SELF-DISCLOSURE, SECRECY, AND PARENTAL KNOWLEDGE

IN CAUCASIAN AND LATINO YOUTH MANAGING

TYPE 1 DIABETES

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SELF-DISCLOSURE, SECRECY, AND PARENTAL KNOWLEDGE IN CAUCASIAN AND LATINO YOUTH MANAGING TYPE 1 DIABETES

by

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SELF-DISCLOSURE, SECRECY, AND PARENTAL KNOWLEDGE

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A qualitative and quantitative examination of self-disclosure and secrecy was conducted to gain insight into their connections with parental knowledge and adolescent type 1 diabetes management. This is the first study to examine adolescent diabetes-related disclosure and secrecy in a diverse sample while considering the broader context of the parent-adolescent relationship. Participants were Caucasian and Latina mothers and their adolescents with type 1 diabetes (N = 118 dyads, 48% Latino, 54% female adolescents, 10 to 15 years old, illness duration > 1 year, 25% on insulin pump). Qualitative data consisted of coding adolescent

responses to interview questions about two self-identified diabetes-related stressful events: "Does your mother (father) know about this stressful event?" and "As far as you know, how did your mother (father) find out?" Quantitative data included adolescent responses to questionnaires measuring diabetes self-disclosure to and secrecy from mothers and fathers, maternal and paternal knowledge, maternal and paternal acceptance (i.e. relationship quality), adherence, and depressive symptoms. Mothers also completed a maternal knowledge questionnaire and HbA1c was extracted from medical records. Sociodemographic data were collected by adolescent and maternal reports. Qualitative analysis revealed 10 ways in which parents came to know of their adolescents' diabetes-related stressful events. For both stressful events, *adolescent disclosed to parent* was the most common code for mothers' and fathers' knowledge, *mother present-observes* was the second most frequent code for mothers, and *mother discloses to father* was the second most frequent code for fathers. Self-disclosure and secrecy predicted adolescent reports of maternal and paternal knowledge, whereas only self-disclosure and not secrecy predicted maternal reports of her own knowledge. Self-disclosure but not secrecy was associated with HbA1c, and secrecy but not self-disclosure was related to adherence, independent of both parental knowledge and acceptance. Although higher self-disclosure to mothers and lower secrecy to fathers were correlated with lower depressive symptoms, these associations were not statistically reliable after covarying parental acceptance and/or knowledge. These results provide a more thorough understanding of the relationship between adolescent self-disclosure and secrecy with health outcomes, raise questions about the focus on parental monitoring in interventions to improve diabetes management during adolescence, and point to important directions for future research.

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PRIOR PUBLICATIONS

Thoth, C.A., Tucker, C., Leahy, M., & Stewart, S.M. (2013). Self-disclosure of serostatus by HIV-positive youth: A Review. *Journal of Behavioral Medicine*. doi: 10.1007/s10865-012-9485-2

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CHAPTER ONE
Introduction

While adolescence is a time of both increased freedom and responsibility, healthy adolescent development occurs when parents remain involved in their adolescents' lives. One way that parents maintain involvement is through monitoring their child's behavior, a construct which traditionally was measured by how much parents really *know* about various aspects of their teens' lives (Barber, 1996). Low parental knowledge has been associated with higher problem behavior (Dishion & McMahon, 1998; Steinberg & Silk 2002), whereas higher parental knowledge of adolescents' activities has been linked to positive emotional, academic, and social outcomes (Crouter, MacDermid, McHale, & Perry-Jenkins, 1990; Dishion, Patterson, Stoolmiller; & Skinner, 1991; Hamza & Willoughby, 2011). A small but growing literature has extended the role of parental monitoring/knowledge into the domain of pediatric illness management, indicating that adolescents' type 1 diabetes management is better when parents maintain involvement by knowing more (Berg et al., 2008; Ellis et al., 2007; King et al., 2012).

Adolescence is a particularly challenging time for diabetes management: pubertal hormones have a dysregulating effect on metabolic control, adherence is poorer, and emotional distress is higher than at younger or older ages (Anderson, Auslander, Jung, Miller, & Santiago, 1990; Bryden et al., 2001; Hood, Peterson, Rohan, & Drotar, 2009; Korbel, Wiebe, Berg, & Palmer 2007; Wysocki et al., 1996). Type 1 diabetes requires consistent daily monitoring, maintenance, and execution of complex tasks (American Diabetes Association, 2013). However, as children age, they become more independent and assume greater responsibility for their diabetes management

(Anderson et al., 2002; Mellin, Neumark-Sztainer, & Patterson, 2004). This lower level of parental involvement during adolescence has been associated with poorer diabetes management. Given the complexity of diabetes-related tasks, maternal as well as paternal knowledge is important (Berg et al., 2008).

Parental knowledge is not only a reflection of parental behaviors such as parental solicitation and behavioral control, but also of adolescent behaviors such as spontaneous disclosure of personal information to parents (Stattin & Kerr, 2000). In fact, recent studies indicate that adolescent disclosure predicts parental knowledge with little contribution from parental solicitation or parental control (Keijsers, Frijins, Branje, & Meeus, 2009; Kerr, Stattin, & Burk, 2010; Smetana, 2008). Adolescent disclosure is comprised of two independent constructs: self-disclosure and secrecy. In the single study that examined these constructs in the context of adolescent type 1diabetes management, self-disclosure was related to poorer diabetes management only when secrecy was low, and keeping diabetes-related secrets from either parent was associated with higher depressive symptoms (Osborn, Berg, Hughes, Pham, & Wiebe, 2013). Thus, the level of adolescent disclosure appears to impact parental knowledge, which in turn is related to health outcomes in teens with diabetes.

While type 1 diabetes is most frequently diagnosed in Caucasian youth (Delamater et al., 1999), its prevalence is increasing worldwide, including among ethnic minority populations such as Latinos (Onkamo, Väänänen, Karnonen, & Tuomilehto, 1999). Latino adolescents are at-risk for poor diabetes management (Delamater et al., 1999; Lawrence et al., 2009; Gallegos-Macias,

Macias, Kaufman, Skipper, & Kalishman, 2003), and Latino adolescents are at higher risk for developing symptoms of depression (Twenge & Nolen-Hoeksema, 2002). In addition, parent-child navigation of adolescence may differ cross-culturally (Roche et al, 2013). Therefore, Latino-Caucasian ethnic comparisons in type 1 diabetes management are warranted.

The proposed study aimed to understand how adolescent self-disclosure to and secrecy from parents was related to parental knowledge of diabetes management behaviors and outcomes (i.e. adherence, metabolic control, and adolescent depressive symptoms) in an ethnically diverse sample of adolescents with type 1 diabetes. In addition, this project explored whether and how parents know about the diabetes-related stressors that occur in the day-to-day lives of their adolescents. This study utilized an existing data set of structured interviews of adolescents as well as adolescents' and their mothers' responses to standardized measures.

CHAPTER TWO
Literature Review

MANANGEMENT OF TYPE 1 DIABETES DURING ADOLESCENCE

Type 1 diabetes mellitus is the third most prevalent chronic disease of childhood (Mayer-Davis et al., 2009). While it was previously known as juvenile-onset diabetes and is most frequently diagnosed in Caucasians (Delamater et al., 1999; Onkamo et al., 1999), it can be diagnosed in individuals of all ages and ethnic backgrounds. Type 1 diabetes occurs when the pancreas does not produce insulin, most likely due to the autoimmune destruction of insulin producing, pancreatic beta cells. Without insulin, cells cannot metabolize glucose, which is necessary to many important functions of the body such as activity, healing, growth, and brain function. Without glucose, the body becomes starved of energy and breaks down fatty acids to create energy, creating a toxic by-product called ketones. High levels of ketones in the bloodstream result in ketoacidosis, brain damage, and even death. Excess glucose in the bloodstream causes microvascular damage, which can lead to cardiovascular disease, retinopathy, nephropathy, and limb amputation (Silverstein et al., 2005; The Diabetes Control and Complications Trial Research Group, 1993).

Type 1 diabetes is a chronic illness and requires complex cognitive skills to manage the various components necessary to regulate blood glucose levels and avoid the significant and potentially life-threatening complications. Adolescence is a particularly difficult developmental period in the managements of type 1 diabetes, for a variety of reasons. The hormonal changes occurring during puberty alter the manner in which carbohydrates are metabolized, making it more difficult to regulate blood glucose levels (Anderson, Auslander, Jung, Miller, & Santiago, 1990). Also,

adolescents with type 1 diabetes are likely to face a variety of problems because they are assuming more independence in diabetes management (Ellis et al., 2007; Helgeson et al., 2008; Palmer et al., 2009) at precisely the time the illness is more difficult to control. Furthermore, other physical, social, and emotional developments that are occurring during adolescence may disrupt the complex process of diabetes management, such as their changing bodies, focus on peer acceptance, and need to learn coping skills to enhance self-management (Silverstein et al., 2005).

There is clear evidence that management of and adjustment to type 1 diabetes is difficult during adolescence. Metabolic control deteriorates longitudinally across adolescence (Helgeson, Siminerio, Escobar, & Becker, 2009), potentially because adolescents have difficulty adhering to their prescribed treatment regimens (Kovacs, Goldston, Obrosky, & Iyengar, 1990; La Greca, Follansbee, & Skyler, 1990). Recent evidence demonstrates that adherence declines linearly across the adolescent years (King et al., in press). Adolescents with type 1 diabetes also have poor psychological adjustment (Anderson, Freeland, Clouse, & Lustman, 2001; Korbel, Wiebe, Berg, & Palmer, 2007; Kovacs, Goldston, Obrosky, & Bonar, 1997), and a recent meta-analysis found that adolescents with type 1 diabetes are at risk for mild to moderately elevated levels of depressive symptoms (Reynolds & Helgeson, 2011). Research examining type 1 diabetes in adolescence often includes outcome variables from these three related categories (i.e. physical outcomes like metabolic control, behavioral management indexed by adherence, and psychological outcomes such as depressive symptoms), an approach that will be utilized in the present study.

Metabolic control is measured by glycosylated hemoglobin, or Hemoglobin A1c (HbA1c), which reflects the average level of glycemic control during the previous three or four months, with a lower number signifying better metabolic control. HbA1c levels for those without diabetes are ≤ 5.75, but for those with type 1 diabetes, they are ≥ 6.5. The American Diabetes Association currently recommends that adolescents with type 1 diabetes have HbA1c < 7.5, or < 7.0 if it can be achieved without excessive hypoglycemia (American Diabetes Association, 2013). Adherence is the degree to which individuals follow the behavioral recommendations of their treatment providers, such as blood glucose monitoring, multiple daily injections or the use of an insulin pump, dietary and exercise recommendations, and frequent medical visits. Adherence is associated with metabolic control (Hood et al., 2009), and both metabolic control and adherence of youth with type 1 diabetes deteriorate across adolescence (King et al., 2012; Wiebe et al., 2011). Finally, depressive symptoms are associated with both metabolic control and adherence (Korbel et al., 2007) and are used more broadly to assess psychosocial adjustment. It is important to study these particular outcome variables given the associations between outcomes during this time period and long-term illness management. Results of the Diabetes Control and Complications Trial (DCCT) and Epidemiology of Diabetes Interventions and Complications (EDIC) study indicate a linear relationship between metabolic control and future development of complications that commonly occur with type 1 diabetes, such as retinopathy, nephropathy, and neuropathy (DCCT, 1994).

PARENTAL INVOLVEMENT IN AND KNOWLEDGE OF ADOLESCENTS' TYPE 1 DIABETES

The management of type 1 diabetes during adolescence is particularly challenging for families. Parents can be involved in their adolescents' diabetes management in many ways. One way that parents maintain involvement in adolescent's diabetes care is by monitoring, a term intended to capture parents' active monitoring of and behavioral structuring of their children's lives (Ellis, Templin, Naar-King, & Frey, 2008). However, the measure designed by Brown, Mounts, Lamborn, & Steinberg (1993) used widely in the developmental psychology literature to assess this construct of monitoring, and recently modified for use with diabetes management (Berg et al., 2008), asks how much parents "really know" about their children's activities outside the home, including their children's diabetes management activities. Because this measure assesses parents' overall knowledge of their children's illness management, it is more appropriately labeled parental knowledge (Ellis et al., 2008).

There is a large body of literature that links increased parental "monitoring" of their adolescent's activities to lower levels of adolescent problem behaviors (Dishion & McMahon, 1998; Racz & McMahon, 2011; Steinberg & Silk, 2008; Willoughby & Hamza, 2011), such as drug use (Brown et al., 1993), trouble with the police (Patterson & Stouthamer-Loeber, 1984), and poor academic performance (Crouter et al., 1990). These associations have been found across ethnicity and socioeconomic status (Forehand, Miller, Dutra, & Chance, 1997). Parental knowledge has also been studied in the context of the management of type 1 diabetes in youth. Adolescents whose parents know more about their diabetes have better illness outcomes

(Follansbee, 1989; Grey et al., 1998). Parental diabetes knowledge is related to adolescents' adherence and metabolic control (Berg et al., 2008; Ellis et al, 2007), and, correspondingly, declines in parental knowledge across age predict longitudinal declines in adolescents' diabetes adherence (King et al., in press).

These positive benefits of continued parental knowledge of their adolescents' activities are potentially at odds with typical adolescence growth in autonomy and independence. Adolescents may have increasingly unsupervised free time (Larson, Richards, Moneta, Holmbeck, & Duckett, 1996; Patterson & Stouthamer-Loeber, 1984), may be responsible for their own transportation (Dodge, Dishion, & Lansford, 2006), and may expect to make their own choices about their lifestyles (Smetana & Asquith, 1994; Steinberg & Silk, 2002). In one study of mostly European-American youth, nearly all report not disclosing to parents about their activities occasionally (Darling, Cumsille, Caldwell, & Dowdy, 2006). In fact, adolescents who report greater self-disclosure to their parents about their away-from-home activities had lower levels of emotional autonomy (Finkenauer, Engles, & Meeus, 2002; Finkenauer, Engels, & Kubacka, 2008). Thus, it may be intrusive and impractical for parents to know about all facets of their adolescents' lives.

Parents can gain this knowledge about their children's behavior by parental solicitation (parents asking their adolescents and other sources about their adolescent's behavior), parental behavioral control (parents limiting the degree of freedom adolescents have in making decisions about their activities), and/or their children's disclosures (adolescents telling their parents information without prompting) (Crouter, Bumpus, Davis, & McHale, 2005; Ellis et al., 2012; Stattin & Kerr,

2000). Understanding the sources of parental knowledge has been explored qualitatively. Waizenhofer, Buchanan, and Jackson-Newsom (2004) classified sources of general parental knowledge in an almost exclusively Caucasian and affluent sample into two categories, active and passive. Active methods were defined as parents directly asking the adolescent or other potential informants as well as actively participating in activities with the children. Passive methods, defined as knowing about routine activities or receiving information from knowledgeable others without directly asking, were divided into three subcategories: passive-child (receiving unsolicited information from the child), passive-spouse (receiving unsolicited information from the spouse), passive-other (receiving unsolicited information from another informed adult besides the spouse). This research suggests that maternal and paternal knowledge comes from different sources. Mothers knew more about adolescents' activities than fathers and gained this information from active supervision and the child's voluntary disclosure. In contrast, fathers received information from their spouses (Waizenhofer et al., 2004). In primarily Caucasian families with children or adolescents with asthma, cystic fibrosis, or type 1 diabetes, Hafetz and Miller (2010) categorized sources of knowledge as parent-driven (verbal solicitation, observation of symptoms, reminders of treatments, and tracking indicators of treatment adherence) and youth-driven (disclosing spontaneously, disclosing in response to requests, and withholding information). Together, this qualitative research describes the complex set of processes through which parents come to know about the activities of their children and the sources of this information.

A somewhat contentious debate in the quantitative literature has surrounded the extent to which parental knowledge reflects parent versus adolescent activities. Recent studies indicate that adolescent disclosure predicts parental knowledge with little contribution from parental solicitation or parental control (Keijsers et al., 2010; Stattin & Kerr, 2000). Therefore, adolescent disclosure is important to understanding the links between high parental knowledge and positive adolescent outcomes. However, the most common measure of adolescent disclosure (Stattin & Kerr, 2000) confounds voluntary self-disclosure and secrecy. While related, secrecy and self-disclosure are distinct constructs (Frijins, Engels, Banje, & Meeus, 2004; Frijins, Keijsers, Branje, & Meeus, 2010; Smetana, Metzger, Gettman, & Campione-Barr, 2006). Adolescents can be both highly self-disclosing and highly secretive. For example, an adolescent may disclose to her parents that she went to a party on Friday night but keep secret that she used alcohol at the party. In several studies, secrecy is associated cross-sectionally and longitudinally with psychological, physical, social, and behavioral disadvantages in adolescence (Finkenauer, Engels, & Meeus, 2002; Frijns, Finkenauer, Vermulst, & Engels, 2005; Frinijs et al., 2010).

For adolescents with type 1 diabetes, diabetes-related self-disclosure may be particularly important for chronic illness management because the adolescents may be the only ones aware of illness symptoms (Hafetz & Miller, 2010). In addition, adolescent self-disclosure to caregivers may elicit parental assistance in diabetes management tasks. This assistance may occur if parents take charge of the situation, collaborate with their adolescent, provide instrumental support, monitor their adolescent, provide diabetes-related reminders, activate external support(s), and/or offer emotional support (Griffith, 2012). Secrecy from parents, however, may

undermine parents' levels of knowledge about adolescents' diabetes-related problems. What remains unclear is whether and how self-disclosure, secrecy, and parental knowledge relate with each other and with diabetes outcomes. In the only existing study of these constructs in diabetes management, Osborn et al. (2013) examined self-disclosure, secrecy, and diabetes outcomes in a sample of adolescents with type 1 diabetes and their mothers and fathers. The results indicated that disclosure was associated with better diabetes management only when secrecy was low. In addition, diabetes-related secrecy from mothers and fathers was associated with higher depressive symptoms (Osborn et al., 2013). However, the sample in this study was homogenous, and parental knowledge was not included in the analyses associated with diabetes outcomes.

While mothers play an important role as the primary caregivers of youth with chronic conditions (Palmer et al 2009; Wysocki et al., 2009), fathers are also involved, albeit to a lesser degree (Seiffge-Krenke, 2002; Wysocki & Gavin, 2006). In both the general developmental literature (Waizenhofer, Buchanan, & Jackson-Newsom, 2004), and the pediatric diabetes literature (Berg et al., 2008), fathers' monitoring and knowledge of their adolescents' lives is lower than that of mothers. Nevertheless, increasing independence of adolescents from their parents in completing diabetes tasks as well as the changing daily management demands of type 1 diabetes during adolescence renders both maternal and paternal monitoring important (Forehand & Nousiainen, 1993; Simons & Conger, 2007).

In summary, adolescents manage the information their parents know about their diabetes-related activities via self-disclosure and secrecy. In adolescents with type 1 diabetes, mothers' and

fathers' knowledge of their adolescents' diabetes-specific problems and stressors may allow parents to help their adolescents manage their diabetes. The current study sought to understand how adolescent self-disclosure, secrecy, and parental knowledge are related in the context of diabetes management. In addition, we assessed whether mothers and fathers know of their adolescents' day-to-day diabetes stressful events and categorized the sources of this knowledge. Lastly, this study examined how these variables are associated with diabetes management.

TYPE 1 DIABETES IN LATINO ADOLESCENTS AND FAMILIES

The largest and fastest-growing minority group in the United States is Latinos (Ramirez & Patricia de la Cruz, 2002). Estimates in 2011 numbered the Latino population at 52 million, which is 16.7% of the nation's total population (US Census, 2011). In 2006, approximately 37% of the Latino population in the United States was < 20 years old (US Census Bureau, 2006). Although type 1 diabetes is most frequently developed in Caucasian children, the incidence of this illness in Latino youth aged 10-19 is increasing and has been estimated to be as high as 13.8% per 100,000 (Lawrence et al., 2009). In fact, type 1 diabetes is more prevalent in Latino adolescents living in the United States than type 2 diabetes (Lawrence et al., 2009). Latino adolescents are at-risk for poor diabetes management, as they may have poor HbA1c levels and/or poorer adherence to treatment recommendations when compared to Caucasian youth (Delamater et al., 1999; Lawrence et al., 2009; Gallegos-Macias et al., 2003). In addition, Latino adolescents are at higher risk for developing symptoms of depression than are Caucasian adolescents (Twenge & Nolen-Hoeksema, 2002). Potential explanations for these ethnic disparities include lower education levels, decreased access to medical care and substandard

treatment(s) (Chaudron et al., 2005). Indeed, some studies have demonstrated that Caucasian versus Latino differences in metabolic control disappear when socioeconomic status is statistically controlled (Gallegos-Macias et al., 2003; Wang, White, & Wiebe, 2011). Thus, given these ethnic disparities and how understudied Latino youth with type 1 diabetes have been (Hsin et al., 2010), the present study expanded upon previous literature by examining Caucasian/Latino ethnic differences in the study variables and explored using measures of socioeconomic status as covariates in the analyses.

SELF-DISCLOSURE AND SECRECY IN ITS DEVELOPMENTAL AND CULTURAL CONTEXT

Adolescence is the developmental period in which youth develop separate identities from their parents and establish personal boundaries (Erickson, 1950). Self-disclosure and secrecy may facilitate this process of privacy, independence, and autonomy development (Finkenauer et al., 2002). There has been very little research on the development of secrecy across adolescence, and that which exists has yielded inconsistent findings. One study found increases in secrecy across adolescence (Keijsers et al., 2010), but several cross-sectional studies did not confirm that younger and older adolescents differ in terms of secrecy (Finkenauer et al., 2002; Smetana 2006). More is known, however, about self-disclosure to parents, which consistently decreases across adolescence (Finkenauser et al., 2002; Smetana, Villalobos, Tasopoulous-Chan, Gettman, & Campione-Barr, 2009).

Research has also shown mixed results regarding gender differences of adolescent and parent in self-disclosure and secrecy. The results of several studies indicate that across adolescence, both girls and boys tend to disclose more to mothers than to fathers (Matza, Kupersmidt, & Glenn, 2001; Smetana et al., 2010), and girls share more with their mothers than do boys (Russell & Saebel, 1997; Smetana et al., 2010). However, Youniss and Smollar (1985) indicate that sons selectively disclose more to fathers than to mothers. Buhrmester and Prager (1995) conclude that the least amount of disclosure occurs between fathers and daughters, followed by father-son, then mother-son, with the greatest amount of disclosure between mothers and daughters. Regardless of parent gender, however, females tend to disclose more than males (Keijsers, Branje, Van der Valk, & Meeus, 2010; Stattin & Kerr, 2000). Lastly, the results of several cross-sectional studies reveal no gender differences in adolescent secrecy (Finkenauer et al., 2002; Finkenauer, Engels, & Baumeister, 2005; Finkenauer et al., 2008; Frijins et al., 2005).

Lastly, there is a compelling rationale for Latino-Caucasian cultural differences in parent-child navigation of adolescent separation-individuation. Familism, defined as "feelings of loyalty, reciprocity, and solidarity towards members of the family, as well as to the notion of family as an extension of self" (Cortez, 1995, p. 249), is higher in Latino families than Caucasian families (Halgunseth, Ispa, & Rudy, 2006; Hardway & Fulgini, 1996). Regardless of acculturation, in Mexican families, cohesion in family life remains strong across generations, and aspects of familism remain important across generations (Halgunseth et al., 2006; Hardway & Fulgini, 2006; Fulgini, 1998). Displaying appropriate respect to family members is an additional important value for Latino families (Harwood, Leyendecker, Carlson, Asencio, & Miller, 2002).

As Latino parents emphasize these cultural values, they may be more controlling and expect greater levels of obedience, compliance, and respect than their European-American counterparts (Chilman, 1993). Consequently, Latino youth who are navigating adolescence may desire greater autonomy from their parents (Fulgini, 1998) and may strategically manage information by concealing information to avoid upsetting them, disrupting family harmony, or getting in trouble. However, the three studies that assess potential ethnic differences in information management strategies between Latinos and Caucasians during the adolescent period find no statistically significant differences (Dekovic et al., 2004; Hunter, Barber, Olsen, McNeely, & Bose, 2011; Smetana et al., 2006).

In summary, there has been relatively little research on the developmental and cultural context of adolescent self-disclosure and secrecy, and the results of these studies examining issues of age, gender and ethnic differences have been mixed. Given the likely importance of self-disclosure and secrecy in the context of the family management of type 1 diabetes, the current study examined whether there are age, gender, and ethnic differences in the levels of these study variables.

RELATIONSHIP QUALITY

It is important to consider that behaviors such as self-disclosure and secrecy during adolescence occur within the broader context of the parent-child relationship (Keijsers & Laid, 2010). The quality of this relationship is another dimension of parental involvement that has often been examined. Adolescents are more likely to self-disclose when they characterize their relationships with parents as being comprised of high levels of trust and acceptance (Kerr,

Stattin, & Trost, 1999; Smetana et al., 2006). In addition, the results of Smetana et al. (2010) indicated that better relationship quality is related to levels of secrecy across the period of a week but were not related to day-to-day fluctuations. The general parent-child relationship sets the tone, but the specifics of the situation also determine whether adolescents choose to disclose to parents (Smetana et al., 2010). In addition, as adolescents make decisions about self-disclosure and secrecy, they consider their parents' previous responses to disclosures and their sense of connection to or feeling controlled by parents (Tilton-Weaver et al., 2010). Therefore, self-disclosure and secrecy are linked to positive aspects of the parent-child relationships such as acceptance and sense of connection, but secrecy is related to more negative aspects of the relationship such as feeling controlled.

Relationship quality also plays an important role in parental knowledge of adolescent type 1 diabetes management. Berg et al. (2008) found that parental knowledge partially mediated the positive relationship between parental acceptance and adolescent type 1 diabetes outcomes. A subsequent study showed that relationship quality and parental knowledge form separate but related dimensions of parental involvement in adolescent type 1 diabetes management (Palmer et al., 2010). Since parental acceptance is associated with parental knowledge and diabetes outcomes, it may potentially be related to adolescent self-disclosure and secrecy. For example, it may be that in the context of a positive parent-adolescent relationship, adolescents spend more time with their parents or self-disclose more to them, which in turn relates to better diabetes management. Therefore, in the context of fully understanding the roles of adolescent self-disclosure and secrecy, and of parental knowledge, in adolescent type 1 diabetes management, it

is important to determine whether any associations between the variables in the current study occurred independent of parental acceptance.

CHAPTER THREE
Rationale, Aims, and Hypotheses

The present study used an existing data set that included quantitative and qualitative methods to determine the extent to which parents' knowledge about their adolescents' diabetes-related stressful events came from their own activities, from adolescent disclosures, or from other sources. In addition, the present study aimed to understand how adolescent disclosure and secrecy were related to parental knowledge of diabetes management behaviors and diabetes outcomes (i.e. metabolic control, adherence, and adolescent depressive symptoms) in an ethnically diverse sample of adolescents with type 1 diabetes, and whether these relationships occurred independent of relationship quality. Quantitative data collected with standardized surveys and medical records were used to index adolescent diabetes management outcomes. Qualitative data from a structured interview with adolescents were used to explore whether and how mothers and fathers know about their adolescents' diabetes-related stressful events.

Aim 1- To explore whether and how parents knew about the diabetes-related stressors that occurred in the day-to-day lives of this ethnically diverse sample of adolescents.

I anticipated that mothers would know about a greater percentage of their adolescents' diabetes-related stressful events than fathers. In regards to the ways in which parents come to know about these stressful events, I hypothesized that adolescent disclosure would be the most frequent code for mothers and fathers, and that fathers would learn of these events from mothers more than mothers would learn from fathers. I had no a priori hypotheses in regards to ethnic differences.

Aim 2- To examine whether there were age, gender, and ethnic differences in levels of self-disclosure, secrecy, and parental knowledge.

I hypothesized that younger adolescents would disclose more than older adolescents, reflecting normative adolescent autonomy development. I expected that adolescent girls would disclose more and keep fewer secrets than adolescent boys. I anticipated that adolescents would disclose more about their diabetes to their mothers than to their fathers, and that mothers would know more about their adolescents' diabetes than fathers. I also predicted that Latino fathers would know less about adolescents' diabetes than Caucasian fathers.

Aim 3- To examine the relationships of self-disclosure and secrecy with adolescent and parent reports of diabetes knowledge.

Consistent with the broader developmental literature, I expected that adolescent self-disclosure and secrecy would be correlated with adolescent report of parental knowledge. I predicted that adolescent self-disclosure, but not secrecy, would be related to parent reports of knowledge.

Aim 4- To determine whether and how self-disclosure, secrecy, and parental knowledge were associated with diabetes management outcomes.

I hypothesized that self-disclosure, secrecy, and parental knowledge would be associated with better outcomes. Reflecting the developmental and clinical literatures, I predicted that secrecy would be associated with greater depressive symptoms.

CHAPTER FOUR
Methodology

PARTICIPANTS

Participants were 118 Caucasian and Latino adolescents with type 1 diabetes mellitus and their mothers, who completed questionnaires and structured interviews as part of a larger project on parental involvement in adolescent type 1 diabetes management. Participants were recruited from the outpatient endocrinology clinic at Children's Medical Center of Dallas. Adolescents between 10 and 15 years of age (M = 12.74, SD = 1.64) were recruited if they had been diagnosed with diabetes for at least 1 year (M = 4.12, SD = 2.78), self-identified as either Caucasian or Latino, and could read and speak English or Spanish. Mothers were recruited because they are most often the primary caregiver in families with chronically ill children (Quittner et al., 1998). For each adolescent, one mother figure was allowed to participate. Adolescents were required to be living with their participating mother more than 50% of the time, given the objectives of the larger study to understand mother-adolescent relationships and diabetes management. Step-mothers or adopted mothers were eligible if they had lived with the adolescent for at least one year. Of the 226 adolescents recruited for participation in the study, 52.2% participated, 15.5% did not attend their scheduled study appointments and did not return calls to be rescheduled, 11.1% declined due to scheduling conflicts, 9.3% declined because they were too busy, 7.5% declined because of transportation issues, and 4.0% were unable to be contacted after initially agreeing. One mother withdrew consent for her and her adolescent's participation in the study because she felt the study questions were too personal.

Demographic information was collected through a combination of maternal report, geographic identifiers from publicly available census data, and medical record data. Adolescent participants were fairly evenly divided by gender (54% female). The participating sample consisted of families in which 48% of adolescents self identified as Latino, and English was the primary language spoken in the home in 72% of these families. Most adolescents (75%) were on a multiple daily injections (MDI) regimen, while 25% of the adolescents were on an insulin pump. Mothers of adolescents on MDI reported that physicians recommended a range of 3-8 insulin injections and 3-12 blood glucose checks per day. The majority of families reported having insurance coverage (93%) that covered medical expenses for the treatment of diabetes. Medicaid was reported as the insurance provider in 55% of this population, while insurance provided through a parent's employment was reported in 25% of the sample. Mothers were primarily biological (92%) and married (75%), and 73% reported living in two parent households with the participating child's father.

DESIGN AND PROCEDURE

Participants were recruited for the study at their diabetes clinic and received consent and assent forms to review prior to a later laboratory appointment. Reminder phone calls were made the day before their scheduled session, and informed consent/assent forms were signed at the beginning of the session after the study was described in more detail and participants were given a chance to ask questions. During the lab session, mothers and adolescents independently completed a structured interview as well as questionnaire measures on a computer. When Spanish versions of measures were not available, the measure was translated and back translated

from English to Spanish by bilingual research assistants. All participants received a brief tutorial on how to complete surveys on the computer; participants who indicated discomfort in completing electronic surveys were provided with paper versions of the questionnaires. Each parent and adolescent participant received a $40 gift card at the completion of the one-time assessment.

MEASURES

Copies of all measures can be found in Appendix A.

Maternal Demographics

Mothers completed a demographic questionnaire about personal, partner, and family information including ethnicity, country of origin, language preferences, own education level, education level of participating adolescent's father, income, and occupational status. They also provided information about the participating adolescent such as grade in school, time since diabetes diagnosis, number of times hospitalized in past year for diabetes, insurance coverage, and diabetes treatment.

Adolescent Demographics

Adolescents completed a personal demographic questionnaire. Items included pump status, ethnicity, country of origin, gender, age, grade, activities, diet, and exercise.

Self-Disclosure and Secrecy

Adolescents completed a diabetes-specific scale that was developed by Osborn et al. (2013) by modifying Stattin and Kerr's (2000) measure to be relevant for diabetes management. Adolescents rated five items on a scale of 1 (strongly disagree) to 5 (strongly agree) to indicate how much information they voluntarily disclosed to or kept secret from their mother and father about their diabetes care (Osborn et al., 2013). The five items were factor analyzed using principal component analysis with varimax (orthogonal) rotation. For the adolescent report of mother and of father, the analysis clearly yielded two factors with eigenvalues > 1.0. These two factors explained a total of 74.50% of the variance for adolescent report of mothers, and a total of 81.21% of the variance for adolescent report of fathers. The first factor was labeled secrecy due to the high loadings of the following two items: "I keep a lot of secrets from my mother/father about my diabetes management" and "I hide a lot from my mother/father about my diabetes management during nights and weekends when I am away from her/him." The second factor was labeled self-disclosure due to the high loadings of the three following items: "I spontaneously tell my mother/father what is going on with my diabetes management," "I often want to tell my mother/father what is going on with my diabetes management," and "I like to tell my mother/father about my diabetes management." Reliability in this sample was good, both for adolescent reports of disclosure (α = .77 and .84 for adolescent report of disclosure to mothers and fathers, respectively) and secrecy (α = .80 and .85 for adolescent report of secrecy from mothers and fathers, respectively).

Parental Knowledge

Adolescents and their mothers completed a diabetes-specific scale of parental knowledge (Berg et al., 2008) based on a scale of general parental monitoring (Barber, 1996). The diabetes-specific scale consisted of six items to capture adolescents' views of their parents' awareness of their diabetes care behaviors and mothers' views of her own awareness of their adolescents' diabetes care. Adolescents reported separately how much mothers and fathers "*really*" know and mothers reported how much they "*really*" know about different aspects of the child's diabetes care (e.g., blood sugar readings; how much insulin has been taken) using a 1 (doesn't know) to 5 (knows everything) scale. This scale has been shown to longitudinally predict adherence among adolescents with diabetes (King et al., 2013). This diabetes-specific scale of parental knowledge had good internal consistency in the present study, when adolescents reported on mothers (α = .89) and on fathers (α = .96) and when mothers reported on their own knowledge (α = .89).

Relationship Quality

The five- item acceptance subscale from the Mother-Father-Peer (MFP) measure was used to assess the supportiveness of the parent-adolescent relationship (Armsden & Greenberg, 1987). This subscale measures the degree to which the parent communicated love, acceptance, and appreciation of the adolescent and correlates well with measures of attachment security (Bernier, Larose, & Whipple, 2005). Adolescents reported maternal and paternal acceptance separately on a 1 (strongly disagree) to a 5 (strongly agree) scale. Reliability in this sample was good, both when adolescents reported on mothers (α = .86 for adolescent report overall, α = .87 in Latino adolescents and α = .83 in Caucasian adolescents) and on fathers (α = .89 for adolescent report overall, α = .90 in Latino adolescents and α = .87 in Caucasian adolescents).

Metabolic Control

Metabolic control in the adolescents was indexed by glycosylated hemoglobin or Hemoglobin A1c (HbA1c), which is recorded in medical records as part of routine clinic visits. HbA1c represents the average blood glucose over the prior three or four months, with higher levels indicating poorer metabolic control. HbA1c is the current standard for measuring whether diabetes treatment goals are being achieved. The first HbA1c index collected at the clinic visit after the laboratory visit was analyzed. The average HbA1c level for the sample (M = 8.55%) did not differ between ethnic groups and was above the American Diabetes Association recommendations of < 7.5% for adolescents (American Diabetes Association, 2013).

Adherence

The Self-Care Inventory (SCI) (La Greca, 1992) is a 16-item measure of adherence that includes all aspects of the type 1 diabetes regimen including blood glucose monitoring, insulin administration, exercise, and diet. Adolescents reported adherence to their regimen over the past month using a 1 (never did it) to 5 (always did this as recommended without fail) scale. This tool was adapted in 2009 with the assistance of a certified diabetes educator to reflect current standard of diabetes care (e.g. pump related items, calculating insulin doses based on carbohydrate content of meals or snacks). The SCI is used commonly in research with children and adolescents with type 1 diabetes as well as ethnically diverse youth. It provides an assessment of adherence comparable to that of a more time-intensive interview method (La Greca, 1992) and is correlated with metabolic control indices (La Greca, Follansebee, & Skyler,

1990). The SCI demonstrated good internal consistency in the present study (α = .85 for adolescent report overall, α = .86 in Latino adolescents and α = .85 in Caucasian adolescents).

Adolescent Depressive Symptoms

Adolescents completed the Children's Depression Inventory (CDI) (Kovacs, 2003) to indicate the extent to which they had experienced depressive symptoms in the past two weeks (e.g., 1 = I am sad once in a while, 2 = I am sad many times, 3 = I am sad all the time). This 27-item scale is sensitive to difficulties in managing diabetes (e.g., Grey, Davidson, Boland, & Tamborlane, 2001; Kovacs et al., 1997). The CDI demonstrated good internal consistency in the present study (α = .83 for adolescent report overall, α = .86 in Latino adolescents and α = .80 in Caucasian adolescents).

QUALITATIVE ANALYSIS

During the structured interview, adolescents identified up to two diabetes-related stressful events from the past week. Adolescents indicated whether their mothers and their fathers knew about each stressful event. If so, research assistants then asked adolescents how their mothers and then how their fathers found out about the stressful event. Audiotapes of the answers were obtained, and transcripts of these audiotapes were used to develop a coding system to categorize the ways by which the parents learned about the stressful event. Spanish language responses were translated at the time of data collection by trained bilingual research assistants, and the consultation of an additional bilingual research assistant at the time of transcription was available but not needed.

Two researchers listened to a percentage of the adolescent interview responses to identify conceptual themes, and these themes were discussed and operationalized. Through an iterative process, 10 categorical domains emerged. Coders included two trained research assistants, and training centered on listening to preselected audiotaped interviews in order to learn to distinguish between the codes. Coders then listened to and coded 10% of the interviews independently, and any discrepancies were discussed with a third trained research assistant until consensus was reached. Interrater reliability calculated for the two coders indicated high levels of agreement on all codes (Kappa > 0.90 for each code).

CHAPTER FIVE
Statistical Analysis

The basic analyses conducted for each aim are described below. It should be noted that data were reviewed to examine the distributional properties of all variables and evaluate the assumptions underlying the analyses.

Aim 1

To address the qualitative aim, I calculated the percentages of adolescents' diabetes-related stressors about which mothers and fathers knew for each stressful event. Chi-square tests were used to determine whether there were differences by parent gender and ethnicity for each stressful event.

Each participant received a score of 0 (i.e. the code was not endorsed) or 1 (the code was endorsed) for each of the 10 codes, for each stressor about which mother and/or father knew. Because differing numbers of mothers and fathers knew about each of the stressful events, the most frequent codes for each parent for stressful event were identified by calculating the percentage out of the total codes assigned that each code was endorsed for mothers and fathers for each stressful event. When possible, chi-square analyses were used to identify differences in code frequencies by parent gender and ethnicity.

Aim 2

Correlations were used to determine whether there were age differences in the levels of self-disclosure, secrecy, parental knowledge, and parental acceptance. Independent samples t-tests were conducted to explore gender and ethnic differences in the levels of the study variables.

Aim 3

Correlations were conducted to examine the relationships of self-disclosure and secrecy with adolescent and parent (in the case of mother) reports of diabetes knowledge. Next, multiple regressions were used to determine whether self-disclosure and secrecy predicted adolescent and parent reports of knowledge. In addition, paired-samples t-tests examined differences in self-disclosure and secrecy to mothers and fathers. Lastly, *r* to *z* transformations were conducted to determine whether the correlations between self-disclosure and secrecy differed across parent gender or ethnicity.

Aim 4

To address the final aim, correlations examined whether self-disclosure, secrecy, parental knowledge, and relationship quality were individually related to diabetes management outcomes. These variables were then entered simultaneously into regression analyses to determine which variable(s) uniquely predicted diabetes outcomes.

CHAPTER SIX
Results

SAMPLE DESCRIPTIVES

Table 1 provides descriptive information for demographic, illness, and predictor and outcome variables overall and by ethnicity. Caucasian mothers had significantly higher levels of educational attainment, $t(114) = -7.40$, $p = .000$, and income than Latina mothers, $t(114) = -6.31$, $p = .000$. In the Latino portion of the sample, 12% were first generation (adolescent and mother born outside of the United States), 57% reported being second generation (adolescent born in the US, mother born outside the US), and 31% were third generation (adolescent and mother born in the US). Seventeen percent (1 of 6) of the first generation participants reported that English was the primary language spoken at home, as opposed to 7% (2 of 28) of the second generation participants. All of the third generation Latino families reported speaking English at home. Mexico was the country of origin of 84% of the Latino sample. Two families reported that they were from Puerto Rico, and one family each reported originating in Guatemala, El Salvador, Bolivia, and Argentina. Therefore, the majority of the Latino sample was comprised of 2nd or 3rd generation English-speaking Mexican-Americans.

Notably, there were no ethnic differences in other demographic or illness variables of interest, including time since diagnosis, illness regimen, and metabolic control (Table 1). Differences on the primary variables of self-disclosure, secrecy, parental knowledge, and acceptance will be described below.

QUALITATIVE ANALYSES

Adolescents identified up to two diabetes-related stressful events: 99.1% of the adolescents were able to identify a first diabetes-related stressful event, and 95.5% of adolescents were able to identify a second. As in Figure 1, 77.6% of mothers knew about adolescents' first identified stressful event and 78.5% of mothers knew about the second identified stressful event, while 51.8% of fathers knew about the first stressful event and 45.1% of fathers knew about the second stressful. Chi-square analyses determined that higher percentages of mothers than fathers knew about the first [$\chi^2 = 11.18$, $p < .01$] and the second [$\chi^2 = 19.92$, $p < .001$] diabetes-related stressful events. Figure 2 illustrates the percentages of the stressful events about which parents knew by ethnicity; however, additional chi-square analyses did not reveal differences in these percentages based on ethnicity.

Adolescents reported a variety of ways by which their mothers and fathers learned about their stressful diabetes-related events. As described in Appendix B, 10 conceptual categories emerged and labels for each of these strategies were chosen based on accepted constructs in the literature and a consensus within the research team. Percentages that each code was endorsed for mothers and fathers for each stressful event can be found in Figures 3 and 4.

The most frequent way both mothers and fathers learned of their adolescents' stressful diabetes-related events for both stressful events was *adolescent discloses to parent*. *Adolescent discloses to parent* reflects when the child spontaneously discloses to the parent without a parental

solicitation. For example, participants described that their parents knew because, "I called my mom and told her," and "mom was in the kitchen too, and I told her."

The second most frequent way that mothers learned of their children's stressful diabetes-related events for both stressful events was *parent present- observes,* while the second most frequent code for fathers was *parent discloses to other parent*. *Parent present-observes* reflects parent observation of the adolescent's diabetes-related stressful event, such as noticing the adolescent's symptoms or observes the youth performing a diabetes-related behavior during or in response to an event. For example, participants described that their parents knew because, "I threw up and my mom saw," and "mom noticed me checking my blood sugar." *Parent discloses to other parent* occurred when one parent disclosed the adolescent's diabetes-related stressful event to the other parent. For example, one participant described that his father knew because, "mom told dad when he got home from work," and another participant explained that, "mom called dad to tell him."

When count sizes were five or larger, chi-square analyses were used to identify differences in code frequencies by ethnicity and parent gender. For both the first and second stressful events, Caucasian adolescents endorsed *adolescent discloses to father* more than Latino adolescents, $\chi^2(1) = 6.09$, $p = .01$ and $\chi^2(1) = 4.16$, $p = .04$. In addition, for both the stressful events, adolescents described that *child discloses to mother* more frequently than *child discloses to father*, $\chi^2(1) = 17.43$, $p < .001$ and $\chi^2(1) = 7.79$, $p < .01$.

AGE, GENDER, AND ETHNICITY ANALYSES

Age

To examine whether there were age differences in the levels of secrecy, self-disclosure, and parental knowledge, a series of correlations were conducted, as displayed in Tables 2 and 3. As anticipated, younger adolescents reported disclosing significantly more to their mothers and fathers than older adolescents. Consistent with the literature, younger adolescents reported that their mothers and fathers knew more about their diabetes than older adolescents. Lastly, there were no differences in levels of secrecy or paternal acceptance based on age.

Adolescent Gender

Independent samples t-tests were conducted to determine whether there were differences in the levels of secrecy, self-disclosure, parental knowledge, and parental acceptance by adolescent gender. Contrary to the hypotheses, there were no adolescent gender differences in any of the study variables (see Tables 2 and 3).

Parent Gender

The results of a paired-samples t-test indicate that, as predicted, adolescents disclose more to mothers (M = 3.61, SD = 1.10) than to fathers (M = 2.94, SD = 1.26), $t(112) = 6.26$, $p < .001$. On the other hand, adolescents did not differ in levels of secrecy kept from mothers (M = 1.78, SD = 1.08) and fathers (M = 1.89, SD = 1.15), $t(112) = -.96$, $p = .34$. As hypothesized, teens reported that their mothers knew more about their diabetes (M = 3.93, SD = 0.93) than did their fathers (M = 3.10, SD = 1.35), $t(113) = 6.77$, $p < .001$.

Ethnicity

As in Table 1, additional independent samples t-tests were conducted to explore ethnic differences in the levels of secrecy, self-disclosure, parental knowledge, and parental acceptance. As predicted, the difference between Latino and Caucasian fathers' knowledge about their adolescents' diabetes approached significance, $t(112) = -1.96$, $p = .053$. Additionally, Caucasian adolescents reported greater maternal and paternal acceptance than Latino adolescents, $t(115) = -2.68$, $p < .01$, and $t(112) = -2.22$, $p = .03$, respectively.

SELF-DISCLOSURE, SECRECY, AND PARENTAL DIABETES KNOWLEDGE

Secrecy and Self-Disclosure

Self-disclosure from mothers and secrecy from mothers were significantly yet weakly correlated (Table 4); however, self-disclosure from fathers and secrecy from fathers were not correlated (Table 5). The results of Fisher's *r* to *z* transformations indicated that the correlations between mothers and fathers differed, $z(112) = -2.96$, $p < .01$. Looking at self-disclosure to and secrecy from mothers only, the results of Fisher's *r* to *z* transformations revealed that the correlations did not differ based on ethnicity, $z(54)= 0.42$, $p = .67$. Looking at self-disclosure to and secrecy from fathers only, the results of Fisher's *r* to *z* transformations revealed that the correlations did not differ based on ethnicity, $z(53)= 0.74$, $p = .46$.

Mothers

The correlations in Table 4 were conducted to examine the relationships of self-disclosure and secrecy, adolescent and maternal reports of diabetes knowledge, and maternal acceptance.

Adolescent and mother reports of knowledge correlated significantly, but modestly, suggesting they have different perspectives on maternal knowledge about diabetes. As predicted, adolescent self-disclosure was positively correlated with both adolescent and mother report of maternal knowledge. Furthermore, adolescent secrecy was negatively correlated with adolescent reports of maternal knowledge, but was unrelated to mother reports of her own knowledge. Lastly, adolescent self-disclosure, but not secrecy, was associated with maternal acceptance.

A multiple regression analysis was used to test if disclosure to mother and secrecy from mother were associated with adolescent reports of maternal knowledge. As in Table 6, the results demonstrated that when both constructs were entered simultaneously into the regression analysis at Step 1, the pattern observed in the correlations above remained: self-disclosure was positively related to and secrecy was negatively related to adolescent report of maternal knowledge. When maternal acceptance was added to the model in Step 2, the previous associations remained and maternal acceptance was not related to adolescent report of maternal knowledge.

Another multiple regression analysis was used to determine whether disclosure to mother and secrecy from mother were significantly related to maternal reports of her own diabetes knowledge. As shown in Table 7, disclosure but not secrecy was associated with maternal report of own knowledge. When maternal acceptance was added to the model in Step 2, both disclosure and maternal acceptance were independently associated with maternal reports of her own knowledge.

Fathers

The correlations in Table 5 were conducted to examine the relationships of these same variables, but in the context of fathers' involvement in diabetes (i.e., self-disclosure and secrecy, adolescent report of paternal diabetes knowledge, and paternal acceptance). It should be noted that patterns of associations were similar for mothers and fathers. As predicted, adolescent self-disclosure was positively correlated with paternal knowledge, and adolescent secrecy was negatively correlated with paternal knowledge. Lastly, adolescent self-disclosure, but not secrecy, was associated with paternal acceptance.

A multiple regression analysis was used to test if disclosure to father and secrecy from father were independently associated with adolescent reports of paternal knowledge. As in Table 8, the results demonstrated that when both constructs were entered simultaneously into the regression analysis at Step 1, the pattern observed in the correlations above remained: self-disclosure was positively related to and secrecy was negatively related to adolescent reports of paternal knowledge. When paternal acceptance was added to the model in Step 2, the previous associations remained and paternal acceptance was related to the adolescent report of paternal knowledge.

SELF-DISCLOSURE, SECRECY, AND DIABETES MANAGEMENT OUTCOMES

Correlations were initially conducted to examine whether self-disclosure, secrecy, and knowledge were related to the outcome variables. As in Table 9, lower (i.e., better) metabolic control was correlated significantly with higher self-disclosures to mother and father, lower

secrecy from father, and higher levels of paternal knowledge. Better adherence and lower depression were correlated significantly with higher self-disclosure, lower secrecy, higher parental knowledge and better parent-adolescent relationship quality, regardless of mother/father parental role.

Four variables that have been used frequently as covariates in the pediatric type 1 diabetes literature are time since diagnosis, pump status, family income, and maternal education. Correlations of these and other sociodemographic variables with the outcomes of interest are shown in Table 9. Shorter time since diagnosis and being on the pump significantly correlated with better HbA1c, adolescent gender was correlated with SCI, and adolescent age was correlated with HbA1c and SCI; therefore, these variables were included in the regressions as covariates.

A series of multiple regression analyses were conducted to test whether self-disclosure to mothers and secrecy from mothers were associated with adolescent outcomes, independent of adolescent reports of maternal knowledge and acceptance. In these analyses, the covariates were entered on Step 1, disclosure and secrecy were added on Step 2, maternal knowledge was added on Step 3, and relationship quality was added at Step 4. As reported in Table 10, higher levels of self-disclosure to mothers were associated with lower HbA1c levels, independent of maternal knowledge and acceptance. Lower secrecy from mothers was related to better adherence, independent of maternal knowledge and acceptance (Table 11). As in Table 12, when

controlling for maternal knowledge and acceptance, neither self-disclosure nor secrecy from mothers were significantly associated with adolescent depressive symptoms.

In addition, a series of multiple regression analyses were conducted to test if self-disclosure to fathers and secrecy from fathers were associated with adolescent outcomes, independent of adolescent reports of paternal knowledge and paternal acceptance. In these analyses, the covariates were entered on Step 1, disclosure and secrecy were added on Step 2, paternal knowledge was added on Step 3, and relationship quality was added at Step 4. As in Table 13, higher levels of self-disclosure to father were associated with lower HbA1c levels, independent of paternal knowledge and acceptance. Lower secrecy from fathers was related to better adherence, independent of paternal knowledge and acceptance (Table 14). Lastly, as reported in Table 15, when controlling for paternal knowledge and acceptance, neither self-disclosure nor secrecy from fathers were significantly associated with adolescent depressive symptoms.

CHAPTER 7
Discussion

A qualitative and quantitative examination of self-disclosure and secrecy was conducted to gain insight into their connections with parental knowledge and adolescent type 1 diabetes management. This is the first study of its kind to examine these variables in a diverse sample while considering the broader context of the parent-adolescent relationship. The qualitative results confirm that adolescent self-disclosure is the primary method by which parents come to know about adolescent diabetes stressful events, raising questions about a focus on "parental" monitoring as a primary focus of intervention to improve diabetes management during adolescence. The quantitative results indicate that self-disclosure and secrecy are factors that contribute to levels of parental knowledge. Self-disclosure but not secrecy was associated with metabolic control, and secrecy but not self-disclosure was related to adherence, independent of parental knowledge and relationship quality. These results provide a more thorough understanding of the relationship between adolescent self-disclosure and secrecy with health outcomes and point to important directions for future research.

SELF-DISCLOSURE, SECRECY, AND PARENTAL KNOWLEDGE

The results of the first three aims of the current study provide an understanding of self-disclosure, secrecy, and parental knowledge in the context of diabetes management. First, the qualitative data offer insight into how frequently parents know about their adolescents' diabetes-related stressful events. Adolescents reported that their mothers knew about these diabetes-stressful events significantly more than fathers, which reflects the quantitative diabetes literature that mothers are more knowledgeable than fathers about their adolescents' diabetes (Berg et al.,

2008). The most frequent way that both mothers and fathers learned of these stressful events was via the adolescent's disclosure. This provides confirmation of the theoretical model which emphasizes that adolescent disclosure contributes more to parental knowledge than parental solicitation or behavioral control (Keijsers, Frijins, Branje, & Meeus, 2009; Kerr, Stattin, & Burk, 2010; Smetana, 2008), as adolescents rarely endorsed that their parents found out about their stressful diabetes-related events in solicitation- and control- related ways.

More Caucasian adolescents endorsed *adolescent discloses to father* than Latino adolescents; however, research on Latino paternal involvement in the United States that might illuminate this difference is lacking. The second most frequent code for mothers, *mother present-observes*, may reflect the greater presence of mothers in the day-to-day lives of their adolescents and status as caregivers (Palmer et al. 2009; Quittner et al., 1998; Wysocki et al., 2009). The second most common way in which fathers knew about their adolescents' diabetes-related stressful events was as a result of the mother telling them, which is consistent with the results of Waizenhofer et al. (1994), who examined these questions in a non-diabetes sample.

We also explored the developmental context in which self-disclosure and secrecy occur by examining age differences in the study variables. Consistent with previous research, younger adolescents reported disclosing more about their diabetes to parents than did older adolescents (Finkenauser et al., 2002; Smetana, et al., 2009) and indicated that their parents know more about their diabetes management than did older adolescents. These findings are consistent with both cross-sectional (Palmer et al., 2010) and longitudinal data (King et al., in press) indicating that multiple aspects of parental involvement decline with age across adolescence, but suggest that a

portion of this reduced involvement may reflect adolescent behaviors. In addition, this literature has focused on the parents' role in this decline, whereas the current study points to the adolescents' contributing role in this process. Interestingly, while the few previous studies examining associations between levels of secrecy and age have had mixed results, in the current study there were no age differences in levels of secrecy. This may lend support to the conceptualization of secrecy as a dispositional or personality tendency (Larson & Chastain, 1990), such that some individuals may tend to keep more secrets than others across their lifespans.

There were no differences in any of the study variables by adolescent gender. The lack of differences by gender in secrecy is consistent with the literature (Finkenauer et al., 2002; Finkenauer et al., 2005; Finkenauer et al., 2008; Frijins et al., 2005) and supports the idea of secrecy as an individual, stable characteristic. Surprising, however, is our finding that levels of self-disclosure did not differ based on adolescent gender, given the wealth of research supporting gender differences in self-disclosure. This literature, though, focuses on general self-disclosure or self-disclosure about areas which they feel their parents have legitimate authority to know, such as personal or moral issues. Thus, adolescent boys and girls may similarly view health-related concerns as a prudential issue that relates to their safety and well-being (Smetana & Asquith, 1994; Smetana et al., 2006).

The quantitative results about parent gender and ethnicity lend further support to the qualitative findings in a few areas. Adolescents self-disclosed more to mothers than fathers, and mothers knew more about their adolescents' type 1 diabetes than fathers. However, while in the current study quantitatively Latino versus Caucasian fathers' levels of diabetes knowledge approaches

significance (p = .053), adolescents disclosed to their fathers more in the context of the qualitative piece of this study (code *adolescent discloses to father* more frequent for Caucasians than Latinos). While the rationale that Latino youth may differently self-disclose or keep secrets than Caucasian youth is theoretically persuasive, our results lend further support to there being no difference between the two ethnicities in information management strategies during adolescence. Additionally, the Latino sample in the current study is comprised of primarily second and third generation English-speaking Latino families whose cultural practices might more likely reflect those of Caucasians.

The third aim linked self-disclosure and secrecy to the more commonly studied variable of parental knowledge about diabetes management. The results of the regressions indicated that adolescent self-disclosure and secrecy have unique associations with adolescent perceptions of maternal knowledge. However, only adolescent self-disclosure was associated with maternal knowledge. These differing patterns reflect the factor analysis of the Diabetes Self-Disclosure and Secrecy measure and confirm the prior developmental literature indicating that secrecy and disclosure are not opposite ends of a single dimension (Frijins et al., 2004; Frijins et al., 2010; Smetana et al, 2006). In addition, these results are consistent with the idea that mothers do not know the information that adolescents have chosen to keep secret. This lends support to the concept that has been introduced in the depression literature (Cole et al., 2002) that researchers should use adolescent reports instead of parent reports of constructs, as most parents are missing some information.

A slightly different pattern of associations was found when predictors of fathers' knowledge were analyzed. Adolescents' reports of self-disclosure and paternal acceptance, but not secrecy,

were associated with paternal knowledge. While mother versus father differences were not directly compared, these patterns suggest that secrecy may operate differently in adolescents' relationships with mothers and fathers, even though there are no differences in levels of secrecy based on parent gender. While this difference in associations has not been studied in any research to date, we posit that it may reflect adolescent's knowledge that their mothers often share information about their diabetes management with fathers. The items in the measure ask adolescents how much their father *really* knows, so adolescents may be including knowledge their fathers have from sources other than themselves.

ADOLESCENT SELF-DISCLOSURE TO AND SECRECY FROM PARENTS RELATED TO DIABETES MANAGEMENT

The final aim of the current study linked these variables with diabetes management outcomes. Self-disclosure to mothers and fathers (but not secrecy) was positively associated with better HbA1c, independent of parental knowledge and acceptance. This result is puzzling, as one would expect self-disclosure to effect metabolic control via parental knowledge, such that self-disclosing adolescents have parents who know more and are able to be involved in adolescents' diabetes management. In addition, secrecy from mothers and fathers (but not self-disclosure) was negatively related to adherence, independent of parental knowledge and acceptance. It may be that keeping secrets from parents makes diabetes management more difficult, regardless of the information that is disclosed. This pattern of results was not completely anticipated, particularly given that Osborn et al (2013) found that both self-disclosure and secrecy were associated with HbA1c and adherence.

Finally, the results of regressions demonstrated that neither self-disclosure nor secrecy were associated with adolescent depressive symptoms when accounting for parental knowledge and acceptance. Maternal acceptance was significantly related to adolescent depressive symptoms. While type 1 diabetes is a risk factor for depressive symptoms in adolescents (Reynolds & Helgeson, 2011), it is only one of many potential factors that could contribute to depressive symptoms. Several studies underscore the connections between adolescents' perceived acceptance by, relationships with, and attachment to their parents with depressive symptoms in clinical and nonclinical samples (Armsden, McCauley, Greenberg, Burke, & Mitchell, 1990; Ryan & Lynch, 1989).

Collectively, these results underscore the importance of adolescent self-disclosure and secrecy for diabetes outcomes, above and beyond adolescents' perceptions of their relationships with their parents.

It should also be noted that ethnicity is not associated with any of the outcome variables. Regardless, ethnicity was explored as a moderator variable in regressions predicting outcomes and no effects were found beyond chance. As with the lack of ethnic differences in study variables, this may reflect similar adolescence separation-individuation processes across cultures or our inability to examine sub-groups within the Latino sample due to sample size.

LIMITATIONS

The participants in the current study were aged 10-15; thus, the results may not generalize to younger children or older adolescents. In addition, only Caucasian and Latino adolescents and

mothers were included in the study, and the Latino sample was primarily comprised of 2nd and 3rd generation Mexican-Americans. As Roche et al. (2013) discuss, there are many factors that are important to consider when conducting cross-cultural and cross-ethnic research such as "cultural orientation," legitimacy of parental authority, age expectations for adolescents' behavioral independence and autonomy. Future research should include measures of these processes. There is a substantial literature that indicates that African-American adolescents are at risk for poor type 1 diabetes management (Silverstein et al., 2005), and future research should include this ethnic group as well as others. Additionally, fathers were not included as participants in the current study, so information about fathers was based on the reports of adolescents and their mothers.

As the current study was cross-sectional and based on self-report, our ability to assess how the studied processes may change over time longitudinally is limited. In addition, the correlational nature of the data limits our ability to make causal interpretations. Lastly, the sample size was too small to fully examine potential mother-father and ethnic group differences. This is particularly true in light of the fact that all self-identified Latino adolescents were recruited and treated as a single group, despite the fact that there is considerable heterogeneity within the Latino culture. We did not have a sufficient sample size to examine more homogeneous subsamples of Latino youth with diabetes.

FUTURE RESEARCH DIRECTIONS

Some literature has suggested that disclosure and secrecy (also conceptualized as "concealment") are two separate spectrums of information management. Falling on the disclosure spectrum are full disclosure, partial disclosure, and disclosure in response to being asked, whereas falling on the concealment spectrum are lying, partial lying, and secret-keeping (Larson & Chastain, 1990). Future pediatric psychology research that assesses how and why adolescents did or did not share diabetes-related information with caregivers would shed light on the reasons and purposes of disclosure and concealment. In addition, given that disclosure and secrecy are associated with health outcomes, research that distinguishes between what adolescents tell their parents and what they keep secret would be particularly important. Furthermore, only one aspect of the parent-child relationship quality was taken into account in the current study. Examining parent-adolescent relationships in a more comprehensive and relationally transactional way (Keijsers & Laird, 2010) might involve more specific questioning and or gathered in a daily diary format as opposed to general self-report.

CLINICAL IMPLICATIONS

The results of previous research recommends that healthcare providers help parents find ways to stay informed about their children and adolescents without being coercive or controlling (Waizenhoefer et al., 2004). Other interventions targeting improved diabetes management focus on psychoeducation, self-management skills, behavioral management, and treatment of psychopathology and problematic family dynamics (Anderson & Collier, 1999; Hood & Nansel, 2007). However, in light of the current results, these approaches could be improved. Since the

links between self-disclosure and secrecy to diabetes outcomes generally remain when controlling for levels of parental knowledge and relationship quality, it would be important for interventions to encourage adolescents to keep their parents informed about their health. Perhaps one way to do so is to normalize adolescents' needs for increased privacy and independence and emphasize that their diabetes is a domain (Smetana et al., 2006) where it is imperative to disclose more and keep fewer secrets. Thus, providers could encourage adolescents to share information about their diabetes care to their parents.

FIGURES

Figure 1 Percentages of Mothers and Fathers Who Knew About Each of Their Adolescent's Diabetes-Related Stressful Events

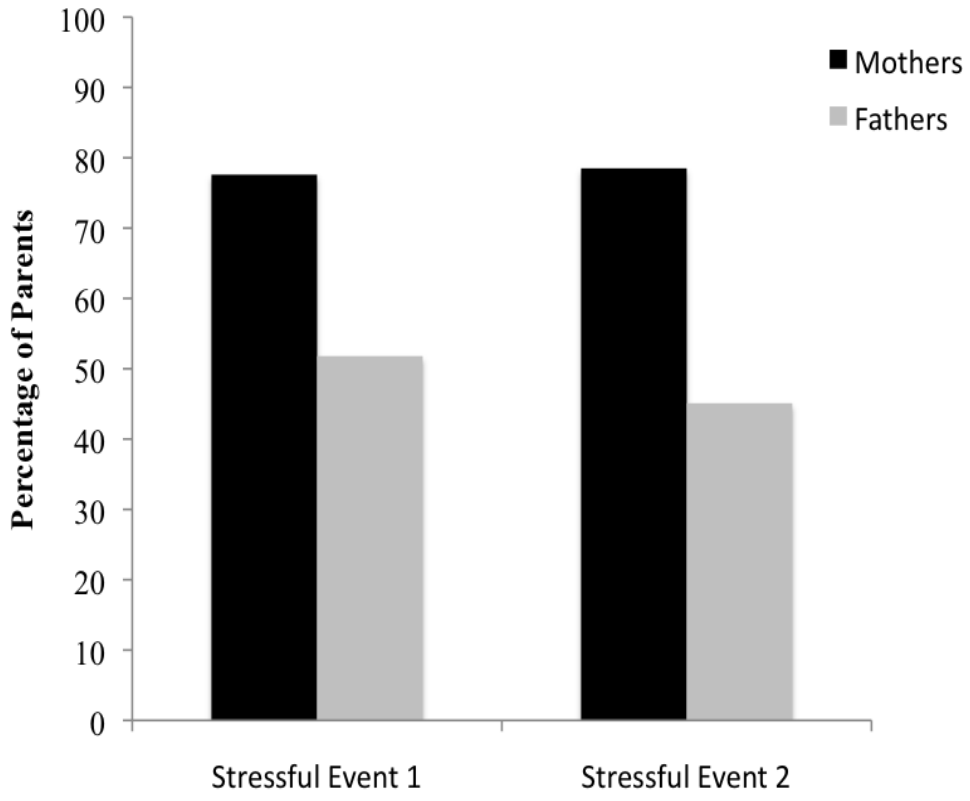


Figure 2 Percentages of Parents Who Knew About Each Stressful Event by Ethnicity

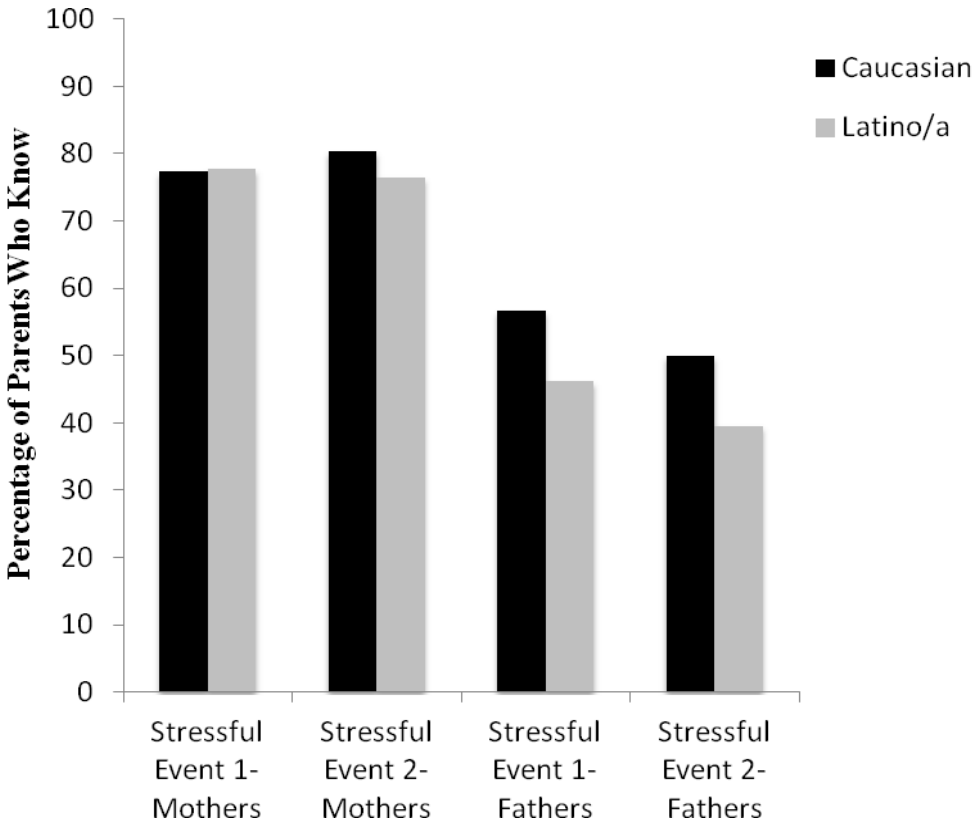


Figure 3 Distribution of Codes for Stressful Event 1

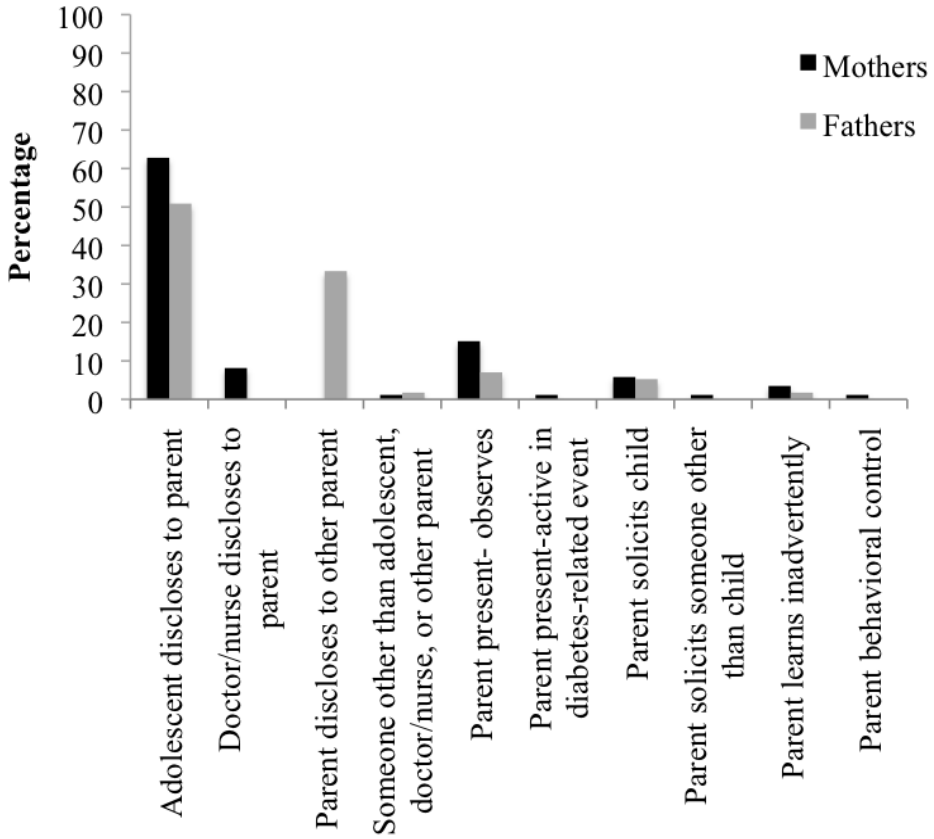
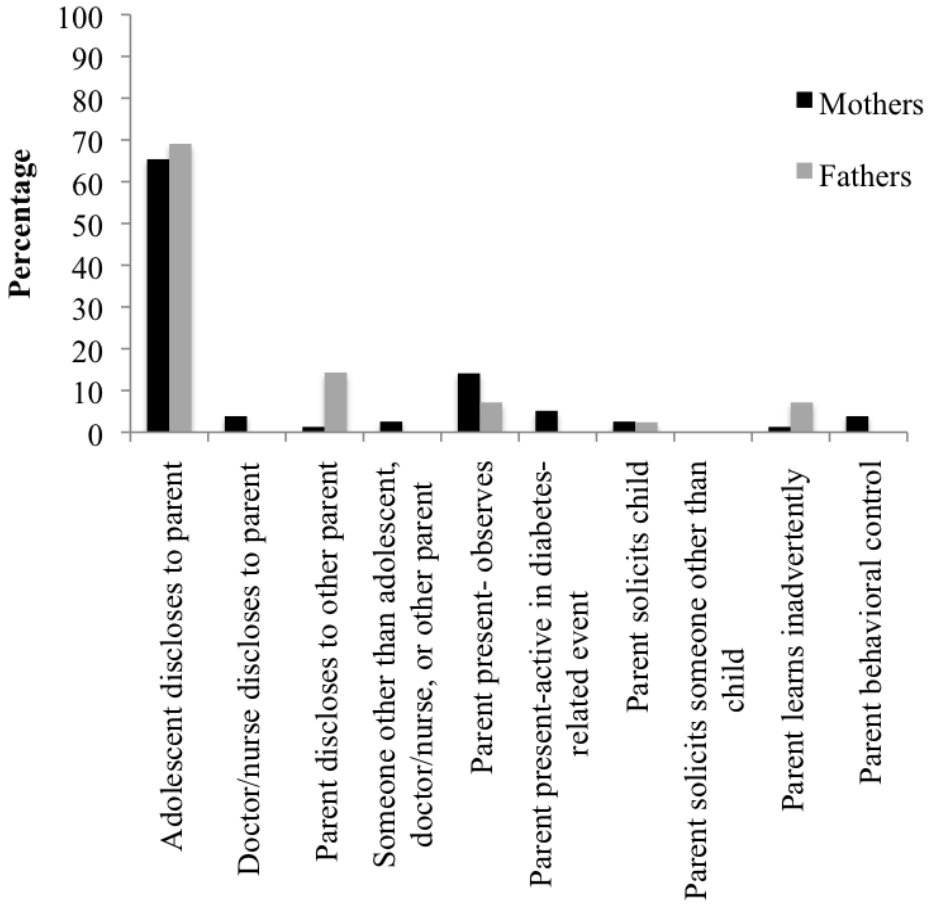


Figure 4 Distribution of Codes for Stressful Event 2



TABLES

Table 1

Descriptive Information Overall and by Ethnicity

	Overall *M (SD)*	Caucasian *M (SD)*	Latino *M (SD)*
Age (years)	13.23 *(1.69)*	13.12 *(1.63)*	13.30 *(1.78)*
% Female	54.23%	46.77%	62.5%
Time since diagnosis (years)	4.62 *(2.84)*	4.90 *(3.14)*	4.31 *(2.45)*
% on pump	25.4%	30.6%	19.6%
Maternal report of income	$25-49,999K	$50-74,999K**	$15-24,999K**
Mother's education	Partial college	Partial college**	HS graduate**
Self-disclosure to mother	3.63 *(1.10)*	3.51 *(1.15)*	3.78 *(1.03)*
Self-disclosure to father	2.94 *(1.26)*	3.01 *(1.23)*	2.86 *(1.31)*
Secrecy from mother	1.80 *(1.07)*	1.85 *(1.14)*	1.72 *(1.00)*
Secrecy from father	1.89 *(1.15)*	1.84 *(1.10)*	1.94 *(1.22)*
Maternal diabetes knowledge (A)	3.95 *(0.93)*	3.82 *(1.01)*	4.10 *(0.81)*
Paternal diabetes knowledge (A)	3.10 *(1.35)*	3.33 *(1.31)*+	2.85 *(1.36)*+
Maternal diabetes knowledge (M)	4.28 *(0.57)*	4.20 *(0.57)*	4.38 *(0.57)*
Maternal acceptance	4.28 *(0.83)*	4.47 *(0.66)***	4.07 *(0.95)***
Paternal acceptance	4.00 *(1.01)*	4.20 *(0.95)**	3.79 *(1.04)**
HbA1c	8.55 *(1.55)*	8.34 *(1.43)*	8.77 *(1.67)*
Self Care Inventory	4.04 *(0.68)*	4.09 *(0.57)*	3.97 *(0.80)*
Children's Depression Inventory	8.36 *(6.09)*	7.69 *(5.32)*	9.11 *(6.83)*

+p = .053, *$p < .05$, **$p < .01$
(A) = adolescent report, (M) = mother report

Table 2

Correlations Between Study Variables Related to Mothers and Age, Gender, and Ethnicity

	Age	Adolescent gender	Ethnicity
Self-disclosure to mother	-.37**	-.02	-.12
Secrecy from mother	.14	-.37	.06
Maternal knowledge (A)	-.35**	-.01	-.15
Maternal knowledge (M)	-.49**	.11	-.15
Maternal acceptance	-.11	-.04	.24**

*$p < .05$. **$p < .01$

(A) = adolescent report, (M) = mother report

Table 3

Correlations Between Study Variables Related to Fathers and Age, Gender, and Ethnicity

	Age	Adolescent gender	Ethnicity
Self-disclosure to father	-.38**	-.02	.06
Secrecy from father	.10	-.13	-.05
Paternal knowledge (A)	-.39**	.00	.18
Paternal acceptance	-.04	-.01	.21*

*$p < .05$. **$p < .01$

(A) = adolescent report

Table 4

Correlations Among Study Variables Related to Mothers

	Secrecy from mother	Maternal knowledge (A)	Maternal knowledge (M)	Maternal acceptance
Self-disclosure to mother	-.24**	.60**	.31**	.38**
Secrecy from mother	-	-.32**	.03	-.15
Maternal knowledge (A)	-	-	.35**	.21*
Maternal knowledge (M)	-	-	-	-.11
Maternal acceptance	-	-	-	-

*$p < .05$. **$p < .01$

(A) = adolescent report, (M) = mother report

Table 5

Correlations Among Study Variables Related to Fathers

	Secrecy from father	Paternal knowledge (A)	Paternal acceptance
Self-disclosure to father	.15	.61**	.57**
Secrecy from father	-	-.21**	-.19*
Paternal knowledge (A)	-	-	.52**
Paternal acceptance	-	-	-

*$p < .05$. **$p < .01$

(A) = adolescent report

Table 6

Predictors of Adolescent Report of Maternal Knowledge

	b	*β*	*p*	
Step 1				R^2= .388, F(2,114) = 36.14**
Self-disclosure to mother	.47	.55	.00**	
Secrecy from mother	-.16	-.19	.02*	
Step 2				R^2= .389, F(3,113) = 23.97**
Self-disclosure to mother	.48	.56	.00**	
Secrecy from mother	-.16	-.19	.02*	
Maternal acceptance	-.04	-.03	.70	

*$p < .05$. **$p < .01$

Table 7

Predictors of Maternal Report of Own Knowledge

	b	*β*	*p*	
Step 1				R^2= .109, F(2,108) = 6.59**
Self-disclosure to mother	.17	.34	.00**	
Secrecy from mother	.06	.12	.22	
Step 2				R^2= .169, F(3,107) = 7.27**
Self-disclosure to mother	.23	.44	.00**	
Secrecy from mother	.06	.11	.23	
Maternal acceptance	-.18	-.27	.01**	

*$p < .05$. **$p < .01$

Table 8

Predictors of Adolescent Report of Paternal Knowledge

	b	*β*	*p*	
Step 1				R^2 = .386, F(2,110) = 34.64**
Self-disclosure to father	.63	.59	.00**	
Secrecy from father	-.14	-.12	.11	
Step 2				R^2= .389, F(3,09) = 27.21**
Self-disclosure to father	.48	.45	.00**	
Secrecy from father	-.11	-.10	.20	
Paternal acceptance	.33	.25	.01**	

*$p < .05$. **$p < .01$

Table 9

Correlations of Study Variables, Potential Covariates, and Sociodemographic Variables with Outcomes

	HbA1c	Self Care Inventory	Children's Depression Inventory
Study Variables			
Self-disclosure to mother	-.24**	.40**	-.37**
Secrecy from mother	.12	-.33**	.28**
Maternal knowledge (A)	-.07	.39**	-.37**
Maternal acceptance	-.16	.21*	-.37**
Self-disclosure to father	-.33*	.30**	-.33**
Secrecy from father	.25**	-.25**	.24*
Paternal knowledge (A)	-.27**	.32**	-.33**
Paternal acceptance	-.16	.21*	-.31**
Potential Covariates			
Time since diagnosis	.23*	.04	.12
Pump status[a]	.23*	-.12	.10
Family income	-.12	-.10	-.04
Maternal education	-.15	.10	-.04
Paternal education (M)	-.18	.03	-.07
Sociodemographic Variables			
Adolescent ethnicity[b]	-.14	.09	-.12
Primary language spoken at home [c]	.09	-.05	.12
Adolescent gender[d]	-.15	-.19*	.09
Adolescent age	.20*	-.25**	.15

$*p < .05$. $**p < .01$

[a] 1 = pump, 2 = multiple daily injections

[b] 1 = Latino, 2 = Caucasian

[c] 1 = male, 2 = female

[d] 1 = English, 2 = Spanish

(A) = adolescent report, (M) = maternal report

Table 10

Predictors of HbA1c (Mother)

	b	*β*	*p*	
Step 1				R^2= .190, F(4,112) = 6.56**
Time since diagnosis	.00	.30	.00**	
Pump status[a]	1.12	.32	.00**	
Adolescent gender[b]	-.49	-.16	.07	
Adolescent age	.00	.14	.10	
Step 2				R^2= .232, F(6,110) = 5.53**
Time since diagnosis	.00	.31	.00*	
Pump status[a]	1.18	.33	.00*	
Adolescent gender[b]	-.50	-.16	.06	
Adolescent age	.00	.06	.51	
Self-disclosure to mother	-.32	-.22	.02*	
Secrecy from mother	-.02	-.01	.89	
Step 3				R^2= .253, F(7,109) = 5.27**
Time since diagnosis	.00	.33	.00**	
Pump status[a]	1.15	.33	.00**	
Adolescent gender[b]	-.50	-.16	.06	
Adolescent age	.00	.09	.34	
Self-disclosure to mother	-.45	-.32	.00**	
Secrecy from mother	.03	.02	.82	
Maternal knowledge (A)	.32	.19	.08	
Step 4				R^2= .253, F(8,108) = 4.57**
Time since diagnosis	.00	.33	.00**	
Pump status[a]	1.16	.33	.00**	
Adolescent gender[b]	-.50	-.16	.06	
Adolescent age	.00	.09	.35	
Self-disclosure to mother	-.46	-.32	.01**	
Secrecy from mother	.03	.02	.82	
Maternal knowledge (A)	.32	.19	.08	
Maternal acceptance	.02	.01	.92	

*$p < .05$. **$p < .01$

[a] 1 = pump, 2 = multiple daily injections

[b] 1 = male, 2 = female

(A) = adolescent report

Table 11

Predictors of Self Care Inventory (Mothers)

	b	*β*	*p*	
Step 1				R^2= .107, F(4,111) = 3.34*
Time since diagnosis	.00	.03	.76	
Pump status[a]	-.13	-.08	.37	
Adolescent gender[b]	-.25	-.19	.04*	
Adolescent age	.00	-.24	.01**	
Step 2				R^2= .276, F(6,109) = 6.91**
Time since diagnosis	.00	.06	.50	
Pump status[a]	-.12	-.08	.38	
Adolescent gender[b]	-.26	-.19	.02*	
Adolescent age	.00	-.10	.26	
Self-disclosure to mother	.18	.30	.00**	
Secrecy from mother	-.16	-.25	.01**	
Step 3				R^2= .295, F(7,108) = 6.47**
Time since diagnosis	.00	.08	.36	
Pump status[a]	-.13	-.08	.34	
Adolescent gender[b]	-.26	-.19	.02*	
Adolescent age	.00	-.07	.41	
Self-disclosure to mother	.12	.21	.05*	
Secrecy from mother	-.13	-.22	.02*	
Maternal knowledge (A)	.14	.19	.08	
Step 4				R^2= .297, F(8,107) = 5.66**
Time since diagnosis	.00	.08	.35	
Pump status[a]	-.11	-.08	.43	
Adolescent gender[b]	-.26	-.19	.02*	
Adolescent age	.00	-.08	.39	
Self-disclosure to mother	.12	.19	.10	
Secrecy from mother	-.14	-.21	.02*	
Maternal knowledge (A)	.14	.19	.08	
Maternal acceptance	.04	.05	.61	

*$p < .05$. **$p < .01$

[a] 1 = pump, 2 = multiple daily injections

[b] 1= male, 2 = female

(A) = adolescent report

Table 12

Predictors of Children's Depressive Inventory (Mothers)

	b	*β*	*p*	
Step 1				R^2= .059, F(4,112) = 1.75
Time since diagnosis	.00	.15	.12	
Pump status[a]	1.74	.13	.20	
Adolescent gender[b]	1.09	.09	.33	
Adolescent age	.00	.13	.16	
Step 2				R^2= .207, F(6,110) = 4.77**
Time since diagnosis	.00	.14	.14	
Pump status[a]	1.78	.13	.16	
Adolescent gender[b]	1.10	.09	.29	
Adolescent age	.00	-.01	.86	
Self-disclosure to mother	-1.85	-.33	.00**	
Secrecy from mother	.99	.17	.05	
Step 3				R^2= .225, F(7,109) = 4.51**
Time since diagnosis	.00	.14	.21	
Pump status[a]	1.85	.13	.14	
Adolescent gender[b]	1.09	.09	.29	
Adolescent age	.00	-.04	.66	
Self-disclosure to mother	-1.36	-.25	.03*	
Secrecy from mother	.82	.14	.11	
Maternal knowledge (A)	-1.16	-.18	.11	
Step 4				R^2= .274, F(8,108) = 5.10**
Time since diagnosis	.00	.10	.25	
Pump status[a]	1.01	.07	.42	
Adolescent gender[b]	1.26	.10	.21	
Adolescent age	.00	-.03	.78	
Self-disclosure to mother	-.79	-.14	.21	
Secrecy from mother	.76	.13	.13	
Maternal knowledge (A)	-1.20	-.18	.09	
Maternal acceptance	-1.84	-.25	.01**	

*$p < .05$. **$p < .01$

[a] 1 = pump, 2 = multiple daily injections

[b] 1 = male, 2 = female

(A) = adolescent report

Table 13

Predictors of HbA1c (Fathers)

	b	*β*	*p*	
Step 1				R^2= .194, F(4,108) = 6.49**
Time since diagnosis	.00	.31	.00**	
Pump status[a]	1.11	.31	.00**	
Adolescent gender[b]	-.48	-.15	.08	
Adolescent age	.00	.15	.08	
Step 2				R^2= .268, F(6,106) = 6.48**
Time since diagnosis	.00	.28	.00*	
Pump status[a]	.93	.26	.00*	
Adolescent gender[b]	-.43	-.14	.11	
Adolescent age	.00	.06	.54	
Self-disclosure to father	-.31	-.25	.01**	
Secrecy from father	.18	.14	.12	
Step 3				R^2= .269, F(7,105) = 5.52**
Time since diagnosis	.00	.28	.00*	
Pump status[a]	.93	.26	.00*	
Adolescent gender[b]	-.43	-.14	.11	
Adolescent age	.00	.05	.60	
Self-disclosure to father	-.28	-.23	.04*	
Secrecy from father	.18	.13	.13	
Paternal knowledge (A)	-.04	-.03	.76	
Step 4				R^2= .280, F(8,104) = 5.06**
Time since diagnosis	.00	.29	.00*	
Pump status[a]	.99	.27	.00*	
Adolescent gender[b]	-.42	-.13	.12	
Adolescent age	.00	.01	.95	
Self-disclosure to father	-.37	-.29	.02*	
Secrecy from father	.19	.14	.11	
Paternal knowledge (A)	-.10	-.08	.48	
Paternal acceptance	.23	.15	.20	

*$p < .05$. **$p < .01$

[a] 1 = pump, 2 = multiple daily injections

[b] 1= male, 2 = female

(A) = adolescent report

Table 14

Predictors of Self Care Inventory (Fathers)

	b	*β*	*p*	
Step 1				R^2= .117, *F*(4,107) = 3.54*
Time since diagnosis	.00	.03	.78	
Pump status[a]	-.19	-.13	.20	
Adolescent gender[b]	-.27	-.20	.03*	
Adolescent age	.00	-.23	.02*	
Step 2				R^2= .213, *F*(6,105) = 4.73**
Time since diagnosis	.00	.07	.47	
Pump status[a]	-.11	-.07	.44	
Adolescent gender[b]	-.31	-.23	.01**	
Adolescent age	.00	-.14	.14	
Self-disclosure to father	.10	.18	.06	
Secrecy from father	-.14	-.25	.01**	
Step 3				R^2= .226, *F*(7,104) = 4.35**
Time since diagnosis	.00	.07	.43	
Pump status[a]	-.10	-.07	.47	
Adolescent gender[b]	-.31	-.23	.01**	
Adolescent age	.00	-.11	.25	
Self-disclosure to father	.06	.11	.34	
Secrecy from father	-.13	-.23	.01*	
Paternal knowledge (A)	.08	.15	.18	
Step 4				R^2= .226, *F*(8,103) = 3.77**
Time since diagnosis	.00	.07	.44	
Pump status[a]	-.10	-.07	.48	
Adolescent gender[b]	-.31	-.23	.01*	
Adolescent age	.00	-.11	.38	
Self-disclosure to father	.06	.10	.41	
Secrecy from father	-.13	-.23	.01*	
Paternal knowledge (A)	.08	.15	.22	
Paternal acceptance	.00	.01	.96	

*$p < .05$. **$p < .01$

[a] 1 = pump, 2 = multiple daily injections

[b] 1 = male, 2 = female

(A) = adolescent report

Table 15

Predictors of Children's Depression Inventory (Fathers)

	b	*β*	*p*	
Step 1				R^2= .065, *F*(4,112) = 1.89
Time since diagnosis	.00	.15	.12	
Pump status[a]	2.31	.17	.09	
Adolescent gender[b]	1.36	.11	.23	
Adolescent age	.00	.10	.29	
Step 2				R^2= .186, *F*(6,106) = 4.03**
Time since diagnosis	.00	.12	.21	
Pump status[a]	1.45	.11	.26	
Adolescent gender[b]	1.66	.14	.13	
Adolescent age	.00	-.02	.81	
Self-disclosure to father	-1.39	-.29	.00**	
Secrecy from father	1.04	.20	.03*	
Step 3				R^2= .203, *F*(7,105) = 3.82**
Time since diagnosis	.00	.11	.23	
Pump status[a]	1.39	.10	.28	
Adolescent gender[b]	1.65	.14	.13	
Adolescent age	.00	-.05	.59	
Self-disclosure to father	-.97	-.20	.08	
Secrecy from father	.94	.18	.05*	
Paternal knowledge (A)	-.76	-.17	.14	
Step 4				R^2= .205, *F*(8,104) = 3.35**
Time since diagnosis	.00	.10	.37	
Pump status[a]	1.31	.10	.32	
Adolescent gender[b]	1.63	.14	.13	
Adolescent age	.00	-.04	.73	
Self-disclosure to father	-.84	-.18	.16	
Secrecy from father	.92	.18	.06	
Paternal knowledge (A)	-.68	-.16	.21	
Paternal acceptance	-.34	-.06	.63	

*$p < .05$. **$p < .01$

[a] 1 = pump, 2= multiple daily injections

[b] 1= male, 2 = female

(A) = adolescent report

APPENDIX A
Measures: Diabetes Disclosure and Secrecy, Parental Knowledge, Parental Acceptance, Self Care Inventory, and Adolescent Depressive Symptoms

Diabetes Self-Disclosure and Secrecy – Mother (DiaDisc)

(Author note: Disclosure is comprised of items 1, 2, and 5. Secrecy is comprised of items 3 and 4.)

Instructions:

Please answer these questions for what you tell your mother about your diabetes management (for example, blood sugar readings, how much insulin you've taken, what you've eaten, what your pump readings are) and **indicate how much you agree or disagree with each statement**.

1 = Strongly disagree
2
3
4
5 = Always did this as recommended without fail

ABOUT MOTHER	Strongly Disagree				Strongly Agree
1. I spontaneously tell my mother about what is going on with my diabetes management.	1	2	3	4	5
2. I often want to tell my mother what is going on with my diabetes management.	1	2	3	4	5
3. I keep a lot of secrets from my mother about my diabetes management.	1	2	3	4	5
4. I hide a lot from my mother about my diabetes management during nights and weekends when I am away from her.	1	2	3	4	5
5. I like to tell my mother about my diabetes management.	1	2	3	4	5

Diabetes Self-Disclosure and Secrecy – Father (DiaDisc)

(Author note: Disclosure is comprised of items 1, 2, and 5. Secrecy is comprised of items 3 and 4.)

Instructions:

Please answer these questions for what you tell your father about your diabetes management (for example, blood sugar readings, how much insulin you've taken, what you've eaten, what your pump readings are) and **indicate how much you agree or disagree with each statement**.

1 = Strongly disagree
2
3
4
5 = Always did this as recommended without fail

ABOUT FATHER	Strongly Disagree				Strongly Agree
1. I spontaneously tell my father about what is going on with my diabetes management.	1	2	3	4	5
2. I often want to tell my father what is going on with my diabetes management.	1	2	3	4	5
3. I keep a lot of secrets from my father about my diabetes management.	1	2	3	4	5
4. I hide a lot from my father about my diabetes management during nights and weekends when I am away from her.	1	2	3	4	5
5. I like to tell my father about my diabetes management.	1	2	3	4	5

Parental Knowledge – Adolescent Report of Mother (MCRPA)

Instructions:

Different parents know different things about their teenagers. We are interested in knowing how much **your <u>mother</u> knows about you.**

For each of the items, circle one number to indicate how much **your <u>mother</u> really knows about you.** Remember, there are no right or wrong answers, and your answers will be kept private. So, please tell us what you REALLY think.

1 = Doesn't know
2 = Knows a little
3 = Knows something
4 = Knows a lot
5 = Knows everything

How much does your mother REALLY know…	Doesn't know	Knows a little	Knows something	Knows a lot	Knows everything
1. Who your friends are?	1	2	3	4	5
2. Where you go at night?	1	2	3	4	5
3. How you spend your money?	1	2	3	4	5
4. What you do with your free time?	1	2	3	4	5
5. Where you are most afternoons after school?	1	2	3	4	5
6. What your blood sugar readings are?	1	2	3	4	5
7. What you have eaten?	1	2	3	4	5
8. How much exercise you get?	1	2	3	4	5
9. How much insulin you have given yourself?	1	2	3	4	5
10. When you take your insulin shots or boluses?	1	2	3	4	5
11. When you test your blood sugar?	1	2	3	4	5

Parental Knowledge – Adolescent Report of Father (MCRPA)

Instructions:

Different parents know different things about their teenagers. We are interested in knowing how much **your <u>father</u> knows about you.**

For each of the items, circle one number to indicate how much **your <u>father</u> really knows about you.** Remember, there are no right or wrong answers, and your answers will be kept private. So, please tell us what you REALLY think.

1 = Doesn't know
2 = Knows a little
3 = Knows something
4 = Knows a lot
5 = Knows everything

How much does your father REALLY know…	Doesn't know	Knows a little	Knows something	Knows a lot	Knows everything
1. Who your friends are?	1	2	3	4	5
2. Where you go at night?	1	2	3	4	5
3. How you spend your money?	1	2	3	4	5
4. What you do with your free time?	1	2	3	4	5
5. Where you are most afternoons after school?	1	2	3	4	5
6. What your blood sugar readings are?	1	2	3	4	5
7. What you have eaten?	1	2	3	4	5
8. How much exercise you get?	1	2	3	4	5
9. How much insulin you have given yourself?	1	2	3	4	5
10. When you take your insulin shots or boluses?	1	2	3	4	5
11. When you test your blood sugar?	1	2	3	4	5

Parental Knowledge – Mother Report of Self (MCRPA)

Instructions:

Different parents know different things about their teenagers. We are interested in knowing how much **you really know about your teen.**

For each of the items, circle one number to indicate how much you **REALLY** know:

1 = Don't know
2 = Know a little
3 = Know something
4 = Know a lot
5 = Know everything

How much do you REALLY know…	Don't know	Know a little	Know something	Know a lot	Know everything
1. Who your son's/daughter's friends are?	1	2	3	4	5
2. Where your child goes at night?	1	2	3	4	5
3. How your child spends his/her money?	1	2	3	4	5
4. What your child does with his/her free time?	1	2	3	4	5
5. Where your child is most afternoons after school?	1	2	3	4	5
6. What your child's blood sugar readings are?	1	2	3	4	5
7. What your child has eaten?	1	2	3	4	5
8. How much exercise your child gets?	1	2	3	4	5
9. How much insulin your child has given himself/herself?	1	2	3	4	5
10. When your child takes his/her insulin shots or boluses?	1	2	3	4	5
11. When your child tests his/her blood sugar?	1	2	3	4	5

Acceptance – Mother (MFP)

(Author note: The acceptance subscale is comprised of items 5, 6, 9, 10, and 12)

Instructions.

Indicate the extent to which the following statements describe **your relationship** with **your mother** by using the following scale:

1 = Strongly disagree with statement
2 = Somewhat disagree with statement
3 = Uncertain about statement
4 = Somewhat agree with statement
5 = Strongly agree with statement

MY MOTHER…

	Strongly Disagree	Somewhat Disagree	Uncertain	Somewhat Agree	Strongly Agree
1. encourages me to make my own decisions.	1	2	3	4	5
2. helps me learn to be independent.	1	2	3	4	5
3. encourages me to do things for myself.	1	2	3	4	5
4. encourages me to try things my way.	1	2	3	4	5
5. sometimes disapproves of specific things I do, but never gives me the impression that she dislikes me as a person.	1	2	3	4	5
6. enjoys being with me.	1	2	3	4	5
7. usually supports me when I want to do new and exciting things.	1	2	3	4	5
8. lets me handle my own money.	1	2	3	4	5
9. can always be depended upon when I really need her help and trust.	1	2	3	4	5

10. tries to make me feel better when I am unhappy.	1	2	3	4	5
11. encourages me to express my own opinion.	1	2	3	4	5
12. gives me the feeling that she likes me as I am; she doesn't feel she has to make me over into someone else.	1	2	3	4	5

Acceptance – Father (MFP)

(Author note: The acceptance subscale is comprised of items 5, 6, 9, 10, and 12)

Instructions.

Indicate the extent to which the following statements describe **your relationship** with **your father** by using the following scale:

1 = Strongly disagree with statement
2 = Somewhat disagree with statement
3 = Uncertain about statement
4 = Somewhat agree with statement
5 = Strongly agree with statement

MY FATHER…

	Strongly Disagree	Somewhat Disagree	Uncertain	Somewhat Agree	Strongly Agree
1. encourages me to make my own decisions.	1	2	3	4	5
2. helps me learn to be independent.	1	2	3	4	5
3. encourages me to do things for myself.	1	2	3	4	5
4. encourages me to try things my way.	1	2	3	4	5
5. sometimes disapproves of specific things I do, but never gives me the impression that he dislikes me as a person.	1	2	3	4	5
6. enjoys being with me.	1	2	3	4	5
7. usually supports me when I want to do new and exciting things.	1	2	3	4	5
8. lets me handle my own money.	1	2	3	4	5
9. can always be depended upon when I really need his help and trust.	1	2	3	4	5

10. tries to make me feel better when I am unhappy.	1	2	3	4	5
11. encourages me to express my own opinion.	1	2	3	4	5
12. gives me the feeling that he likes me as I am; he doesn't feel he has to make me over into someone else.	1	2	3	4	5

Self Care Inventory – Child Report (SCI)

Instructions:

Please rate each of the items according to how well you followed your recommended regimen for diabetes care in the past month. Use the following scale:

1 = Never did it
2 = Sometimes followed recommendations; mostly not
3 = Followed recommendations about 50% of the time
4 = Usually did this as recommended; occasional lapses
5 = Always did this as recommended without fail
NA = Not applicable to my regimen

In the past month, how well have you followed recommendations for:

	Never	Sometimes	50%	Usually	Always	NA
1. Checking blood glucose with monitor?	1	2	3	4	5	NA
2. Glucose recording?	1	2	3	4	5	NA
3. Checking ketones in blood or urine when blood glucose is high?	1	2	3	4	5	NA
4. Administering correct insulin dose?	1	2	3	4	5	NA
5. Administering insulin at the right time?	1	2	3	4	5	NA
6. Adjusting insulin intake based on blood glucose values?	1	2	3	4	5	NA
7. Eating the proper foods or counting all carbohydrates eaten?	1	2	3	4	5	NA
8. Eating meals/snacks on time?	1	2	3	4	5	NA
9. Carrying quick-acting sugar to treat	1	2	3	4	5	NA

reactions?						
10. Coming in for appointments?	1	2	3	4	5	NA
11. Wearing a medic alert ID?	1	2	3	4	5	NA
12. Exercising regularly?	1	2	3	4	5	NA
13. Reading food labels?	1	2	3	4	5	NA
14. Treating low blood glucose?	1	2	3	4	5	NA
15. Counting carbohydrates correctly?	1	2	3	4	5	NA
16. Calculating insulin doses based on carbohydrate content of meals or snacks?	1	2	3	4	5	NA

Children's Depression Inventory (CDI)

Instructions:

Kids sometimes have different feelings and ideas. This form lists the feelings and ideas in groups. From each group of three sentences, pick one sentence that describes you best for the past two weeks. After you pick a sentence from the first group, go on to the next group.

There is no right or wrong answer. Just pick the sentence that best describes the way you have been recently. Put a mark like this **X** next to your answer. Put the mark in the box next to the sentence that you pick.

Here is an example of how this form works. If you read books a lot, you would probably check the first sentence like this:

Example:

- ☐ I read books all the time.
- ☒ I read books once in a while.
- ☐ I never read books.

Remember, in each box, pick out the one sentence that describes you best in the PAST TWO WEEKS.

Item 1

- ☐ I am sad once in a while.
- ☐ I am sad many times.
- ☐ I am sad all the time.

Item 2

- ☐ Nothing will ever work out for me.
- ☐ I am not sure if things will work out for me.
- ☐ Things will work out for me O.K.

Item 3

- ☐ I do most things O.K.
- ☐ I do many things wrong.
- ☐ I do everything wrong.

Item 4

- ☐ I have fun in many things.
- ☐ I have fun in some things.
- ☐ Nothing is fun at all.

Item 5

- ☐ I am bad all the time.
- ☐ I am bad many times.
- ☐ I am bad once in a while.

Item 6

- ☐ I think about bad things happening to me once in a while.
- ☐ I worry that bad things will happen to me.
- ☐ I am sure that terrible things will happen to me.

Item 7

- ☐ I hate myself.
- ☐ I do not like myself.
- ☐ I like myself.

Item 8

- ☐ All bad things are my fault.
- ☐ Many bad things are my fault.
- ☐ Bad things are not usually my fault.

Item 9

- ☐ I do not think about killing myself.
- ☐ I think about killing myself but I would not do it.
- ☐ I want to kill myself.

Item 10

- ☐ I feel like crying every day.
- ☐ I feel like crying many days.
- ☐ I feel like crying once in a while.

Item 11

- ☐ Things bother me all the time.
- ☐ Things bother me many times.
- ☐ Things bother me once in a while.

Item 12

- ☐ I like being with people.
- ☐ I do not like being with people many times.
- ☐ I do not want to be with people at all.

Item 13

- ☐ I cannot make up my mind about things.
- ☐ It is hard to make up my mind about things.
- ☐ I make up my mind about things easily.

Item 14

- ☐ I look O.K.
- ☐ There are some bad things about my looks.
- ☐ I look ugly.

Item 15

- ☐ I have to push myself all the time to do my schoolwork.
- ☐ I have to push myself many times to do schoolwork.
- ☐ Doing schoolwork is not a big problem.

Item 16

- ☐ I have trouble sleeping every night.
- ☐ I have trouble sleeping many nights.
- ☐ I sleep pretty well.

Item 17

- ☐ I am tired once in a while.
- ☐ I am tired many days.
- ☐ I am tired all the time.

Item 18

- ☐ Most days I do not feel like eating.
- ☐ Many days I do not feel like eating.
- ☐ I eat pretty well.

Item 19

- ☐ I do not worry about aches and pains.
- ☐ I worry about aches and pains many times.
- ☐ I worry about aches and pains all the time.

Item 20

- ☐ I do not feel alone.
- ☐ I feel alone many times.
- ☐ I feel alone all the time.

Item 21

- ☐ I never have fun at school.
- ☐ I have fun at school only once in a while.
- ☐ I have fun at school many times.

Item 22

- ☐ I have plenty of friends.
- ☐ I have some friends but I wish I had more.
- ☐ I do not have any friends.

Item 23

- ☐ My schoolwork is alright.
- ☐ My schoolwork is not as good as before.
- ☐ I do very badly in subjects I used to be good in.

Item 24

- ☐ I can never be as good as other kids.
- ☐ I can be as good as other kids if I want to.
- ☐ I am just as good as other kids

Item 25

- ☐ Nobody really loves me.
- ☐ I am not sure if anybody loves me.
- ☐ I am sure that somebody loves me.

Item 26

- ☐ I usually do what I am told.
- ☐ I do not do what I am told most times.
- ☐ I never do what I am told.

Item 27

- ☐ I get along with people.
- ☐ I get into fights many times.
- ☐ I get into fights all the time.

APPENDIX B
Coding scheme utilized in the present study with examples

Name of code	Description of Code	Example(s)
Adolescent discloses to parent	Parent learns of adolescent's stressful diabetes-related event because the adolescent told the parent. This reflects a spontaneous (not solicited) disclosure of the adolescent to the parent.	"I called my mom and told her." "Mom was in the kitchen too and I told her."
Doctor/nurse discloses to parent	Parent learns of adolescent's stressful diabetes-related event because a medical professional tells him/her.	"The school nurse called my mom about what had happened in PE."
Parent discloses to other parent	The way that one parent learns of the adolescent's stressful diabetes-related event is that the other parent tells him/her.	"Mom told dad." "Dad told mom."
Someone else discloses to parent (other than adolescent, doctor/nurse, or other parent)	Parent learns of adolescent's stressful diabetes-related event because they learn of it from someone other than the adolescent, a medical professional, or the other parent. Examples include a sibling of the adolescent, friend of the adolescent parent of a friend of the adolescent, teacher, etc.	"My sister told my mom that I was having symptoms."
Parent present-observes	Parent learns of the adolescent's stressful diabetes-related event because the parent observes the event, notices the adolescent's symptoms, or observes the adolescent performing a diabetes-related behavior during or in response to the event.	"Because mom was there." (unspecified) "Because my mom was around when I checked my blood sugar." "I threw up at the restaurant and my mom saw." "At night when my mom felt my back, she noticed that I was warm and wondered whether she gave me the flu."
Parent present-active in diabetes-related event	Parent learns of the stressful diabetes-related event, because the parent is performing a diabetes task with or for the adolescent.	"Mom was helping me figure out how many carbs I had eaten." "My parents were checking my blood sugar when I was asleep in the middle of the night, and the

		meter said it was low.”
Parent solicits adolescent	Parent learns of the adolescent’s stressful diabetes-related event by asking the adolescent directly.	“Mom asked me if I was low.”
Parent solicits someone other than adolescent	Parent learns about the adolescent’s stressful diabetes-related event by soliciting information from someone other than the adolescent.	“My mom always talks with my teachers.”
Parent learns inadvertently	The parent learns about the adolescent’s stressful diabetes-related event inadvertently. Parent did not seek out information, and it was not deliberately given to the parent by any source. Examples include a parent finding evidence or overhearing a conversation.	“Mom noticed that the cupcakes were missing.” “Mom overheard me telling dad.”
Parental behavioral control	Parent structures the environment in a way that he/she will know information about the adolescent’s diabetes management.	“I put my blood sugar levels down on the chart in the kitchen that my mom makes me use every day for tracking.”

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