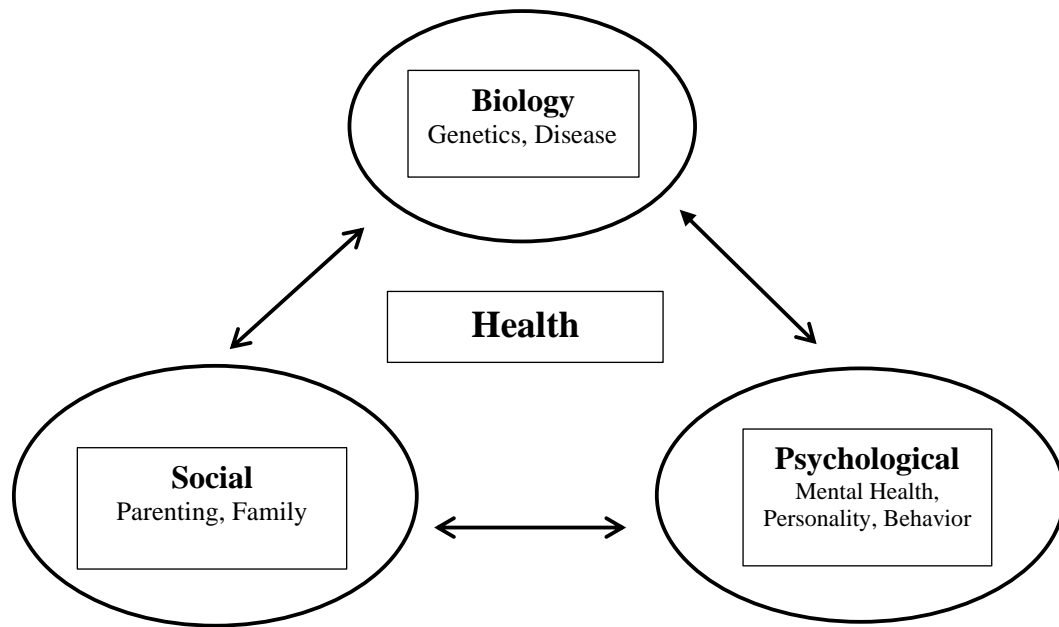


Figure 1. The Biopsychosocial Model

### Self-Efficacy

One specific factor that was assessed in this study was a theoretical concept from social cognitive development theory called *self-efficacy* (Bandura, 1986; 1997). Self-efficacy is defined as the “beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (Bandura, 1997, p. 3). The concept of self-efficacy is theorized to be specific to one task or area at hand, as opposed to beliefs about one’s abilities and competence in general (Luszczynska, Gutierrez-Dona, & Schwarzer, 2005). Self-efficacy is related to the concept of motivation and has been shown to have a significant impact on an individual’s initiative or determination. Individuals are more likely to work hard when they believe they are able to complete a task, even in the face of challenging circumstances (Crain, 2000). However, the same individual will put forth less effort and be more likely to give up when the person holds a

belief of being incapable of completing a task, regardless of actual ability level for the task. The development of self-efficacy is influenced by an individual's past experiences with related tasks (Bandura, 1986). The individual's thoughts and emotions about previous experiences combine to influence what goals the individual will choose to work towards in the future, and the amount of motivation towards those goals (Crain, 2000).

*Parenting self-efficacy* can be defined as a parent's beliefs regarding their abilities to organize and execute the courses of action required as a parent. This can be considered a social factor for the child's development within the biopsychosocial model (Engel, 1977). The limited research on parenting self-efficacy within a T1D parent population has focused on diabetes-specific parenting behaviors related to disease management, rather than general parenting behaviors and abilities (Marvicsin, 2007). This is likely due to a majority of research on this topic thus far being focused on studying the physical health and disease management of this population as a primary priority. Research on overall parenting self-efficacy beliefs in this population is almost non-existent. Research has shown that parenting self-efficacy is vital to the mental health development of children in a general population (Jones & Prinz, 2005). Therefore, it is imperative that more research on this topic be conducted in order to help gain more knowledge about the mental health development of children with T1D.

## **Resilience**

In addition, a psychological factor of the Biopsychosocial Model within this study was the theoretical concept of *resilience*, defined as “the personal qualities and skills that allow for an individual's healthy/successful functioning or adaptation within the context

of significant adversity or a disruptive life event” (Lee et al., 2013, p. 269). The concept of resilience as a psychological factor within a biopsychosocial model framework for chronic illness populations has previously been examined (Black & Dorstyn, 2015). However, the examination of this concept within a parent reported T1D child sample is currently lacking (Monaghan, Clary, Stern, Hilliard, & Streisand, 2015). The current study used the individual’s amount of emotional self-regulation and responsibility as a measure of resilience (Merrell, 2011)

### **Definition of Terms**

*Type 1 diabetes* is a chronic, autoimmune illness commonly diagnosed in childhood. It is not preventable and has no known cure (ADA, 2012; 2018). The pancreas stops producing insulin, and daily treatment and management of the disease becomes the responsibility of the diabetic, or a parent/caregiver.

*Type 1 diabetes/disease management* becomes the responsibility of the individual or parent/caretaker after diagnosis. The individual is entirely insulin-dependent for survival. Management requires numerous daily tasks including treatment of insulin through insulin shots or insulin pump, daily blood glucose testing, and continuous monitoring for blood sugar symptoms (ADA, 2012).

*Self-efficacy* is the “beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (Bandura, 1997, p. 3).

*Parenting self-efficacy* can be defined as a parent’s beliefs regarding their abilities to organize and execute the courses of action required as a parent.



*Resilience* is “the personal qualities and skills that allow for an individual’s healthy/successful functioning or adaptation within the context of significant adversity or a disruptive life event” (Lee et al., 2013, p. 269).

*Self-regulation/responsibility* of the child is the “self-awareness, metacognition, intrapersonal insight, self-management, direction, ability to accept responsibility, and ability to think before acting” (Merrell, 2011, p. 4).

### **Purpose**

This study compared parent-reported measures of child resilience, child mental health, parent stress, and parenting self-efficacy between a group of parents of children diagnosed with T1D (ages of 6-12 years old) and a group of parents with typically-developing children without chronic illness (ages of 6-12 years old).

### **Hypotheses**

- 1) Parents of children diagnosed with T1D will report higher levels of stress than parents of children without T1D (see Figure 2).
- 2) Children diagnosed with T1D will have higher levels of parent-reported child mental health issues than children without T1D. If hypothesis 1 is supported, then parent stress will be included in this analysis. (see Figure 3).
- 3) The relationship between a diagnosis of T1D and parent-reported child mental health issues is moderated by the child’s level of parent-reported psychological resilience (see Figure 4).
- 4) The relationship between a diagnosis of T1D and parent-reported child mental health issues is moderated by the parent’s level of parenting self-efficacy (see Figure 5).

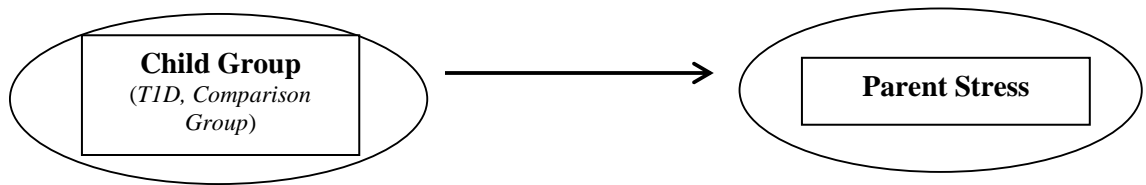


Figure 2. Hypothesis One

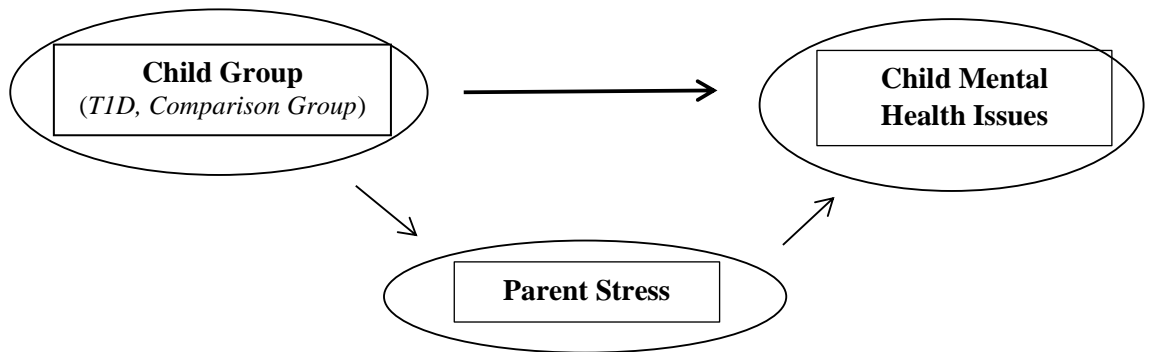


Figure 3. Hypothesis Two

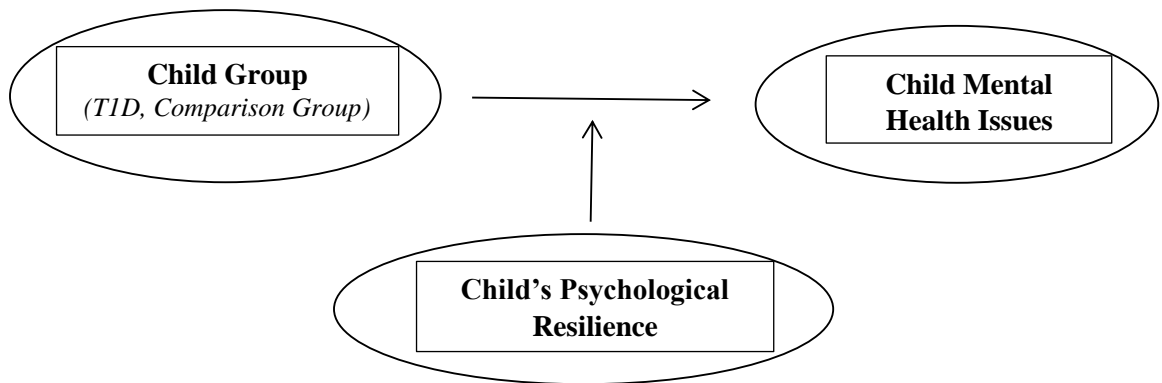
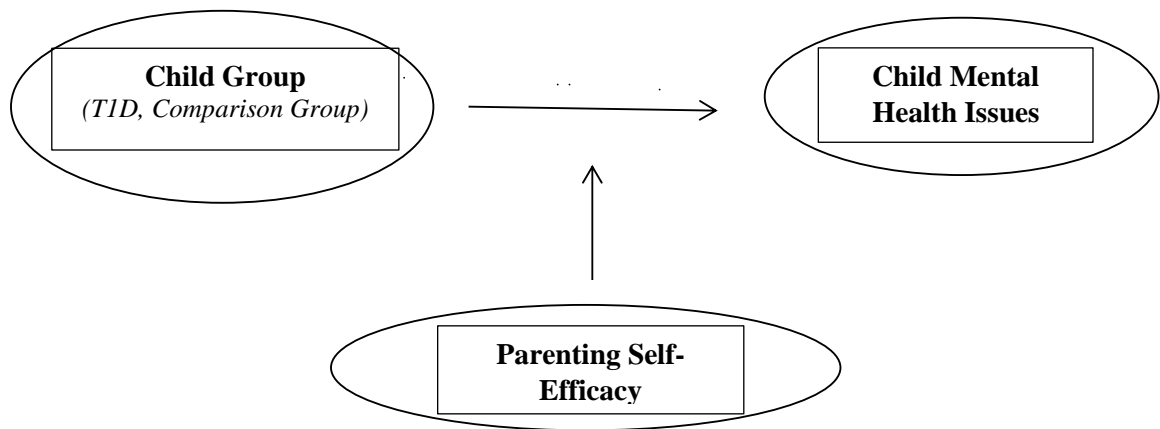


Figure 4. Hypothesis Three



*Figure 5.* Hypothesis Four

## CHAPTER II

### REVIEW OF LITERATURE

#### **Type 1 Diabetes**

T1D is a chronic, incurable illness that is one of the most commonly diagnosed diseases in childhood (Pettitt et al., 2014). It is an autoimmune disease where the pancreas stops producing insulin, a hormone that monitors levels of sugar in the bloodstream. Within the biopsychosocial model (Engel, 1977), a diagnosis of T1D is considered a biological factor of the child, which interacts with social and psychological factors during development. T1D is commonly confused with type 2 diabetes. Unlike type 2 diabetes, which is usually diagnosed in adulthood and is commonly associated with excess body weight, diet, or lack of exercise, T1D cannot be prevented and the disease cannot be managed without use of insulin (ADA, 2012; 2018; Centers for Disease Control [CDC], 2017). The causes of the onset of the disease are unknown, and T1D has no known cure.

T1D was also previously called “juvenile diabetes” as a result of it being most frequently diagnosed in childhood (Chiang, Kirkman, Laffel, & Peters, 2014). However, individuals will have the disease throughout the entire lifespan, so there are many adult individuals living with T1D. Therefore, recent organizational efforts have attempted to limit the use of “juvenile diabetes” in order to reflect the large population of adults living with T1D (Juvenile Diabetes Research Foundation [JDRF], 2018).

## **Causes of Type 1 Diabetes**

The cause of T1D is unknown, but it is commonly understood to be a combination of genetic and environmental factors (Pugliese, 2013). Individuals with T1D are genetically predisposed to develop this disease. The overall prevalence of T1D in the US is approximately 0.3%, but if a first-degree relative has T1D, the risk of diagnosis increases to about 5% (Chiang et al., 2014). The environmental factors that trigger the body's immune system to destroy insulin-producing cells in the pancreas are still unknown, despite immense research. However, current lines of research suggest certain common viruses, along with the individual's diet and microorganisms in the gut, as environmental triggers in people already predisposed to the illness (Pugliese, 2013).

## **Prevalence of Type 1 Diabetes**

National organizations that gather information on chronic illnesses for the public often group T1D and type 2 diabetes together within their statistics. Therefore, the exact prevalence of T1D in childhood is difficult to ascertain. However, it is well-known that type 1 is much less prevalent than type 2, and it accounts for approximately only 5% of all diabetes cases (CDC, 2017). One U.S. national study reported an average age of diagnosis for T1D to be 8.1 years (Pettitt et al., 2014). The JDRF reported in 2018 that 1.25 million Americans are currently diagnosed with T1D, including about 200,000 children and adolescents (less than 20 years old) and more than 1 million adults.

It is estimated that the number of newly diagnosed cases of T1D continues to grow each year. The SEARCH for Diabetes in Youth study estimated that in 2009, 18,436 US youth were newly diagnosed with T1D (Chiang et al., 2014). The JDRF

(2018) recently reported that 40,000 individuals are newly diagnosed each year in the US. Additionally, between 2001 and 2009, there was a 21% increase in the prevalence of T1D in children and adolescents. Causes for this increase in prevalence are still unclear.

The prevalence varies for T1D amongst different races/ethnicities, genders, socioeconomic groups, and other demographic characteristics. However, the disease is highest among Caucasian children (CDC, 2017). Between 2011 and 2012, the estimated prevalence of T1D was highest among non-Hispanic white children and adolescents, with non-Hispanic Black children showing the second highest prevalence.

Incidence rates of new diagnoses annually vary greatly amongst nationalities across the world. East Asians and American Indians have the lowest incidence rates (0.1–8 per 100,000/year), in comparison to Scandinavian countries and the Finnish, who have the highest rates (> 64.2 per 100,000/year; Chiang et al., 2014). T1D continues to rise in children below 5 years old in Europe, where it is increasing annually by 2-3% in countries like Germany and Norway (Ryden et al., 2016). Research has not yet demonstrated clear reasoning for the differences in prevalence between countries.

### **Disease Management and Complications**

T1D is an entirely insulin-dependent disease and living with it involves daily treatment of insulin through insulin shots or insulin pump, daily blood glucose testing, and continuous monitoring for blood sugar symptoms (ADA, 2012). This schedule can be demanding for the caregivers who often take responsibility for the daily management of diabetes in school-age children with T1D. Primary responsibility of a child's diabetes management most often is taken on by the child's primary caregiver. Disease

management tasks are typically given gradually to older children and adolescents as they grow and gain developmental maturity (Streisand & Monaghan, 2014). When the adolescent becomes an adult, it is most common for the individual with T1D to have become the sole caretaker of the diabetes management by that point.

Strictly scheduled and highly responsive treatment is important in order to avoid complications from T1D. Consistently poor blood sugar control has been connected to unsatisfactory quality of life and increased possibility of mental health issues (Buchberger et al., 2016; Caferoğlu, Inanç, Hatipoğlu, & Kurtoğlu, 2016). Long-term, inadequate disease management can lead to permanent health complications, including kidney disease, nerve and vascular damage, vision loss, and increased risk for amputation, heart attack, or stroke (ADA, 2012; CDC, 2017). It is not uncommon for individuals with T1D to also be diagnosed with another chronic, autoimmune illness (e.g., celiac disease or thyroid disease) (Chiang et al., 2014). Without daily insulin and daily management tasks, T1D can lead to coma from diabetic ketoacidosis and death within a short timeframe. This potentially fatal outcome is likely to cause anxiety and stress in children living with the disease, and their parents or primary caregivers.

### **Type 1 Diabetes in Childhood and Mental Health**

Research has shown a significant relationship between T1D and mental health issues, such as a higher likelihood of depression and anxiety (Buchberger et al., 2016; Egede & Dismuke, 2011). This research supports the Biopsychosocial Model, which demonstrates a reciprocal influence of physical and psychological factors throughout child development (Engel, 1977). Anxiety and depression can both be major

psychological barriers to quality of life and diabetes management. Most studies on this topic have utilized an adolescent or adult sample with T1D, rather than a middle childhood population. This study aimed to fill part of this gap by using a parent-report measure of a middle childhood population (age 6-12 years).

Individuals with T1D have a higher likelihood of depression and serious psychological distress (Egede & Dismuke, 2011; Sacco & Bykowski, 2010). The recognition that the illness is chronic, the burden of disease management, and the disruption of normal childhood activities due to daily management are likely to increase psychological issues in this population. To examine this, Reynolds and Helgeson (2011) conducted a meta-analysis across 22 studies utilizing a population of children with T1D on the topic of depression. Significant small to medium effects demonstrated that children with T1D had more psychological distress than child comparison groups. In studies that examined internalizing and externalizing behavior problems, it was found that children with T1D had more internalizing behavior problems than comparison groups; however, there were no differences in externalizing behavior problems. Children with T1D had significantly more depressive symptoms, clinical depression, anxiety, and psychological distress with small to medium effects. No significant group differences in self-esteem, peer difficulties, or psychopathology were found.

The emotional and psychological burden on mental health that individuals with T1D experience is distinctive when compared to typical depression symptoms. The prevalence of depression among this population has been so pervasive that many professionals have proposed a separate mental health diagnosis for diabetics (Fisher et al.,



2015; Hagger, Hendrieckx, Sturt, Skinner, & Speight, 2016; Powers, Richter, Ackard, & Craft, 2017). Higher levels of emotional burden related to diabetes are associated with low diabetes-specific support and low generic quality of life (Joensen, Almdal, & Willaing, 2016), as well as poor diabetes control and higher rates of depression (Powers et al., 2017). The processing of emotions is important in this population, since the interaction of emotional processing and self-control in T1D has been shown to predict blood sugar control (Hughes, Berg, & Wiebe, 2012).

Anxiety is also widely prevalent among individuals with T1D (Majidi et al., 2015). As a result of the considerable burden of daily tasks and management responsibilities of T1D, this connection is understandable. It has been demonstrated that over half of type 1 diabetics score at or above criteria for both high general stress and high diabetes-specific stress (Rechenberg, Whittemore, Holland, & Grey, 2017). In one study, anxiety was found in 32% of adolescents with T1D and higher levels of anxiety showed a negative impact on blood sugar control (Buchberger et al., 2016). Symptoms of anxiety are common in young people with T1D, especially among girls (Rechenberg, Whittemore, & Grey, 2017). These anxiety symptoms are associated with poor blood sugar control, unhealthy coping behaviors, poor self-management, depressive symptoms, fear of low blood sugar, and decreased frequency of monitoring blood glucose levels. Fear of low blood sugar and its relation to anxiety has been well-documented (Driscoll, Raymond, Naranjo, & Patton, 2016; Gonder-Frederick, Nyer, Shepard, Vajda, & Clarke, 2011). Distinctions between types of anxiety, such as state and trait anxiety, have also been explored in a youth population with T1D (Rechenberg, Whittemore, & Grey, 2017).

State anxiety was defined as the individual's likelihood to respond anxiously to a stimulus, and trait anxiety was defined as a temporary experience of the physiological arousal associated with feelings of dread and tension. State anxiety was associated with higher family conflict and decreased blood glucose monitoring behaviors, whereas trait anxiety was associated with increased fear of and worry about low blood sugar.

### **Type 1 Diabetic Parent Stress**

A parent's stress levels as a caregiver are critical to the ability to manage the child's disease and the child's psychological well-being. It is well-documented that parents of both young children and older children with T1D report significant levels of anxiety and stress about parenting tasks (Hullman et al., 2010; Moghaddam, Teimouri, Noori, Firouzkoochi, & Akbradi rad, 2016; Moreira et al., 2014). Parents of children with T1D felt increased stress and anxiety about parenting tasks when compared to parents of children without disease (Moreira et al., 2014). In addition, mothers of children with T1D reported more levels of stress than parents of children with cancer or cystic fibrosis in one study (Hullman et al., 2010). Mothers of children with T1D have also been shown to have higher levels of cortisol, a biological measure of stress, than mothers of children with cancer (Greening, Stoppelbein, & Cheek, 2017).

Research shows that parental stress levels are high shortly following the child's T1D diagnosis and are likely to remain prevalent years later. About one-third of parents reported severe emotional distress at the time of T1D diagnosis, and around 20% of parents reported high emotional distress 1-4 years later (Whittemore, Jaser, Chao, Jang & Grey, 2012). One review showed prevalence rates of acute stress disorder in parents

following a child's diagnosis ranging from 12 to 63% (Woolf, Muscara, Anderson, & McCarthy, 2016).

Parental stress has an impact on parent self-efficacy and parent mental health. Research shows that parent self-efficacy and amount of responsibility in diabetes management significantly affect both stress frequency in parents and perceived difficulty of stress (Streisand, Swift, Wickmark, Chen, & Holmes, 2005). Greater parent emotional distress is also associated with less parent self-efficacy (Streisand et al., 2005; Whittemore et al., 2012). A longitudinal 5-year study demonstrated that, in parents of children with T1D, high levels of general parenting stress and diabetes-specific parenting stress were both associated with poorer parent mental health (Helgeson, Becker, Escobar, & Siminerio, 2012). Maternal difficulty coping with diabetes-related stress has been related to greater maternal anxiety and depression symptoms, as well (Jaser, Whittemore, Ambrosino, Lindemann, & Grey, 2009; Jaser, Linsky, & Grey, 2014).

There are many different sources of stress for parents of T1D children, including both short-term and long-term concerns. Several qualitative studies have revealed themes of stress for parents of children with T1D. The immense burden of disease management has been separately described by parents as "mission impossible" (Lindstrom, Aman, Lindahl-Norberg, Forssberg, & Anderzen-Carlsson, 2017, p. 151), or "constant-ness" (Rifshana, Breheny, Taylor, & Ross, 2017, p. 3230), and described by parents of young children with T1D as "constant vigilance" (Sullivan-Bolyai, Deatrick, Gruppuso, Tamborlane, & Grey, 2003, p. 24) or "isolating" (Smaldone & Ritholz, 2011, p. 91). Some parent stress concerns include the child's emotional/mental health (Erickson et al.,

2015), financial and health-insurance concerns, daily blood glucose management and challenges, possible health complications of T1D (Erickson et al., 2015; Ersig, Tsalikian, Coffey, & Williams, 2016; Gannoni & Shute, 2009), and normative child developmental transitions (Ersig et al., 2016; Smaldone & Ritholz, 2011). Fear of child's low blood sugar is also a major stressor for parents (Streisand et al., 2005), and it is highest among both mothers and fathers of school-age children (Hawkes, McDarby, & Cody, 2014).

Demographic factors that may contribute to parent stress are important to consider. The child's age is an important factor to consider in T1D parent stress. The care of a younger child with T1D can be more challenging and stressful, due to the developmental nature of young children and the child's inability to personally manage aspects of the disease (Streisand & Monaghan, 2014). Mothers of young children with T1D are especially vulnerable to stress, with 21% of mothers reporting significant levels of anxiety (Jaser et al., 2009). However, child age does not appear to affect the significant relationship that exists between parent stress and T1D child mental health. Higher quality of life in children with T1D is associated with low levels of parent stress, regardless of the child's age (Moreira et al., 2014).

Lower income level has been shown to be one of the most important demographic factors that can account for higher symptoms of anxiety in mothers of children with T1D (Greening et al., 2017; Jaser et al., 2009), with the high cost of diabetes management supplies likely playing a role. Other factors to consider that are associated with high parent distress in this population include the age of the parents, parents of children with poor blood sugar control, and low parent emotional support (Hessler, Fisher, Polonsky, &

Johnson, 2016). Additionally, parents of younger children, those of lower socioeconomic status, single parents, and parents identifying as a racial/ethnic minority are more likely to experience high levels of emotional distress (Hessler et al., 2016; Streisand et al., 2005; Whittemore et al., 2012). However, racial and ethnic differences in T1D parent stress have produced varying results in different studies, with no significant differences found in another study's sample (Greening et al., 2017).

### **Type 1 Diabetic Parent Stress and Child Mental Health**

While research is lacking in relation to the mental health of middle and early childhood populations with T1D, the role of parent stress in these populations as an influencing factor has been well-documented (Hilliard, Monaghan, Cogen, & Streisand, 2011; Nieuwesteeg et al., 2016). This research supports the biopsychosocial model, which proposes a reciprocal influence between social factors such as parent stress and psychological, mental health factors of the child throughout development (Engel, 1977). Among parents of 2 to 6-year-old children with T1D, higher amounts of parent anxiety and parenting stress were related to more problematic child behavior (Hilliard et al., 2011). In another sample of young children with T1D, both general parenting stress and T1D-related stress were related to lower child quality of life, measured as parent-reported Likert-type items about the child's feelings in relation to his or her diabetes (Nieuwesteeg et al., 2016). This relationship remained the same even after testing the contribution of disease management variability to this relationship. One 5-year study demonstrated that greater levels of general parenting stress were associated with more child depressive

symptoms and less child self-care behavior in a population of 10 to 14-year-olds with T1D (Helgeson et al., 2012).

High parent stress levels have been found to be connected to increased internalizing problems, such as anxiety and depression, in children with T1D (Lewin et al., 2005). One sample demonstrated that parenting stress is associated with higher levels of child depressive symptoms in children aged 8-12 years (Mullins et al., 2004). This relationship between stress and child depression appears to exist in all child age groups. After controlling for age, fathers of adolescents with T1D indicated significantly more stress than a comparison group; however, parenting stress was related to child depression in only the T1D sample group (Maas-van Schaaijk, Roeleveld-Versteegh, & van Baar, 2013). Maternal stress explained 22% of the child's depressive symptoms, while paternal stress explained 25% of the variance in child symptoms. These findings suggest that a unique and significant relationship between parent stress and child depression exists in populations with T1D.

### **Self-Efficacy and Parenting**

Parenting self-efficacy has been demonstrated as an important influencing factor in both parent-child relationships and childhood mental health (Jones & Prinz, 2005). Perceived beliefs about parenting abilities can affect parent mental health and stress level, in addition to the parent-child relationship. Decreased parenting self-efficacy influences motivation to perform parenting duties and behaviors, which in turn affect a child's overall well-being. Mothers who experience social pressure to meet ideological standards of parenting have reported lowered self-efficacy and higher levels of stress (Henderson,

Harmon, & Newman, 2015). Parenting self-efficacy beliefs in mothers have also shown influence in other parenting variables, such as behavioral and emotional responsiveness, positive affect, levels of irritability, and support (Roksam, 2016). Interventions that focus on building parent empowerment and self-efficacy have demonstrated improvement in parent stress and access to mental health services (Bode et al., 2016), therefore, increasing the likelihood that parents will access mental health services for their children as well.

### **Self-Efficacy and Disease Management**

The potential role of parenting self-efficacy cannot be over-emphasized as a factor in disease management and child mental health outcomes. Parenting factors, such as parenting self-efficacy, influence both child physical health and mental health outcomes within the Biopsychosocial Model (Engel, 1977). While research on general parenting self-efficacy in parents of children with T1D is lacking, there is evidence of a relationship between diabetes-specific self-efficacy and disease management. It is possible that parenting self-efficacy will play an even more influential role in child mental health issues of children with T1D than comparison groups, due to the extra responsibility and actions required with T1D management. In fact, around 22% of variations in diabetes-management behaviors in populations with T1D can be explained by self-efficacy beliefs and perceptions of illness (Abubakari, Cousins, Thomas, Sharma, & Naderali, 2016). These two concepts were also significant predictors of management behaviors in people with poorly controlled diabetes. In a similar study, illness perception and self-efficacy in diabetes were also examined, with results showing that 30.8% of

blood glucose differences could be attributed to diabetes self-efficacy, blood glucose consequences, and identity (Griva, Myers, & Newman, 2000). In this study, beliefs about diabetes were effective in predicting diabetes-related behaviors.

One important aspect of psychological well-being to consider is the individual's beliefs about abilities to cope with the necessary and daily tasks of self-management. Lack of self-efficacy in diabetes has been shown to play a role in the development of depression, with it being an important variable in the relationship between poor blood sugar control and depression (Hackworth et al., 2013; Sacco & Bykowski, 2010). The parents' ability to cope is also an important consideration in parenting self-efficacy. In a sample of mothers of school-age children with T1D, it was found that maternal coping resources, measured as cognitive, social, emotional, spiritual/philosophical, and physical coping resources, were significantly and positively related to maternal diabetes-specific parenting self-efficacy (Marvicsin, 2007).

Perceptions of unsuccessful control over diabetes management also play a role in the development of depression in populations of individuals diagnosed with T1D. One study demonstrated that illness beliefs were not related to self-management behaviors, but both were important contributors to psychological well-being in adolescents with T1D (Law, Kelly, Huey, & Summerbell, 2002). In reality, doctor-recommended blood glucose levels for disease management may be difficult to attain for even highly-educated and high-achieving patients (Snow, Sandall, & Humphrey, 2014), due to numerous and unpredictable physical factors such as hormones, stress, dehydration, or amount of sleep, that can affect blood sugar levels in unknown ways. Unrealistic and unattainable goals



can be counterproductive in self-efficacy interventions and maintaining high self-efficacy levels. Difficult and impractical expectations are likely to affect the individual's beliefs about abilities to obtain goals.

### **Self-Efficacy and Parenting a Type 1 Diabetic Child**

Parenting self-efficacy that focuses on general parenting beliefs, rather than diabetes-specific parenting beliefs, in a parent population of children with T1D is very limited in research. However, there have been studies that primarily focus on T1D disease management, that also examine diabetes-specific parenting self-efficacy. A majority of these studies focus on the relationship between parenting factors and their influence on disease management in children with T1D. It is possible that general parenting self-efficacy could play an even more important role in the mental health issues of children with T1D in contrast to a comparison group of parents, due to the complex burden and dual nature of a T1D caregiving parent role.

In one qualitative study, all parent participants reported having a perception of never mastering diabetes management (Smaldone & Ritholz, 2011). In a study examining both adolescent and parent diabetes-related stress in parent and T1D child dyads, it was found that parents' perception or belief of their child having reduced diabetes-related self-efficacy predicted parental diabetes-related stress (Law, Walsh, Queralt, & Nouwen, 2013). Higher blood sugars, increased perception of negative consequences, and decreased self-efficacy predicted adolescent diabetes distress. It was found that higher child blood sugars and more diabetes responsibility disagreements between child and parent also predicted parental diabetes-related stress.

Understanding more about parent beliefs regarding abilities to parent in general is important, considering that family functioning can have a strong effect on child well-being. Better quality of life in children with T1D has been shown to be related to higher levels of family cohesion (Moreira et al., 2014). In a study comparing parents of children with T1D and parents of children without disease, parents of T1D children perceived less family cohesion, in addition to feeling increased stress about parenting tasks. It has been found that family conflict surrounding diabetes-specific topics or management between the parent and child with T1D can predict poorer diabetes management and control (Hilliard et al., 2013). Family functioning and diabetes management behaviors are strongly related to a T1D child's health status (Lewin et. al, 2006). Parenting self-efficacy can be viewed as playing an important role in both family conflict and family functioning.

### **Resilience and Mental Health**

Resilience has been shown to be an important factor in protecting individuals against the negative mental health outcomes of facing adversity. *Resilience* can be defined as “the personal qualities and skills that allow for an individual’s healthy/successful functioning or adaptation within the context of significant adversity or a disruptive life event” (Lee et al., 2013, p. 269). It involves achieving a positive outcome despite exposure to one or more adverse events or other significant risk factors, such as a T1D diagnosis (Hilliard, Harris, & Weissberg-Benchell, 2012). A meta-analysis of studies examining mental health and resilience showed that low levels of resilience were associated with negative indicators of mental health, such as depression, anxiety, or

negative affect (Hu, Zhang, & Wang, 2015). In contrast, high levels of resilience were positively correlated with positive indicators of mental health, such as life-satisfaction and positive affect. These findings suggest that individuals who have higher amounts of resilience and experience adversity are less likely to experience depression or anxiety as an outcome.

Individual specific, protective variables as a measure of personal resilience are an important area for future research to consider. Many researchers define resilience as a developmental process that involves the influence of protective factors and the influence of interactions with the environment, family, and community (Lee et al., 2013). This definition of protective factors of resilience fits well within the biopsychosocial model of development, where psychological factors of the child develop with influence from social and physical factors (Engel, 1977). Protective factors in children include individual characteristics, such as self-regulation or self-concept, family conditions, and environmental factors that are associated with the concept of resilience (Zolkoski & Bullock, 2012). Protective factors were shown to have the largest effect on resilience in one meta-analysis, in comparison to risk and demographic factors (Lee et al., 2013). Self-regulation is one example of an important protective factor in children. For example, individual self-regulation variables, such as goal setting and impulse control, were predictors of resilience in one adolescent sample (Dias & Cadime, 2017).

Additionally, psychological resilience has been shown to have buffering effects on children's physical health. One meta-analysis was conducted involving 14 studies that examined the effect of vulnerability and protective factors on the health of children (aged

4-18 years) who had experienced a psychosocial adversity (Lavoie, Pereira, & Talwar, 2016). In this study, protective factors had a significant effect on physical measures of health, including physiological measures, such as sleep and overall health. In another study, resilience was also significantly associated with health-related quality of life in a sample of adolescents and was shown to be a predictor in areas related to mental health (Simon-Saiz et al., 2018).

### **Resilience and Mental Health in Type 1 Diabetes**

The examination of resilience specific to a population with T1D is an important, though relatively new, area of research. The diabetes resilience model, as proposed by Hilliard, Harris, and Weissberg-Benchell (2012), is an important new framework specific to T1D that incorporates categories of protective factors and risk factors of resilience. The diabetes-specific categories of their model include Risks & Assets (social/contextual, family, and individual), Protective Processes (social/contextual, family, and individual), Diabetes Competence (behavioral resilience), and Diabetes Health Outcomes (health resilience). Within this model, high levels of parent stress and low levels of parenting self-efficacy can be considered family risk factors. High levels of child resilience can be considered an individual asset that affects the individual's protective processes, diabetes behaviors, and health outcomes with T1D. In a child population with T1D, resilience includes low levels of distress (such as low levels of anxiety or depression) and good diabetes control.

Specific resilience protective factors in T1D are an important new area of study. It is possible that resilience will be even more important as a protective factor to the mental

health of children with T1D, in contrast to comparison groups, due to the immense burden and adversity of T1D as a disease. Children with T1D are likely to need even more resilience than comparison children to overcome similar amounts of mental health issues, due to the extra burden of daily disease management.

Recent studies on the influence of self-regulation or child self-control as a resilience factor have shown promising results in populations with T1D. One study examined protective factors in young children with T1D by testing potential child protective factors of initiative, self-control, and attachment (Monaghan et al., 2015). Levels of higher child self-control were significantly associated with lower parent stress. Additionally, after controlling for family income and race, higher child self-control also significantly contributed to higher child quality of life, with 7% of the variance in child quality of life being due to child's self-control. In one study utilizing an adolescents with T1D sample, it was found that problems in cognitive (i.e., executive function) and emotional (i.e., depressive symptoms) self-regulation were related to poor diabetes management, both at the between-and within-person levels (Wiebe et al., 2018). Future research on these concepts of individual protective factors is crucial to health outcomes and mental health in child populations with T1D.

Protective factors related to emotions may be an important future research topic in a population with T1D. It has been found that a negative association exists between levels of emotional intelligence and blood glucose levels, where increased emotional intelligence also leads to better diabetes control in individuals with T1D, even after controlling for age, SES, and gender (Ruiz-Aranda et al., 2018). Additionally, significant

correlations have been found between emotional burdens and impulse control difficulties, non-acceptance of emotional response, difficulties engaging in goal-directed behavior, lack of emotional clarity, and overall difficulties in emotional regulation in adolescents with T1D (Ruiz-Aranda et al., 2018). The authors concluded that the relationship between difficulties in emotional regulation and T1D glucose control appeared to be mediated by diabetes-related distress. In another study, a population of adults with T1D and type 2 diabetes was examined, and it was found that emotional intelligence influenced diabetes self-management behaviors. Additionally, this relationship was also mediated by diabetes-related distress (Schinckusa, Avalosseb, Van den Brouckea, & Mikolajczaka, 2018).

Potential protective resilience factors can also be studied in parents of children with T1D in order to understand more about preventing emotional burdens in a parent population. Mednick et al. (2007) found that after controlling for significant medical and demographic covariates, hope (a resilience factor) significantly affects maternal anxiety with very young children in this population, where mothers with more levels of hope have less anxiety. Protective variables have also previously been studied in populations of mothers of children with other types of chronic illnesses. Protective variables and resilience have also been shown to protect individuals against cancer-related distress in a population of mothers who have a child with cancer (Gudmundsdottir, Schirren, & Boman, 2011) and adult cancer patients (Min et al., 2013).

## CHAPTER III

### METHODOLOGY

This quantitative study compared parent-reported Likert-type measurements of child resilience, child mental health issues, parent stress, and parenting self-efficacy between a group of parents of children diagnosed with T1D between the ages of 6-12 years old and a group of parents of typically-developing children without chronic illness between the ages of 6-12 years old. The hypotheses were as follows:

- 1) Parents of children diagnosed with T1D will report higher levels of stress than parents of children without T1D.
- 2) Children diagnosed with T1D will have higher levels of parent-reported child mental health issues than children without T1D. If Hypothesis 1 is supported, parent stress will be included in this analysis.
- 3) The relationship between T1D and child mental health issues is moderated by the child's level of parent-reported psychological resilience.
- 4) The relationship between T1D and child mental health issues is moderated by the parent's level of parenting self-efficacy.

#### **Participants**

Participants included 82 parents who had self-reported that their child has been diagnosed with T1D by a medical doctor and 56 comparison group parents of children without T1D. All participants indicated that their child was between the ages of 6 and 12 years of age. Children with other chronic illnesses were excluded from this study, due to the likelihood that other chronic illnesses would confound the results. The parent

participants in both groups were required to indicate that they are a “primary caregiver” of the child(ren) in their family.

### **Sample Size**

The required sample size was determined using G\*Power 3 to ensure adequate statistical power (Faul, Erdfelder, Lang, & Buchner, 2007). The first two hypotheses required a multivariate analysis of variance (MANOVA) statistic. Using a MANOVA with repeated measures between factors analysis, a statistical power of .8, a statistical significance level of  $p < .05$ , and an effect size of .25, with 2 measurements and 2 groups, and .30 correlation between the 2 measurements, it was determined that a minimum total study sample size for these two hypotheses was 84 total participants.

For the second part of this study, the third and fourth hypotheses required a linear regression moderation analysis. Using a linear multiple regression: fixed model,  $R^2$  deviation from zero analysis, a statistical power of .80, a statistical significance level of  $p < .05$ , a medium effect size of .15, and 5 predictor variables, a minimum sample size of parent participants for adequate power is 92 participants. Secondly, individual  $t$  test power analyses were run for the predictors. A  $t$ -test family and linear multiple regression: fixed model, single regression coefficient test was used. A one-tailed test, with a small effect size of .15, statistical significance level of  $p < .05$ , statistical power of .80, and 5 predictors revealed that a sample size of 43 participants was needed. Added together, the minimum sample size for the third and fourth hypotheses is 135 total participants (68 parents of children without diabetes or chronic illness, 68 participants of parents of children with T1D). The larger sample size requirement for the regression moderation



analysis was followed, in comparison to the MANOVA analysis. Therefore, it was decided that a minimum of 135 participants (68 parents of children without diabetes or chronic illness, 68 participants of parents of children with T1D) was required for this study. The actual sample size for this study was 138 participants (82 parents of children with T1D and 56 comparison group parents), and this was determined to be an adequate sample size for statistical power.

### **Protection of Human Subjects**

Approval from Texas Woman's University (TWU) Institutional Review Board was obtained prior to beginning the study. In addition, permission was obtained from all organization gatekeepers and social media page organizers prior to any participant recruitment.

An informed consent form (see Appendix A) was presented to participants prior to their completion of the survey measurements. The informed consent form explained that the individuals' participation in the study was voluntary and that they could drop out of the study at any time. It also stated that participants' answers and personal information would be kept confidential and that they were free to refuse any demographic questions with which they did not feel comfortable.

### **Materials**

#### **Demographic and Health Information Questionnaire**

A questionnaire was created and used to gather demographic information and health information (see Appendix B). Some questions were answered in multiple choice format, while others were answered as a fill-in-the-blank. The Demographic and Health

Information Questionnaire included either 14 or 17 total questions, depending on whether parents had indicated that their child has been diagnosed with T1D. Questions were asked regarding both the parent and child's demographic information, followed by questions regarding the child's health status.

Demographic questions included both the parent and child's age, gender, and race/ethnicity. Parent-specific questions included primary caregiver status, relationship status, household income, and whether the parent has been diagnosed with a chronic illness. Additional questions included whether the child has a mental health disorder diagnosis or has received mental health services.

Health questions included whether the child has been diagnosed with T1D by a medical doctor or has ever been diagnosed with another chronic illness. All participants who had indicated that their child has been diagnosed with another chronic illness were excluded from the study. Three follow-up questions included length of T1D disease duration, age of T1D diagnosis, and parent's estimation of child's frequency of average blood sugar levels being within recommended guidelines for children with T1D. In the health field, average blood sugar levels are used as a measurement of an individual's general ability to control blood sugar levels and manage diabetes. This question was gathered to assess whether participants in the diabetes sample were normally distributed on their general abilities to control their blood sugar and manage diabetes.

### **Child Behavior Checklist**

Childhood mental health, specifically anxiety and depression, was measured in this study utilizing the internalizing problems subscale of the Child Behavior Checklist

(CBCL; Achenbach & Rescorla, 2001; see Appendix C). This measurement asks parents to report on whether the frequency of a behavior is applicable to their child over the past 6 months. The CBCL is a well-established measure of internalizing and externalizing problem behaviors in children. There are several forms of this measurement, including child self-report, teacher-report, and parent-report, in addition to forms for different age ranges. This study utilized the parent-report measurement form for ages 6-18, the most appropriate version for a study population of parents of children aged 6-12 years.

The entire CBCL scale consists of 112 total items that combine eight syndrome scales: anxious/depressed, withdrawn/depressed, somatic complaints, rule-breaking behavior, aggressive behavior, social problems, thought problems, and attention problems. A total problems score sums the scores of all 112 reported problem items. There are two larger subscales that combine several of the syndrome scales: internalizing and externalizing problems. Externalizing problems combines rule-breaking and aggressive behavior.

The internalizing problems subscale contains 32 total items and combines three of the eight syndrome scales: anxious/depressed (i.e., *nervous/guilty*; 13 items), withdrawn/depressed (i.e., *enjoys little*; 8 items), and somatic complaints (i.e., *nightmares*; 11 items). This measurement asks parents to report on whether the frequency of the behavior is applicable to their child over the past 6 months. The questions are answered using a 3-point Likert-type scale that ranges from 0 (*Not True*) to 2 (*Very True or Often True*). Higher scores on the CBCL indicate more parent-reported child mental health issues.

This study utilized only the anxious/depressed subscale (13 items) and the withdrawn/depressed subscale (8 items) for a total of 21 items. The use of a somatic/physical complaints subscale in a study comparing a chronic illness population to a typically developing population would be likely to confound the study and produce inaccurate results. Children with T1D are more likely than typically developing children to experience somatic complaints (i.e., headache, stomachache, dizziness, etc.) frequently, often as a result of the chronic illness and hypoglycemia/hyperglycemia episode symptoms, rather than as a symptom of child anxiety or depression.

The CBCL has previously been used in studies examining mental health in populations of children with chronic illness (Zhang, Wei, Shen, & Zhang, 2015). One meta-analytic review of studies of children with T1D found that internalizing and externalizing behavioral problems in this population were often measured using the CBCL (Reynolds & Helgson, 2011). The test-retest reliability coefficients have previously been demonstrated as .84 for the anxious/depressed subscale and .80 for the withdrawn/depressed subscale (Achenbach & Rescorla, 2001). The CBCL scale reliability for the 21 items used from the two subscales for this particular sample was good ( $\alpha = .90$ ).

### **The Parental Stress Scale**

Parent stress was measured using the Parental Stress Scale (PSS, Berry & Jones, 1995; see Appendix D). This parenting self-report measure contains 18 items, rated on a 5-point Likert-type scale from 1 (*strongly disagree*) to 5 (*strongly agree*). There are four subscales: rewards (6 items), loss of control (3 items), parental stressors (6 items) and

parental satisfaction (3 items), as well as the total parental stress score. Eight of these items are negatively worded and reverse scored. For analysis, the items of these subscales were summed to create a total parental stress score. Participant scores ranged from 18-90, where a higher participant score indicated greater parental stress.

The reported internal consistency of the Parental Stress Scale for this study's sample was good ( $\alpha = .88$ ). The Parental Stress Scale has previously been demonstrated as internally consistent in populations of parents of children with chronic illness ( $\alpha = .84$ ) (Zelman & Ferro, 2018). Initial evidence for the scale demonstrated adequate reliability ( $\alpha = .83$ ) and a test-retest correlation over a 6-week period of .81 (Berry & Jones, 1995). In comparison to another measure of parent stress, the Parenting Stress Index (Abidin, 1990), the two measurements were highly correlated and significant (.75,  $p < .01$ ).

### **The Social Emotional Assets and Resilience Scale**

Child resilience, specifically the child's resources of self-regulation and responsibility, were measured using the Self-Regulation/Responsibility subscale of the Social Emotional Assets and Resilience Scale (SEARS-P; Merrell, 2011; see Appendix E). The SEARS form that was utilized was the parent-report form. The SEARS-P is a parent-report measure intended for parents of children and adolescents in Grades K through 12 (ages 5 to 18 years); therefore, it is appropriate for this study's population of parents of children aged 6-12 years. The entire SEARS-P scale consists of 39 items and has three subscales: self-regulation/responsibility, social competence, and empathy.

Parents were asked to respond on a 4-point Likert-type scale from 0 (*never*) to 3 (*always*) to whether the question describes their child within the last 6 months. The

subscale that was utilized is the self-regulation/responsibility subscale that contains 22 total items (i.e., *accepts responsibility when she/he needs to and when life is hard, doesn't let things get to him/her*). The items were summed together to yield a total self-regulation/responsibility score, ranging from 0 to 66, where a higher participant score indicated more levels of self-regulation/responsibility.

The self-regulation/responsibility subscale of the SEARS-P demonstrated excellent internal consistency for this study's sample ( $\alpha = .92$ ). This subscale has previously been reported to have an internal consistency coefficient of .95 (Merrell, 2011), and a test-retest reliability coefficient of .92. It also has a high intercorrelation with the SEARS-P total scale of .95. The subscale also demonstrates effective convergent construct validity through positive correlations for grades K-6 with the Social Skills Rating System (.71; Gresham & Elliott, 1990) and with the Home and Community Social Behavior Scales (.87; Merrell & Calderella, 2002; Merrell, 2011).

### **Parenting Sense of Competence Scale**

The instrument utilized in this study to measure parenting self-efficacy was the efficacy subscale of the Parenting Sense of Competence Scale (PSOC; Gibaud-Wallston & Wandersman, 1978; Johnston & Mash, 1989; see Appendix F). The PSOC is a parent-reported Likert scale that is designed to measure both parental efficacy (parent's perceived competence in the parenting role) and parental satisfaction (parent's liking of the parenting role). The PSOC measurement includes a 17-item total scale score that combines two subscales of parent satisfaction and parent efficacy.

The parent efficacy subscale contains 7 items and measures the parent's perceived competence in the parenting role (i.e. *being a parent is manageable, and any problems are easily solved*). The seven Likert-type items within this subscale range from 1 (*strongly agree*) to 6 (*strongly disagree*) and are all reverse-scored. However, the seven items of this Likert subscale were all presented as reverse-scored prior to this study, so that participant answers ranged from 1 (*strongly disagree*) to 6 (*strongly agree*). The items were totaled to create an efficacy score for each participant, where a higher score indicated a higher sense of parenting self-confidence. As a result of the scale originally being designed to be administered to mothers, a few of the questions were reworded from "mother" to "parent," in order to make the questions applicable to fathers.

The efficacy subscale of the PSOC measure demonstrated good internal consistency ( $\alpha = .85$ ) for the current study sample. An internal reliability estimate for the efficacy scale in a sample of mothers of infants has been reported as .72 (Cutrona & Troutman, 1986). Additionally, for the total PSOC scale, Pearson correlations with both externalizing and internalizing CBCL subscales have previously demonstrated significant and negative correlations (Johnston & Mash, 1989).

## **Procedure**

### **Recruitment Method**

The sampling technique that was used in this study can be best described as both purposive sampling and convenience/snowball sampling. Due to the low prevalence of T1D, convenience/snowball sampling was most appropriate. Potential geographical limitations further restricted the number of possible study participants, making the use of

an online survey to recruit national participants in this study even more important and appropriate. It can also be described as purposive, because of the inclusion and exclusion criteria required for the study's generalizability and target population.

For the T1D sample group, known local area and national diabetes-affiliated organizations were contacted. Two national organizations were contacted to see if there were potential mailing lists or national opportunities to recruit. National organizations and local chapters were contacted to gain permission to contact parents who had enrolled their children in national and local T1D summer camps. Additionally, three state T1D diabetes camps were contacted to ask permission to contact parents. It was important that T1D summer camps that represented a wide variety of demographic factors, such as income levels, were included. The T1D summer camps were researched beforehand to ensure that summer camps' costs were likely to cater to parents of a variety of income levels.

Local chapters of T1D-affiliated organizations were contacted to gain permission to contact local parent members regarding their possible interest in the study and distribute flyers (see Appendix G). Page managers were contacted for Facebook T1D-related interest groups to receive permission to write a post with study information, purpose, and website link to the study to inform interested caregivers.

Managers for various online diabetes support forums were also contacted for help. The study information, purpose, and website link to the study were then posted in diabetes support forums. Local hospitals were asked permission to share recruitment flyers with parents at appropriate events and educational classes.



Throughout the comparison group recruitment process, a modified version of study recruitment materials was required in order to not cause confusion for comparison group participants. For example, a description modification on recruitment flyers was “a childhood development study for parents” rather than “a child development and Type 1 Diabetes study” (see Appendix H). For the comparison group, it was important that the children represent typical child development. Therefore, the specific requirement for this group was that these children have not been diagnosed with any type of chronic illness. Additionally, it was required that the parents have children in the same age range of 6-12 years to reflect the ages of the sample with T1D. Purposive and convenience sampling was used to match the sampling type utilized in the T1D sample.

For the comparison group, local summer camp organizers were contacted and asked to distribute flyers and ask for parent contact information to participate in this study. Page managers for Facebook parent interest pages and groups were contacted, such as parents of local schools, parents of local neighborhoods, parents of children involved in local organizations and/or sports, and/or general local parent interest groups. Local Parks and Recreation departments were contacted to ask permission to share flyers at summer events for families and children. Area daycare and childcare centers were contacted to ask permission to share flyer information with parents. Local university student parent clubs and student daycares were both emailed to ask permission to share study information and flyers.

## **Study Procedure**

Interested participants were given study flyers or study information, and all recruitment materials had a link to the online survey hosted by PsychData, a confidentially secure survey website. Informed Consent, Demographic and Health Information Questionnaire, two internalizing behavior problem subscales of the CBCL, the Parental Stress Scale (PSS), the SEARS-P self-regulation/responsibility subscale, and the PSOC efficacy subscale were all completed by each participant using a computer of their own choosing and at any time, through this website. All questions and answers were set up on this website prior to distribution of any study materials and recruitment of participants. Only a one-time commitment was required for each participant. The Informed Consent, Demographic and Health Information Questionnaire, CBCL internalizing problems subscales, PSS scale, and PSOC efficacy subscale altogether took approximately 15 to 20 minutes or less for each participant to complete, with most participants completing the entire study in less than 15 minutes. There was a combined 68 items for all four survey measurements.

The first page of the PsychData website link was the informed consent form (see Appendix A), and participants had to click “continue” to acknowledge informed consent for the study and continue to the survey. The survey consisted of the Demographic and Health Information Questionnaire, the CBCL anxious/depressed and withdrawn/depressed subscales, the PSS, the self-regulation/responsibility subscale of the SEARS, and the efficacy subscale of the PSOC.

At the end of the survey measurements, the participants were given the option to click on a separate website link if they were interested in receiving a \$5.00 Starbucks gift certificate and an executive summary of the study results. Clicking on the link took them to another PsychData survey where they could enter their email address. Using a separate website to distribute gift cards ensured additional confidentiality of the participants' data because the identifiable contact information was not linked to their survey answers. The \$5.00 Starbucks gift certificates were funded by a Student Small Grant from Texas Woman's University's Center for Student Research.

## CHAPTER IV

### RESULTS

Data were gathered from 138 participants, and all data were imported from PsychData into the Statistical Package for Social Sciences (SPSS). Data was analyzed to compare child mental health issues, parent stress, child resilience, and parent self-efficacy in two groups: parents of children diagnosed with T1D and parents of children without T1D. The Hypotheses tested were:

- 1) Parents of children diagnosed with T1D will report higher levels of stress than parents of children without T1D.
- 2) Children diagnosed with T1D will have higher levels of parent-reported child mental health issues than children without T1D. If Hypothesis 1 is supported, the influence of parent stress will be included in this analysis.
- 3) The relationship between T1D and parent-reported child mental health issues is moderated by the child's level of parent-reported psychological resilience.
- 4) The relationship between T1D and parent-reported child mental health issues is moderated by the parent's level of parenting self-efficacy.

#### **Preliminary Analysis**

##### **Testing of Statistical Assumptions**

The two comparison groups included parents of children with T1D ( $n = 82$ ; 59%) and the comparison group parents ( $n = 56$ ; 41%). The four continuous variables fell within standard skewness and kurtosis cutoffs (see Table 1). Because of the overall sample size being greater than 100 ( $n = 138$ ), Shapiro-Wilks and Kolmogorov-Smirnov

tests were not examined. The histograms, Q-Q plots, and box plots of the continuous variables of interest demonstrated adequately normal distributions. Boxplots of each continuous variable showed that no outliers were detected. The variable of parent-reported child mental health demonstrated departure of homogeneity of variance, due to the significance of Levene's test ( $p = .003$ ). This was not surprising given the fact that children with T1D usually show significantly higher levels of depression and anxiety (Buchberger et al., 2016). To assess potential multicollinearity, Tolerance and VIF levels were examined for the continuous variables of child resilience, parenting self-efficacy, parent stress, and child mental health issues. All tolerance levels were above .33 and all VIF levels were below 3.0, so it was determined that there was no significant multicollinearity.

Table 1

*Skewness and Kurtosis of Continuous Variables of Interest*

Continuous variable	<i>skewness</i>	<i>kurtosis</i>
Parenting Self-Efficacy (PSOC)	0.29	-0.84
Parenting Stress (PSS)	0.00	-1.03
Parent-Reported Child Resilience (SEARS-P)	0.33	-0.34
Parent-Reported Child Mental Health (CBCL)	0.31	-1.25

Continuous data were analyzed for patterns of missing data. After preparing the data for analysis, it was observed that out of 138 recorded cases, 61 cases contained missing data (44.20%) and out of 90 variables, 52 variables contained missing data (57.78%), which amounted to 3.12% missing information in the dataset. Some of this

missing data likely reflects missing data for comparison group parents, who were purposefully not asked three demographic questions that relate to a child diagnosis of T1D. To assess whether the pattern of missing values was missing completely at random (MCAR), Little's MCAR test (Little, 1988) was conducted. The null hypothesis of Little's MCAR test is that the pattern of the data is MCAR and follows a  $\chi^2$  distribution. Using an expectation-maximization algorithm, the MCAR test estimates the univariate means and correlations for each of the variables. The results revealed that the pattern of missing values in the data was MCAR,  $\chi^2 (141) = 77.60$   $p = 1.00$ .

### **Descriptive Statistics**

Descriptive statistics were run for each demographic variable obtained from the Demographic and Health Information Questionnaire, including measures of central tendency (mean, median, mode), measures of variability (range, standard deviation), and frequencies. Running descriptive statistics on demographic and health variables attempted to ensure that the study sample accurately represented the target population. Special focus was given to the demographic variables of participant household income (Greening, et al., 2017; Hessler et al., 2016; Hullman et al., 2010; Jaser et al., 2009; Monaghan et al., 2015) and parent relationship status (Harris, Greco, Wysocki, Elder-Danda, & White, 1999), variables which previous research has shown to affect variables such as parent stress and mental health in T1D children and their parents.

Frequencies and percentages for the categorical demographic variables of children are displayed in Table 2. A majority of child participants had a T1D diagnosis (59.4%). In addition, roughly half of child participants were female (51.4%) and a majority were

White/Caucasian (65.9%). Child age ranged from 6 to 12 years old ( $M = 9.48$ ,  $SD = 2.28$ ).

Table 2

*Descriptive Statistics Frequencies and Percentages for Categorical Demographic Variables of Children*

Categorical demographic variable	<i>n</i>	%
Child Type 1 Diabetes Status (yes or no)		
Yes, Type 1 Diabetes	82	59.4
No Diabetes	56	40.6
Child Gender		
Male	67	48.6
Female	71	51.4
Child Race/Ethnicity		
White/Caucasian	89	65.9
Mixed Race	12	8.9
Black	15	11.1
Hispanic/Latino	18	13.3
Asian	1	.7
Missing	3	2.2
Child Mental Health Diagnosis		
Yes	44	31.9
No	94	68.1
Child Mental Health Services		
Never	84	60.9
Yes, Six Weeks or Less	8	5.8
Yes, Six Weeks – 3 Months	15	10.9
Yes, 3 Months – 6 Months	8	5.8
Yes, 6 Months – 9 Months	6	4.3
Yes, 9 Months – 1 Year	9	6.5
Yes, 1 Year or More	7	5.1
Missing	1	.7

*Note:* Variables with no missing data reported had zero missing data

Frequencies and percentages for the categorical demographic variables of parents/caregivers are displayed in Table 3. The majority of parent participants were also

female (73.2%) and white/Caucasian (71.1%). In addition, the majority of parent participants were married (84.8%) and had a household income of over \$120,000 (31.4%). Parent age ranged from 23 to 54 years old ( $M = 38.55$ ,  $SD = 7.18$ ).

Table 3

*Descriptive Statistics Frequencies and Percentages for Categorical Demographic Variables of Parents/Caregivers*

Categorical Demographic Variable	<i>n</i>	%
Parent Gender		
Male	37	26.8
Female	101	73.2
Parent Relationship Status		
Married	117	84.8
Single, Never Married	5	3.6
Domestic Partnership/Significant Other	8	5.8
Divorced	7	5.1
Widowed	1	.7
Parent Race/Ethnicity		
White/Caucasian	96	71.1
Mixed Race	3	2.2
Black	17	12.6
Hispanic/Latino	18	13.3
Asian	1	.7
Missing	3	2.2
Current Household Income		
Less than \$19,999	2	1.5
\$20,000 to \$39,999	8	5.8
\$40,000 to \$59,999	19	13.8
\$60,000 to \$79,999	25	18.2
\$80,000 to \$99,999	15	10.9
\$100,000 to \$119,000	25	18.2
Over \$120,000	43	31.4
Missing	1	.7
Parent Has a Chronic Illness		
Yes	21	15.2
No	117	84.8

*Note:* Variables with no missing data reported had zero missing data



Demographic questions specific to participants who indicated that their child has been diagnosed with T1D ( $n = 82$ ) were also analyzed (see Table 4). The age of diagnosis for children with T1D ranged from 1 to 12 years old ( $M = 8.13$ ,  $SD = 2.87$ ). Length of T1D diagnosis ranged from less than a year to 10 years ( $M = 2.47$ ,  $SD = 2.04$ ). A majority of these parent participants indicated that they felt their child's average blood sugar levels were sometimes within recommended guidelines for children with T1D (42.7%), followed by often (36.6%), rarely (18.3%), and always (1.2%;  $M = 3.21$ ,  $SD = .75$ ). It should be noted that 7.3% of parents within the T1D sample group also reported being diagnosed with T1D themselves, in addition to 12.2% of parents who reported being diagnosed with a chronic illness other than T1D (see Table 4). However, a comparison of means in parent stress levels between the two groups (T1D or other parent chronic illness, no parent chronic illness) of the entire parent sample did not find a significant difference in parental stress levels,  $t(31.31) = -1.93$ ,  $p = .06$ .

Table 4

*Descriptive Statistics for Categorical Variables of Type 1 Participants (n = 82)*

Categorical Demographic Table	<i>n</i>	%
How often are your child's average blood sugar levels within recommended guidelines for type 1 diabetic children?		
Rarely	15	18.3
Sometimes	35	42.7
Often	30	36.6
Always	1	1.2
Missing	1	1.2
Parent Also Diagnosed with Type 1 Diabetes		
Yes	6	7.3
No	76	92.7
Parent Diagnosed with a Chronic Illness Other than T1D		
Yes	10	12.2
No	72	87.8

*Note:* Variables with no missing data reported had zero missing data

Descriptive statistics for the four continuous variables of interest are shown in Table 5. All continuous variables utilized a Likert-type scale, with mean participant child resilience scores ranging from 0 to 3 ( $M = 2.69$ ,  $SD = .58$ ), with a higher score indicating higher levels of child resilience (i.e. self-regulation/responsibility). Child mental health scores ranged from 0 to 2 ( $M = 1.53$ ,  $SD = .41$ ), with a higher score indicating greater mental health issues. Parent stress scores ranged from 1 to 5 ( $M = 2.37$ ,  $SD = .73$ ), with higher scores indicating greater levels of parent stress. Finally, parenting self-efficacy scores ranged from 1 to 6 ( $M = 4.11$ ,  $SD = .93$ ), with higher scores indicating greater levels of parenting self-efficacy.

Bivariate correlations were conducted to examine the relationship between

continuous variables of child resilience, child mental health, parent stress, and parenting self-efficacy. The results revealed that all four continuous variables were significantly correlated,  $ps < .001$ . None of the bivariate correlations between continuous variables of interest demonstrated multicollinearity ( $r > .80$ ). Further details of relationships among these variables are shown in Table 5. Parent stress was positively related to child mental health problems ( $r = .73$ ) and negatively related to parent self-efficacy ( $r = -.68$ ) and child resilience ( $r = -.53$ ). In addition, parent self-efficacy and child resilience were negatively related to child mental health problems ( $rs = -.58$  and  $-.49$ ).

Table 5

*Means, Standard Deviations, and Bivariate Correlations of Continuous Variables*

	<i>M</i>	<i>SD</i>	1.	2.	3.	4.
1. Child Resilience (SEARS-P)	2.69	.58	-			
2. Child Mental Health (CBCL)	1.53	.41	-.49**	-		
3. Parent Stress (PSS)	2.37	.73	-.53**	.73**	-	
4. Parent Self-Efficacy (PSOC)	4.11	.93	.56**	-.58**	-.68**	-

*Note:* \* $p < .05$ . \*\* $p < .001$

## Main Analyses

### Group Differences in Parent stress and Child Mental Health (Hypotheses 1 and 2)

Hypothesis 1 predicted that parents of children with T1D would have higher levels of stress compared to parents of children without T1D. Hypothesis 2 predicted that

children with T1D would have higher levels of depression and anxiety than children without T1D. These hypotheses were tested together with a multivariate analysis of variance (MANOVA), using group status as the independent variable and parent stress (measured by PSS scores) and child mental health issues (measured by CBCL subscale scores) as the dependent variables. In addition, the variable of parenting self-efficacy (measured by the PSOC subscale scores) was included in this analysis as a dependent variable, due to preliminary analyses showing significant correlations between parenting self-efficacy and parent stress.

The overall model was significant,  $V = .28$ ,  $F(3, 128) = 16.53$ ,  $p < .001$ , partial  $\eta^2 = .28$ . Due to a high bivariate correlation between the three dependent variables, follow-up tests on the individual dependent variables were conducted using Roy Bargman's stepdown analysis, with parent stress entered in Step 1, parenting self-efficacy entered in Step 2, and child mental health issues entered in Step 3 (see Table 6). This order was determined based on theory and previous literature. To decrease the familywise error rate, significance was determined based on a bonferroni corrected alpha level of .016.

The first step showed significant group differences in parent stress,  $F(1, 130) = 42.84$ ,  $p < .001$ ,  $\eta^2 = .25$ . Parents of children with T1D reported significantly higher parent stress levels ( $M = 2.67$ ,  $SD = .59$ ) compared to parents of children without T1D ( $M = 1.93$ ,  $SD = .69$ ).

Step 2 included parent stress as a covariate and parenting self-efficacy as the dependent variable. Once the effect of parent stress had been accounted for, there was no longer a unique effect on parenting self-efficacy,  $F(1, 129) = 2.38$ ,  $p = .125$ , partial  $\eta^2 =$

.02. While it was not significant, parents of children with T1D still reported lower levels of parenting self-efficacy ( $M = 3.78$ ,  $SD = .77$ ) compared to parents of children without T1D ( $M = 4.59$ ,  $SD = .94$ ).

Finally, Step 3 used parent stress and parenting self-efficacy as covariates and child mental health as the dependent variable. Once the effects of parent stress and parenting self-efficacy had been accounted for, there was no longer a unique effect of group status on child mental health issues,  $F(1, 128) = 3.14$ ,  $p = .079$ , partial  $\eta^2 = .02$ . Although not significant after accounting for these variables, parents of children with T1D still reported higher depression and anxiety scores for their children ( $M = 1.69$ ,  $SD = .40$ ) compared to parents of children without T1D ( $M = 1.30$ ,  $SD = .32$ ).

Table 6

*One-Way MANOVA Comparing Groups on Parent Stress and Child Mental Health Using Stepdown Analysis (n=132)*

Variable	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>	$\eta^2$
Parent Stress				42.84	.00**	.25
Type 1 Diabetic						
Parent	79	2.67	.59			
Comparison Group	53	1.93	.69			
Parenting Self-Efficacy				2.38	.125	.02
Type 1 Diabetic						
Parent	79	3.78	.77			
Comparison Group	53	4.59	.94			
Parent Stress (control)				73.34	.00**	.36
Child Mental Health				3.14	.079	.02
Type 1 Diabetic	79	1.69	.40			
Comparison Group	53	1.30	.32			
Parenting Self-Efficacy (control)				2.36	.127	.02
Parent Stress (control)				47.72	.00**	.27

Note: \* $p < .05$ . \*\* $p < .001$

### **Group Differences in Child Mental Health Moderated by Child Resilience and Parenting Self-Efficacy**

Hypothesis 3 predicted that the relationship between T1D status and child mental health issues would be moderated by child resilience levels. Hypothesis 4 predicted that this relationship would be moderated by parenting self-efficacy levels. To analyze these two hypotheses, a linear regression moderation analysis was conducted using group status as the independent variable, child mental health issues (measured by CBCL subscale scores) as the dependent variable, and child resilience (measured by the SEARS-P subscale score) and parenting self-efficacy (measured by the PSOC subscale score) as the moderators.

Group status, child resilience, and parenting self-efficacy were entered as predictors in the first block, and the interaction terms of child resilience x group status and parenting self-efficacy x group status were entered in the second block. These interaction terms were created after mean-centering the variables. Child group status was coded as 1 (*comparison group*) and 2 (*type 1 diabetes*). Table 7 shows the detailed results of the analysis.

The first model was significant,  $F(3, 128) = 31.19, p < .001, R^2 = .42$ . Group status was significantly associated with child mental health issues,  $\beta = .25, t(131) = 3.30, p = .001$ , with children with T1D demonstrating a significant association with mental health issues, in comparison to children without T1D. Child resilience was significantly negatively associated with child mental health issues,  $\beta = -.21, t(131) = -2.54, p = .012$ . As child resilience levels increased, depression and anxiety levels decreased. Parenting

self-efficacy was also significantly, negatively associated with child mental health problems,  $\beta = -.36$ ,  $t(131) = -4.16$ ,  $p < .001$ , indicating that increased parenting self-efficacy is associated with decreased child mental health issues.

The second model was also significant,  $F(5, 126) = 20.01$ ,  $p < .001$ ,  $R^2 = .44$ . This second model indicated that the moderator variable created from the interaction term of child group status and parent-reported child resilience was not significantly associated with child mental health problems ( $\beta = .09$ ,  $p = .73$ ). Therefore, the effect that the child's amount of psychological resilience has on that child's amount of mental health issues is the same or similar for both children with T1D and those without the illness.

The moderator variable created from the interaction term of child group status and parenting self-efficacy was also not significantly associated with child mental health issues ( $\beta = -.58$ ,  $p = .054$ ). This indicates that the effect the parent's amount of parenting self-efficacy has on the child's amount of mental health problems is similar for both groups of children.

Table 7

*Hierarchical Linear Regression Predicting Child Mental Health Issues from Continuous Variables of Interest and Moderator Variables (n = 132)*

Dependent variable	Unstandardized		Standardized		<i>p</i>
	<i>b</i>	SE	$\beta$	<i>t</i>	
Child Mental Health Issues					
Child Group Status <sup>a</sup>	.21	.06	.25	3.30	.001
Child Resilience	-.15	.06	-.21	-2.54	< .05
Parenting Self-Efficacy	-.16	.04	-.36	-4.16	<.001
Child Mental Health Issues					
Child Group Status <sup>a</sup>	.22	.06	.26	3.45	.001
Child Resilience	-.27	.22	-.38	-1.25	.21
Parenting Self-Efficacy	.11	.15	.25	.76	.45
Child Resilience x					
Child Group Status <sup>a</sup>	.04	.13	.09	.34	.73
Parenting Self-Efficacy					
x Child Group Status <sup>a</sup>	-.17	.09	-.58	-1.95	.054

*Note.* First Model Predicting Child Mental Health,  $F(3, 128) = 31.19, p < .001, R^2 = .42$ . Second Model Predicting Child Mental Health,  $F(5, 126) = 20.01, p < .001, R^2 = .44$

<sup>a</sup>Child Group Status 1= no diabetes, 2 = diabetes

### Follow-Up Analysis for Hypothesis 3

After the primary analysis for Hypotheses 3 and 4, it was decided that a follow-up analysis of Hypothesis 3 would be appropriate. Hypothesis 3 predicted that the relationship between T1D group status and child mental health issues would be moderated by child resilience levels. Given the strong influence of parent stress on child mental health evidenced in Hypotheses 1 and 2, a follow-up regression analysis was conducted adding parent stress as another moderator.

A linear regression moderation analysis was conducted using group status, child resilience (measured using the SEARS-P scale) and parent stress (measured from the PSS



scale scores) as predictor variables, child mental health issues (measured by CBCL subscale scores) as the outcome variable, and the interaction of parent stress and child resilience as a moderator. Group status, child resilience, and parent stress were entered as predictors in the first block, and the interaction term of child resilience x parent stress was entered in the second block. This interaction term was created after mean-centering the variables. Child group status was coded as 1 (*comparison group*) and 2 (*type 1 diabetes*). Table 8 shows the detailed results of the analysis.

The first model was significant,  $F(3, 128) = 54.88, p < .001, R^2 = .56$ . However, group status was not significantly associated with child mental health issues in this model,  $\beta = .12, t(131) = 1.83, p = .07$ . Neither was child resilience,  $\beta = -.13, t(131) = -1.94, p = .055$ . Parent stress was significantly associated with child mental health problems,  $\beta = .60, t(131) = 7.99, p < .001$ , indicating that increased parent stress is associated with increased child mental health issues.

The second model was also significant  $F(4, 127) = 41.51, p < .001, R^2 = .57$ . This second model indicated that the moderator variable created from the interaction term of parent-reported child resilience and parent stress was not significantly associated with child mental health problems ( $\beta = -.07, p = .28$ ). Therefore, the effect that the parent's amount of parenting stress has on that child's amount of mental health issues is the same or similar for both children with high amounts of psychological resilience and low amounts of psychological resilience.

Table 8

*Follow-Up Analysis of Hierarchical Linear Regression Predicting Child Mental Health Issues (n = 132)*

Dependent variable	Unstandardized		Standardized		
	<i>b</i>	SE	$\beta$	<i>t</i>	<i>p</i>
Child Mental Health Issues					
Child Group Status <sup>a</sup>	.10	.06	.12	1.83	.07
Child Resilience	-.10	.05	-.13	-1.94	.055
Parent Stress	.34	.04	.60	7.99	<.001
Child Mental Health Issues					
Child Group Status <sup>a</sup>	.12	.06	.14	2.03	<.05
Child Resilience	-.12	.05	-.16	-2.19	<.05
Parent Stress	.34	.04	.60	7.97	<.001
Child Resilience x Parent Stress	-.07	.06	-.07	-1.09	.28

*Note.* First Model Predicting Child Mental Health,  $F(3, 128) = 54.88, p < .001, R^2 = .56$ . Second Model Predicting Child Mental Health,  $F(4, 127) = 41.51, p < .001, R^2 = .57$

<sup>a</sup>Child Group Status 1 = no diabetes, 2 = diabetes

## CHAPTER V

### DISCUSSION

The purpose of this study was to compare parent-reported measures of child resilience, child mental health, parent stress, and parenting self-efficacy between a group of parents of children diagnosed with T1D (ages of 6-12 years old) and a group of parents with typically-developing children without chronic illness (ages of 6-12 years old). Overall, parent stress, parent self-efficacy, and child resilience were all linked to child mental health. Higher levels of parent stress and lower levels of parent self-efficacy and child resilience were associated with higher levels of child mental health issues. However, group comparisons of parents of children with T1D and those without chronically ill children showed more nuanced results.

As expected, parents of children with T1D reported significantly higher levels of parent stress than parents of children without T1D. This reflects the current literature indicating a significant amount of parenting stress amongst parents of children with T1D (Moreira et al., 2014). In addition, the prediction that children with T1D would have higher levels of parent-reported depression and anxiety issues than children without diabetes was also supported. This reflects the current literature indicating a higher likelihood of individuals with T1D to experience symptoms of anxiety (Buchberger et al., 2016) and depression (Reynolds & Helgeson, 2011).

Interestingly, when the effects of parent stress and parent self-efficacy were accounted for, the group differences in child mental health issues were no longer significant. Thus, the diagnosis of T1D does not necessarily influence worse mental

health outcomes in children; rather, these outcomes seem to be influenced by levels of parent stress. These results indicate that high amounts of parent stress can lead to low amounts of parenting self-efficacy, which in turn may lead to high amounts of child mental health issues. Given the increased stress and decreased self-efficacy in parents of children with T1D, these children may be at an increased risk of mental health issues, such as anxiety and depression.

Hypotheses 3 and 4 predicted that child resilience and parenting self-efficacy would serve as moderators for the relationship between T1D status and child mental health. While child resilience and parenting self-efficacy were both associated with lower depression and anxiety among all children, the moderation effect was not significant, indicating that group differences in child mental health outcomes did not vary based on resilience or self-efficacy levels.

Follow-up analyses adding parent stress to the model revealed interesting results. Testing whether child resilience could serve as a protective factor in the relationship between parent stress and child mental health issues provided a better picture of the influence of parent stress. Child resilience did not moderate the relationship between parent stress and child mental health, indicating that the effect of parent stress on the child's amount of mental health issues is the same or similar for both children with high amounts of psychological resilience and those with low amounts of resilience. In other words, if a parent has high amounts of stress, child psychological resilience is not strong enough of a buffer on its own to protect against the effect of parent stress on child mental health issues.

### **Implications of the Results**

These results demonstrate that it is an interaction of parenting factors (parent stress and parenting self-efficacy) that influences mental health issues within a child population with T1D. This research demonstrates the crucial roles that social support networks and access to resources serve for parents of children with T1D to help reduce parent stress and increase parenting self-efficacy. Professionals who work with this population should understand the importance of the relationships amongst these variables, and that parent/caregiver support and encouragement is vital to mitigate the possible negative child mental health effects in children with T1D.

Across all types of mental health therapy modalities, intervention with this child population should include efforts to decrease parent stress and increase parenting self-efficacy. Family therapy can serve as an effective intervention, with a focus on these parent factors and how they may affect the child's mental health through the family system. When providing individual mental health counseling for a child with T1D, frequent parent consultations and continuous assessment for parent or caregiver stress levels is encouraged. Referrals for a parent to receive individual mental health counseling may be appropriate, if it is determined that parent stress levels are high.

This research study attempted to fill in several gaps in the current research regarding T1D and childhood. Very little research thus far has consisted of exploring the overall, general parenting self-efficacy beliefs of parents of children with T1D. Although these results do not demonstrate that general parenting self-efficacy influences child mental health issues differently between these two populations, parenting self-efficacy

does remain an important factor in childhood mental health issues overall. It is important for future research to attempt to understand more about the general parenting self-efficacy of parents of children with T1D as a protective factor, in order to inform best mental health practices for a child population with T1D.

In addition, very little research thus far has attempted to study child resilience as an influencing factor in the relationship between a T1D diagnosis and child mental health. While these results indicated that there were not significant group differences in child resilience based on group status, child resilience does remain an important factor in childhood mental health overall. It is important for future research to attempt to understand more about child resilience as a potential protective factor for mental health within a child T1D population.

### **Limitations and Directions for Future Research**

As with any study that proposes the use of convenience sampling, this type of recruitment method has flaws. It is difficult to say whether the results of this study can accurately be generalized to the target population in question. However, the use of a population with T1D makes the use of convenience and snowball sampling necessary due to the low prevalence of the disease (ADA, 2018). The use of convenience/snowball sampling and recruitment through social media on a national scale together allowed better access to possible participants.

This study did not test or control for unknown demographic or psychological factors that may have affected levels of parent stress, parent self-efficacy, child resilience, and child mental health. Parent mental health was not assessed, even though

this is likely a variable that affects parent stress, parenting self-efficacy, and child mental health. Future research should look at additional factors that may also affect parent stress and child mental health, such as household income, parent relationship status, and general health. In addition, longitudinal research should be deployed to look at how changes across development influence the impact of various factors on child mental health in this population. Longitudinal research could also provide a more accurate picture of the changes that occur within these study variables as the child develops and takes on more responsibility in T1D disease management tasks.

Finally, the use of a parent-reported sample may not accurately represent the variables of child mental health issues and child psychological resilience. It is possible that parent-reported data on these variables may be biased or not accurate. Future research should incorporate child-reported measures of child mental health issues and psychological resilience to serve a more accurate picture of the dynamics of these variables in analysis. This study utilized child self-regulation and responsibility as measures of resilience in children, and it is recommended that future research also assess for other protective variables as measures of child resilience.

### **Conclusion**

This study is one of the first of its kind to propose and study that the variables of general parenting self-efficacy and child resilience influence the development of mental health issues in a child population with T1D. It was found that parent stress, parent self-efficacy, and child resilience were all influencing factors in child mental health. Higher

levels of parent stress and lower levels of parent self-efficacy and child resilience were related to higher levels of child depression and anxiety.

High parent stress is likely to influence lowered amounts of parenting self-efficacy, which is likely to influence mental health issues in a child population with T1D. In addition, child resilience is also an influencing factor in T1D child mental health; however, resilience alone is not enough to buffer the negative effects of high parent stress. Hopefully, this study helps researchers, professionals, and parents to better understand how to help and prevent anxiety and depression within children with T1D. If mental health issues are not treated or prevented in childhood, there is a high potential for these issues to increase and become even more significant in adolescence. Parenting factors such as parenting stress and general parenting self-efficacy are essential to the overall health and psychological well-being of children living with this disease.



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APPENDIX A  
Informed Consent



**Texas Woman's University – Consent to Participate in Research**  
**Parenting and Child Development Study**

Principal Investigator: Nicole Liudahl Carroll, MS, LPC, RPT, NCC; Email: nliudahl@twu.edu

Faculty Advisor: Brigitte Vittrup, Ph.D.; Email: BVittrup@twu.edu

By filling out this survey, you agree to participate in a research study on parenting and child development among different parent groups. The results of this study will contribute to knowledge in the field of childhood development. You will be asked questions regarding your and your child's demographic information, your child's health and development, and your experiences as a parent.

Participation is voluntary, and you may withdraw from the study or choose not to participate at any time and for any reason without any penalty.

By filling out this survey, you allow the Principal Investigator to use the results in conference presentations and/or research publications. However, information is collected anonymously, and the information you provide cannot be linked to your name or personal information. Confidentiality will be protected to the extent that is allowed by law. There is a potential risk of loss of confidentiality in all email, downloading, electronic meetings, and internet transactions.

Survey data, which does not contain identifiable information, may be used in future research studies by the Principal Investigator, but it will not be distributed to other investigators.

It is expected to take 15-20 minutes to complete the survey, and you may complete it at any time and in any location that is convenient to you.

At the end of the survey, you will be given the opportunity to link to a separate survey site where you can enter your email address to receive a \$4.00 gift certificate and/or an executive summary of the study results when they become available. In order to be eligible for the incentive, you must answer all survey questions, excluding the demographic information, which is optional. Please note that the contact information you provide will be collected separately from the main survey, not connected to the site on which you enter your answers to the survey questions. Thus, there will be no way of linking your contact information to your answers. All email addresses will be erased upon completion of the study.

Should you feel emotional discomfort or distress due to the topics covered in this survey, you may use the links below to access a mental health provider in your area:

- American Psychological Association Psychologist Locator: <http://locator.apa.org>
- Psychology Today Find a Therapist: <http://therapists.psychologytoday.com/rms>

The researchers will try to prevent any problem that could happen because of this research. You should let the researchers know at once if there is a problem and they will help you. However, TWU does not provide medical services or financial assistance for injuries that might happen because you are taking part in this research.

Thank you in advance for completing this survey. You may print and keep a copy of this consent form. If you have any questions about the research study, please contact the researchers (contact information at the top of this page). If you have questions about your rights as a participant in this research or the way this study has been conducted, you may contact the Texas Woman's University Office of Research and Sponsored programs at 940-898-3378 or via e-mail at [IRB@twu.edu](mailto:IRB@twu.edu).

**By clicking on the “Continue” button below, you are indicating your consent to participate in the study.**

## APPENDIX B

### Demographic and Health Information Questionnaire

Please complete the following questions regarding your own information and your child's information, to the best of your knowledge. If you have more than one child, ***please choose only one of your children (between the ages of 6 to 12 years old)*** in answering the following questions.

1) Do you consider yourself a primary caregiver for your child?

- a. Yes
- b. No

2) What is your age in years?

\_\_\_\_\_ years

3) Which gender do you most identify with?

- a. Male
- b. Female

4) What is your relationship status?

- a. Married
- b. Single, Never Married
- c. Domestic Partnership or Significant Other
- d. Divorced
- e. Widowed

5) What is your race/ethnicity? \_\_\_\_\_

6) What is your current household income?

- a. Less than \$19,999
- b. \$20,000 to \$39,999
- c. \$40,000 to \$59,999
- d. \$60,000 to \$79,999
- e. \$80,000 to \$99,999
- f. \$100,000 to \$119,000
- g. Over \$120,000

7) Have you ever been medically diagnosed with a chronic illness (*For Example:* Type 1 Diabetes, Type 2 Diabetes, Asthma, Cystic Fibrosis, Celiac Disease, Cancer, Thyroid Disease, Cerebral Palsy, Epilepsy, Congenital Heart Problems, Spina Bifida, Sickle Cell Anemia)?

- a. No
- b. Yes, Type 1 Diabetes (Juvenile Diabetes)
- c. Yes, another chronic illness (fill in the blank)

8) What is your child's age in years?

\_\_\_\_\_ years

9) What is your child's gender?

- a. Male
- b. Female

10) What is your child's race/ethnicity? \_\_\_\_\_

11) Has your child ever been diagnosed with a mental health disorder?

- a. No
- b. Yes, Depression
- c. Yes, Anxiety
- d. Yes, Other (Fill in the Blank)

12) Has your child ever received mental health services?

- a. No
- b. Yes, Six Weeks or Less
- c. Yes, Six Weeks – 3 Months
- d. Yes, 3 Months - 6 Months
- e. Yes, 6 Months – 9 Months
- f. Yes, 9 Months - 1 year
- g. Yes, 1 year or More

13) Has your child ever been medically diagnosed with Type 1 Diabetes (Juvenile Diabetes)?

- a. Yes
- b. No

14) Has your child ever been medically diagnosed with another chronic illness (*For Example:* Type 2 Diabetes, Asthma, Cystic Fibrosis, Celiac Disease, Cancer, Thyroid Disease, Cerebral Palsy, Epilepsy, Congenital Heart Problems, Spina Bifida, Sickle Cell Anemia)?

- a. No
- i. Yes (Fill in the Blank)

15) For how long has your child been diagnosed with Type 1 Diabetes (Juvenile Diabetes)?

\_\_\_\_\_ years

16) At what age was your child diagnosed with Type 1 Diabetes (Juvenile Diabetes)?

\_\_\_\_\_ years

17) Overall, how often are your child's average blood sugar levels within recommended guidelines for type 1 diabetic children?

- a. Never
- b. Rarely
- c. Sometimes
- d. Often
- e. Always
- f. I Don't Know
- g. I'd Prefer Not to Say

APPENDIX C

The Child Behavior Checklist (CBCL)

Anxious/Depressed and Withdrawn/Depressed Subscales

## CBCL

Below is a list of items that describe children. For each item that describes your child now or within the past 6 months, please circle the 2 if the item is **very true or often true**. Circle the 1 if the item is **somewhat or sometimes true** of your child. If the item is **not true** of your child, circle the 0. Please answer all items as well as you can, even if some do not seem to apply to your child.

1. Cries a lot	0	1	2
2. Fears certain animals, situations, or places other than school	0	1	2
3. Fears going to school	0	1	2
4. Fears he/she might think or do something bad	0	1	2
5. Feels he/she has to be perfect	0	1	2
6. Feels or complains that no one loves him/her	0	1	2
7. Feels worthless or inferior	0	1	2
8. Nervous, highstrung, or tense	0	1	2
9. Too fearful or anxious	0	1	2
10. Feels too guilty	0	1	2
11. Self-conscious or easily embarrassed	0	1	2
12. Talks about killing self	0	1	2
13. Worries	0	1	2
14. There is very little he/she enjoys	0	1	2
15. Would rather be alone than with others	0	1	2
16. Refuses to talk	0	1	2
17. Secretive, keeps things to self	0	1	2
18. Too shy or timid	0	1	2
19. Underactive, slow moving, or lacks energy	0	1	2
20. Unhappy, sad, or depressed	0	1	2
21. Withdrawn, doesn't get involved with others	0	1	2

## APPENDIX D

### The Parental Stress Scale (PSS)



### PSS

The following experiences describe feelings and perceptions about the experience of being a parent. Think of each of the items in terms of how your relationship with your child typically is. Please indicate the degree to which you agree or disagree with the following items by placing the appropriate number in the space provided

**1= Strongly disagree   2= Disagree   3= Undecided   4= Agree   5=Strongly agree**

- 1) \_\_\_ I am happy in my role as a parent.
- 2) \_\_\_ There is little or nothing I wouldn't do for my child if it was necessary.
- 3) \_\_\_ Caring for my child sometimes takes more time and energy than I have to give.
- 4) \_\_\_ I sometimes worry whether I am doing enough for my child.
- 5) \_\_\_ I feel close to my child.
- 6) \_\_\_ I enjoy spending time with my child.
- 7) \_\_\_ My child is an important source of affection for me.
- 8) \_\_\_ Having this child gives me a more certain and optimistic view for the future.
- 9) \_\_\_ The major source of stress in my life is my child.
- 10) \_\_\_ Having this child leaves little time and flexibility in my life.
- 11) \_\_\_ Having this child has been a financial burden.
- 12) \_\_\_ It is difficult to balance different responsibilities because of my child.
- 13) \_\_\_ The behavior of my child is often embarrassing or stressful to me.
- 14) \_\_\_ If I had to do it over again, I might decide not to have this child.
- 15) \_\_\_ I feel overwhelmed by the responsibility of being a parent.
- 16) \_\_\_ Having this child has meant having too few choices and too little control over my life.
- 17) \_\_\_ I am satisfied as a parent.
- 18) \_\_\_ I find this child enjoyable.

## APPENDIX E

The Social Emotional Assets and Resilience Scale-Parent (SEARS-P)

Self-Regulation/Responsibility Subscale

Please complete the following questions regarding your child, to the best of your knowledge. If you have more than one child, *please choose only one of your children* (between the ages of 6 to 12 years old) in answering the following questions.

### SEARS-P

Read each sentence and circle the letter that best describes the child you are rating in the past 6 months.

- |  |       |           |       |        |
|--|-------|-----------|-------|--------|
| 1. Stays calm when there is a problem or argument...                       | Never | Sometimes | Often | Always |
| 2. Is good at understanding the point of view of other people....          | Never | Sometimes | Often | Always |
| 3. Works on chores and projects independently, without help...             | Never | Sometimes | Often | Always |
| 4. Expresses disagreement with other people without fighting or arguing... | Never | Sometimes | Often | Always |
| 5. Is a good listener...   | Never | Sometimes | Often | Always |
| 6. Is good at solving problems...  | Never | Sometimes | Often | Always |
| 7. Makes good decisions...   | Never | Sometimes | Often | Always |
| 8. Is good at settling disagreements of other people...                    | Never | Sometimes | Often | Always |
| 9. Stays in control when he/she gets angry...                              | Never | Sometimes | Often | Always |
| 10. Thinks before he/she acts...   | Never | Sometimes | Often | Always |
| 11. Is dependable, someone you can rely on...                              | Never | Sometimes | Often | Always |
| 12. Thinks of her/his problems in ways that help...                        | Never | Sometimes | Often | Always |
| 13. Accepts responsibility when she/he needs to...                         | Never | Sometimes | Often | Always |
| 14. Is able to handle problems on her/his own...                           | Never | Sometimes | Often | Always |
| 15. Knows how to calm down when stressed or upset...                       | Never | Sometimes | Often | Always |
| 16. Knows how to identify and change negative thoughts...                  | Never | Sometimes | Often | Always |
| 17. I trust her/him  | Never | Sometimes | Often | Always |
| 18. Can figure out whether or not negative thoughts are realistic.         | Never | Sometimes | Often | Always |
| 19. Can identify errors in the way he/she thinks about things...           | Never | Sometimes | Often | Always |
| 20. Knows how to set goals for what he/she wants in life...                | Never | Sometimes | Often | Always |
| 21. Is able to handle problems that really bother other kids...            | Never | Sometimes | Often | Always |
| 22. When life is hard, doesn't let things get to him/her...                | Never | Sometimes | Often | Always |

APPENDIX F  
Parenting Sense of Competence Scale (PSOC)  
Efficacy Subscale

### PSOC Efficacy Subscale

Please rate the extent to which you agree or disagree to the following statements...

<b>Strongly Disagree</b>	<b>Somewhat Disagree</b>	<b>Disagree</b>	<b>Agree</b>	<b>Somewhat Agree</b>	<b>Strongly Agree</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>

- |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| 1. The problems of taking care of a child are easy to solve once you know how your actions affect your child, an understanding I have acquired. | 1 | 2 | 3 | 4 | 5 | 6 |
| 2. I would make a fine model for a new parent to follow in order to learn what he/she would need to know in order to be a good parent.          | 1 | 2 | 3 | 4 | 5 | 6 |
| 3. Being a parent is manageable, and any problems are easily solved.  | 1 | 2 | 3 | 4 | 5 | 6 |
| 4. I meet my own personal expectations for expertise in caring for my child.  | 1 | 2 | 3 | 4 | 5 | 6 |
| 5. If anyone can find the answer to what is troubling my child, I am the one.   | 1 | 2 | 3 | 4 | 5 | 6 |
| 6. Considering how long I've been a parent, I feel thoroughly familiar with this role.  | 1 | 2 | 3 | 4 | 5 | 6 |
| 7. I honestly believe I have all the skills necessary to be a good parent to my child.  | 1 | 2 | 3 | 4 | 5 | 6 |

## APPENDIX G

### Emotional Development and Type 1 Diabetes Study Flyer

## **Child Development and Type 1 Diabetes Study**

You have the opportunity to be a part of a child development research study for Type 1 Diabetes in childhood!

*Is your child between the ages of 6 and 12 years old?*

*Has your child been diagnosed with Type 1 Diabetes?*

*Are you a primary caregiver for your child?*

If you answered YES to these questions, you may be eligible to participate in a childhood development research study.

**Benefits will include a \$5.00 gift certificate to Starbucks after completion of the study.** This one-time online questionnaire for parents/caregivers will take approximately 15 to 20 minutes or less to complete. All participation is voluntary and may be discontinued at any time.

Primary caregivers/parents of Type 1 Diabetic children between the ages of 6-12 years old are eligible to participate

**Use this Link to Participate in the Study:**

<https://www.psychdata.com/s.asp?SID=185420>

*Please email Nicole Carroll at [nliudahl@twu.edu](mailto:nliudahl@twu.edu) for more information or if you have any questions. There is a potential risk of loss of confidentiality in all email downloading, electronic meetings, and internet transactions*

## APPENDIX H

### Emotional Development and Childhood Study Flyer



## **Childhood Development Study for Parents**

You have the opportunity to be a part of a development research study for children!

*Is your child between the ages of 6 and 12 years old?*

*Has your child never been diagnosed with a chronic illness?*

*Are you a primary caregiver for your child?*

If you answered YES to these questions, you may be eligible to participate in a childhood development research study.

**Benefits will include a \$5.00 gift certificate to Starbucks upon completion of the study.** The one-time online questionnaire for parents will take approximately 15 to 20 minutes or less to complete. All participation is voluntary and may be discontinued at any time.

Primary caregivers/parents of children without chronic illness between the ages of 6-12 years old are eligible to participate

**Use this Link to Participate in the Study:**

<https://www.psychdata.com/s.asp?SID=185420>

Please email Nicole Carroll at [nliudahl@twu.edu](mailto:nliudahl@twu.edu) for more information or if you have any questions. There is a potential risk of loss of confidentiality in all email downloading, electronic meetings, and internet transactions.