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The Influence of Emotion Regulation and Family Involvement on Diabetes Distress among Adults with Type 2 Diabetes

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THE INFLUENCE OF EMOTION REGULATION AND FAMILY INVOLVEMENT ON DIABETES DISTRESS AMONG ADULTS WITH TYPE 2 DIABETES

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ABSTRACT

Adults with diabetes frequently experience diabetes related distress which is associated with negative health outcomes. Family members are commonly involved in patients' diabetes self-management. However, family involvement can have harmful and/or helpful effects on patients' diabetes outcomes. Difficulties in regulating emotions may play a role in patients' interactions with family members and experience of diabetes distress. This study examined the role of emotion regulation and type of family involvement in diabetes distress among 370 adults with type 2 diabetes. Two separate three-step sequential linear regression models were used to test the main and interactive effects of harmful and helpful family involvement and emotion regulation on diabetes distress. There were significant main effects of emotion regulation (B = 0.02, SE = 0.00, 95% CI [0.01, 0.02], p <.001) and harmful family involvement (B = 0.42, SE = 0.08, 95% CI [0.26, 0.58], p < .001) on diabetes distress. Emotion regulation did not moderate the relationship of harmful (B = -0.01, SE = 0.00, 95% CI [-0.01, 0.00], p = .403) and helpful (B = 0.00, SE = 0.00, 95% CI [-0.01, 0.00], p = .148) family involvement on diabetes distress. Difficulties in emotion regulation may play a key role in patients' diabetes distress – regardless of type of family involvement.

Keywords: Diabetes Distress, Emotion Regulation, Family Involvement, Social Support, Chronic Disease Self-Management

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CHAPTER I

INTRODUCTION

Adults with type 2 diabetes are at risk for a range of irreversible long-term complications such as peripheral neuropathy, vision loss, kidney failure, and cardiovascular disease (e.g., heart attack or stroke; Afkarian et al., 2013; Davies et al., 2006; Lee et al., 2015; Sowers et al., 2001). These complications are associated with greater functional impairment (Fisher et al., 2014), higher levels of disability (Gregg et al., 2002), lower quality of life (Dall et al., 2010), and greater risk of early mortality (De Marco et al., 1999; Morrish et al., 2001). Effective diabetes self-management and long-term control of blood glucose levels (i.e., glycemic control) can prevent or forestall the development of diabetes related complications. However, to achieve and maintain glycemic control, adults with diabetes need to engage in complex and demanding daily self-management regimens that often include checking blood sugar, taking medications, exercising, and restricting carbohydrate consumption (Beck et al., 2017; Funnell et al., 2008; Harris et al., 2000).

Adults with diabetes commonly experience psychological distress stemming from threat of long-term complications, concerns associated with functional impairment, coordination of complex medical care, and adherence to onerous daily self-management regimens (Dennick et al., 2017; Fisher et al., 2014; Fisher et al., 2019). Prior studies have demonstrated that diabetes related distress (hereafter, diabetes distress) is an important predictor of diabetes self-management and cardiometabolic outcomes among patients with type 2 diabetes. Diabetes

distress has been linked to a wide range of negative health outcomes. A longitudinal study by Fisher and colleagues (2009) found that individuals with greater diabetes distress were less likely to exercise and more likely to have a poor diet compared to those with lower levels of diabetes distress. Additionally, studies have found that higher diabetes distress is associated with worse adherence to oral antihyperglycemic medications and insulin (Gonzalez et al., 2014; Jannoo et al., 2017). Several cross-sectional and longitudinal studies of adults with type-2 diabetes have found that higher diabetes distress is associated with worse glycemic control as measured by glycated hemoglobin A1c (HbA1c; Aikens, 2012; Fisher et al., 2010; Lee et al., 2018; Ogbera & Adeyemi-Doro, 2011; Tsujii et al., 2012). Adults with high diabetes distress are twice as likely to have high blood pressure compared to adults with low diabetes distress (Chew et al., 2018). Additionally, higher diabetes distress has been linked with significantly higher levels of non-HDL cholesterol (Fisher et al., 2008; Winchester et al., 2016). Further, studies suggest that diabetes distress is associated with more missed work days and higher risk of mortality among individuals with type 2 diabetes (Adriaanse et al., 2008; Fisher et al., 2008). Finally, among patients with type 2 diabetes, higher diabetes distress is associated with lower overall quality of life (Carper et al., 2014).

Unfortunately, existing research suggests that high diabetes related distress is common and relatively persistent over time. For example, prior studies have found that approximately one-third of adults with type 2 diabetes have clinically significant levels of diabetes distress (Fisher et al., 2012; Fisher et al., 2008). A very large multinational survey of 8,596 adults with diabetes living in 17 different countries found that approximately 45% of participants reported high levels of diabetes distress (Funnell et al., 2015). Importantly, a large study of U.S. adults found significantly higher levels of diabetes distress among African American, Hispanic, and

Chinese Americans compared to White non-Hispanic Americans – suggesting that racial and ethnic differences in diabetes distress may represent an important health disparity in the United States (Peyrot et al., 2014). A longitudinal study by Fisher and colleagues (2008) found that approximately half of adults with high levels of diabetes distress at baseline maintained high levels of diabetes distress over an 18-month period (Fisher et al., 2008). The high prevalence, temporal stability, and negative impacts on diabetes related outcomes (e.g., self-care behaviors and physiological indicators), highlight the clinical importance of diabetes distress. Indeed, current standards of medical care for patients with diabetes recommend routine monitoring of patients' diabetes distress (American Diabetes Association, 2019).

Interventions to enhance diabetes self-management and diabetes-specific problem solving are effective in reducing diabetes distress and in improving self-management behaviors including healthier diet, increase in physical activity, and better medication adherence (Fisher et al., 2013). However, trials of existing interventions have not yielded improvements in patients' HbA1c. A systematic review and meta-analysis of diabetes distress interventions found that psychoeducation about interrelatedness of diabetes, mood, and motivation was associated with reduction of diabetes distress immediately following the intervention and at follow-up assessment points ranging from 6 to 54 months (Sturt et al., 2015). The same meta-analysis found that motivational interviewing interventions significantly reduced both diabetes distress and HbA1c (Sturt et al., 2015). These findings suggest that diabetes distress is amenable to existing psychological intervention and that experimentally induced changes in diabetes distress contribute to improvements in some diabetes outcomes.

Adults with diabetes frequently receive disease-related support from informal health supporters such as family members or friends (Lee et al., 2017; Rosland et al., 2010). For

example, one recent study found that 76 percent of adults with type 2 diabetes had at least one family member or friend who provided regular assistance with their diabetes self-management (Lee et al., 2019). These support persons often help patients with self-management activities such as checking blood sugar, taking medications, making healthy dietary choices, and with coordination of medical care (e.g., filling prescriptions and remembering medical appointments; Lee et al., 2017; Mayberry & Osborn, 2012; Rosland et al., 2014). Community-dwelling older adults with diabetes receive between 10 and 14 hours of assistance from these informal caregivers per week (Langa et al., 2002). These findings underscore both the prevalence and extent of support provided to adults with type 2 diabetes.

Studies suggest that higher levels of social support from family and friends are generally associated with positive health outcomes for adults with diabetes (Strom & Egede, 2012). For example, cross-sectional and interventional studies suggest that adults with type 2 diabetes who receive higher levels of social support have significantly better cardiometabolic indicators such as glycemic control, systolic blood pressure, and lipid levels (Bond et al., 2010; Sacco & Yanover, 2006; Tang et al., 2008; Trief et al., 2011). Additional studies suggest that patients with high levels of social support have significantly fewer depressive and diabetes-related symptoms (Bond et al., 2010; Sacco & Yanover, 2006). Higher levels of social support are associated with more positive behavioral outcomes (King et al., 2010; McEwen et al., 2010; Nicklett & Liang, 2010; Rosland et al., 2008; Wen, Parchman, et al., 2004; Wolever et al., 2010). For example, greater social support is linked with better adherence to daily diabetes self-care activities including self-monitoring of blood glucose, adhering to diet and exercise plans, and checking feet (Rosland et al., 2008; Rosland et al., 2014; Shaw et al., 2006; Wen, Shepherd, et al., 2004). Moreover, research suggests that social support may moderate the relationship between diabetes

stressors and patients' experience of diabetes related distress. For example, one prior study found that support satisfaction and the number of social supporters moderated the association between diabetes burden (e.g., diet, physical activity, blood glucose monitoring, and insulin injections) and diabetes distress (Baek et al., 2014). The same study found that greater support satisfaction was associated with lower levels of diabetes distress (Baek et al., 2014). Notably, the relationship between high levels of social support and better diabetes outcomes appears to be consistent across different types of supporter relationships (e.g., partners, peers, nurse; Strom & Egede, 2012).

An emerging body of evidence indicates that, among adults with type 2 diabetes, the type, rather than the amount of assistance or involvement from family and friends may be a particularly important determinant of diabetes-related outcomes (Baig et al., 2015; Mayberry et al., 2019; Mayberry & Osborn, 2012; Torenholt et al., 2014). One recent longitudinal study found that patients with type 2 diabetes had lower diabetes distress, better diabetes self-care behaviors, and better 12-month glycemic control when family members and friends were supportive of their' personal efforts to autonomously manage their diabetes (Lee et al., 2019). Another study found that diabetes distress at baseline was associated with poorer 12-month glycemic control among patients with low autonomy support from family members and friends (Lee et al., 2018). However, diabetes distress was not associated with poorer glycemic control among patients with high levels of autonomy support from family and friends. Overall, these findings suggest that family members and friends may be more effective when they provide autonomy enhancing rather than controlling or coercive support strategies. Among patients with diabetes, supportive family behaviors are linked with greater adherence to self-care behaviors (e.g., self-monitoring of blood glucose and taking diabetes medication), whereas obstructive

family behaviors are associated with lower adherence to diabetes self-care activities (Mayberry et al., 2014). Harmful family involvement (e.g., miscarried helping, threats, and coercion) in patients' diabetes self-care, although often unintended, is associated with negative consequences including worse self-management, lower medication adherence, less frequent self-monitoring of blood glucose, poorer diet and exercise, as well as with greater interpersonal conflict between patients and their family members (Mayberry et al., 2019). Overall, these studies indicate that family or friends' involvement in patients' diabetes self-management can be harmful or helpful, depending on the type of assistance provided. Indeed, some authors have suggested that support based interventions focused on increasing helpful family involvement while simultaneously decreasing harmful family involvement are more effective in improving diabetes self-management than interventions focused only on increasing helpful family involvement (Mayberry et al., 2014; Rosland et al., 2012). Yet, no studies to date have examined the associations of harmful or helpful family involvement with diabetes distress.

Psychological factors, such as emotion and emotion regulation may also play an important role in individuals' experience of diabetes distress. Emotion regulation is a multidimensional construct that includes awareness of ones' emotions; ability to control impulsive behaviors and pursue goal-directed behaviors when experiencing aversive emotions; the ability to use adaptive and situationally appropriate strategies to regulate the intensity and duration of emotional responses; and willingness to experience negative emotions to pursue important or meaningful life activities (Gratz & Roemer, 2004). Difficulties with emotion regulation can influence the development of several mental health conditions, such as depression and anxiety (Hu et al., 2014; Sloan et al., 2017). Further, difficulties in emotion regulation are associated with unhealthy behaviors such as emotional eating (Crockett et al., 2015; Gianini et

al., 2013). Some evidence suggests that healthy behaviors, such as aerobic exercise, may attenuate the relationship between difficulties with emotion regulation and stress induced negative affect (Bernstein & McNally, 2017). Moreover, difficulties in emotion regulation are associated with poorer social interactions among healthy adults and poorer social participation and functioning among adults with chronic disease (Lopes et al., 2005). For example, a longitudinal study of adults recovering from a recent stroke found that baseline difficulties in emotion regulation were associated with poorer social engagement at 12-month follow-up (Cooper et al., 2015). A study of adults with rheumatoid arthritis found that dimensions of emotion regulation (e.g., emotional ambiguity) were associated with poorer social functioning (van Middendorp et al., 2005). Emotion regulation has been implicated in lower social related quality of life among adults with multiple sclerosis (Phillips et al., 2009). Finally, one recent review concluded that difficulties in emotion regulation may undermine individual's ability to cope with the stress associated with chronic health conditions (Wierenga et al., 2017). These findings suggest that difficulties in emotion regulation may play an important role in both health-related behaviors and social engagement which are particularly beneficial for adults with diabetes.

Recent studies provide evidence for a link between emotion regulation and diabetes distress. Another study among adults with type 1 and 2 diabetes found that diabetes distress was significantly associated with more negative emotional intensity and inversely related to emotional clarity and the ability to repair negative emotions (Coccaro et al., 2020) – suggesting the ability to regulate negative emotions may help mitigate diabetes distress. Another prior study found that greater use of cognitive emotion regulation strategies was associated with diabetes distress among adults with type 2 diabetes (Kane et al., 2018). No existing studies have

examined the link between a more comprehensive model of emotion regulation *abilities* and important diabetes related outcomes such as diabetes distress. Further, it is not clear how patients' use of maladaptive emotion regulation strategies interact with harmful or helpful familial involvement in their diabetes self-care or their experience of diabetes distress.

The current study examined whether individuals' use of maladaptive emotion regulation strategies moderates the relationship between the type of family involvement (e.g., harmful vs. helpful involvement) and diabetes distress. First, we hypothesized that difficulties regulating emotions would be associated with greater diabetes related distress. Second, we hypothesized higher levels of harmful family involvement would be associated with higher diabetes distress. Third, we hypothesized harmful family involvement and difficulties with emotion regulation would interact and predict diabetes distress. Specifically, the relationship between harmful family involvement and higher diabetes distress would be significantly stronger among patients with greater difficulties in emotion regulation. Fourth, we hypothesized higher levels of helpful family involvement would be associated with lower diabetes distress. Fifth, we hypothesized that helpful family involvement and difficulties with emotion regulation would interact to predict diabetes distress. Specifically, the relationship between helpful family involvement and lower diabetes distress would be significantly stronger among patients with lower levels of difficulties in emotion regulation.

CHAPTER II

METHOD

Participants and Procedure

Participants were recruited from CloudResearch, a participant-sourcing platform. To be included, panel members had to be over the age of 18 and reported having been diagnosed with type 2 diabetes. Eligible participants were asked to provide informed consent prior to enrolling in the study (Appendix A). After providing informed consent, participants were asked to complete a battery of survey measures. We used G*Power to conduct an *a priori* power analysis to determine the sample size needed to detect a small effect size (d = .05) for the ΔR^2 in a sequential linear regression model with alpha set to .05 (Faul et al., 2007). Results showed that a total sample of 262 participants were required to achieve full power (i.e., β = .95). However, the proposed study is a part of a larger survey of 370 adults with type 2 diabetes and we used the full sample to achieve maximum power.

Measures

Sociodemographic and Medical Characteristics. Participants were asked to report their age, race, ethnicity, highest level of education, annual household income, age when first diagnosed with type 2 diabetes, presence of health insurance and primary care provider during the past 12 months. These variables were used to characterize the sample.

Diabetes Distress. The Diabetes Distress Scale – 17 (DDS) was used to measure participants' emotional distress associated with having diabetes (Polonsky et al., 2005). The DDS

is comprised of 17 items which assess diabetes-related emotional distress (Appendix B). Participants rated the extent to which they agree with each item (e.g., "Feeling that diabetes is taking up too much of my mental and physical energy every day") on a Likert scale from 1 ("Not a Problem") to 6 ("A Very Serious Problem"). The DDS consists of four subscales: Emotional burden subscale (EB), physician-related distress subscale (PD), regimen-related distress subscale (RD), and diabetes-related interpersonal distress subscale (ID). In this study, we used the total scale score as a measure of participants' overall diabetes related distress. The total scale has demonstrated strong internal consistency in previous studies (α = .93) and in the present sample (α = .97). The DDS total scale score has shown convergent validity with the Depression Anxiety and Stress Scale (rho = .43-.51; Chin et al., 2017). Additionally, the DDS has strong criterion validity with higher scores associated with poorer self-care (e.g., meal planning, exercise, self-monitoring of blood glucose), elevated lipid levels, and higher HbA1c (Fisher et al., 2014; Lee et al., 2018; Polonsky et al., 2005).

Family Involvement in Diabetes Self-Care. The Family and Friend Involvement in Adults' Diabetes (FIAD) was used to measure the type of social support participants receive (Appendix C; Mayberry et al., 2019). The FIAD is comprised of 16 items. Participants rate how often their friends or family members engage in specific behaviors (e.g., "exercise with you or ask you to exercise with them?") on a Likert scale from 1 ("Never in the past month") to 5 ("Twice or more each week"). The FIAD consists of two eight-item subscales: *helpful* family involvement and *harmful* family involvement. FIAD subscales were used as the focal independent variable in this study. The helpful involvement subscale has good internal consistency (α = .86 - .87), and the harmful involvement subscale has acceptable internal consistency (α = .72 - .63). The FIAD has demonstrated strong criterion validity with patient

reported self-care behaviors including effectiveness of family support, satisfaction with their family support, as well as with HbA1c (Mayberry et al., 2019). Additionally, the FIAD subscales have high test-retest reliability (harmful *rho* = .61, helpful *rho* = .64) over a period of three months and have shown good internal consistency in prior work (helpful: α = .87; harmful: α = .72) and excellent internal reliability in this sample (harmful: α = .94; helpful: α = .91).

Difficulties in Emotion Regulation Scale. The Difficulties in Emotion Regulation Scale (DERS) was used to measure participants' use of maladaptive emotion regulation (Appendix D; Gratz & Roemer, 2004). The DERS is a 36-item self-report measure of difficulties in emotion regulation based on six factors: (1) non-acceptance of emotional responses, (2) difficulties engaging in goal-directed behavior, (3) impulsive control difficulties, (4) lack of emotional awareness, (5) limited access to emotion regulation strategies, and (6) lack of emotional clarity (Gratz & Roemer, 2004). Participants report whether statements about emotion regulation (e.g., "I am clear about my feelings", "When I'm upset, I have difficulty controlling my behaviors") are true for them on a Likert scale from 1 ("Almost never") to 5 ("Almost always"). The DERS total score was used as the putative moderator in this study. The DERS has shown to have excellent internal consistency in previous studies (α = .93) and in the present study (α = .95), as well as good test-retest reliability (*r* = .88; Gratz & Roemer, 2004). Additionally, the DERS has good convergent validity with similar measures of negative mood regulation, experiential avoidance, and emotional expressivity (Gratz & Roemer, 2004).

Perceived Stress Scale and Insulin. The Short Form Perceived Stress Scale (PSS-4) was used to measure participants' perceived general life stress (Appendix E; Cohen et al., 1983). The PSS-4 has fair internal reliability (α = .72). Prior studies have found that the PSS-4 is significantly correlated with other stress measures, such as the life-events scale (*r* = .28).

Furthermore, the PSS-4 predicts self-reported health status (r = .23), inability to perform routine activities (r = .21), health related behavioral outcomes (e.g., cigarettes smoked per day; r = .37), and comorbid health conditions (r = .14; Cohen et al., 1983). In this study, the PSS-4 was used to measure and control for variance associated with general life stress. We also measured and controlled for patient reported insulin use (do not use insulin = 0, use insulin = 1).

Fear of Coronavirus-19 Scale. The Fear of Coronavirus-19 Scale, a 7-item measure of COVID-19 fear, was used to further describe the sample (Appendix F). Participants indicated their level of agreement (e.g., "My hands become clammy when I think about coronavirus-19") on a Likert scale from 1 ("Strongly disagree") to 5 ("Strongly agree"). Participants were considered to have significant levels of COVID-19 fears by agreeing with the seven items on average. The FCV-19S is associated with higher scores of depression measures (e.g., Bangla PHQ-9; Sakib et al., 2020).

Coronavirus-19 Influence on Diabetes. We measured disruptions associated with COVID-19 to diabetes self-care using three topics: The influence of the pandemic on diabetes self-care, their ability to receive help with diabetes self-care, and their ability to cope with the stress associated with having diabetes (Appendix G).

Data Analysis

Descriptive statistics were used to characterize the sample. We examined univariate distributions of each study variable to assess normality and identify outliers (Hoaglin & Iglewicz, 1987). Pearson correlations were used to examine the bivariate associations between predictors and control variables. We used two separate three-step sequential linear regression models to test the main and interactive effects of both the harmful and helpful family involvement subscales of the FIAD with Difficulties in Emotion Regulation Scale (DERS) total scores on Diabetes

Distress Scale scores. All predictors were mean centered. Prior studies have linked insulin use with higher diabetes distress (Baek et al., 2014; Polonsky et al., 2005). Consequently, we controlled for participants' insulin use in all statistical models. Further, we controlled for PSS-4 scores in both models to help isolate the unique relationship between harmful or helpful family involvement and difficulties with emotion regulation with *diabetes distress* – above and beyond general life stress (Coccaro et al., 2021). Harmful and helpful family involvement were simultaneously included in the model to control for the overlap in helpful and harmful family involvement in previous studies and in the present study ($r = .80$, $p < .001$; Mayberry et al., 2019). Variance inflation factors were calculated to assess potential multicollinearity among predictor variables. All analyses were performed using SPSS version 26 (IBM Corp, 2019). All statistical tests were two-tailed with alpha = .05.

CHAPTER III

RESULTS

Participant Characteristics

The sample was approximately half male and predominantly White. The average age of the sample was 55 years. Most participants were high school graduates with more than three quarters having at least some college experience. Participants were roughly equally distributed across income levels. More than 95% of participants saw a primary care provider and had health insurance over the past 12 months. More than a third of participants were prescribed insulin at the time of data collection. Approximately one third of the sample perceived the coronavirus pandemic to have at least a moderate amount of negative influence on their diabetes self-care activities (37.4%), their ability to receive help with diabetes self-care from family members and friends (30.6%), and their ability to cope with the stress associated with having diabetes (32.3%). More than a third of participants endorsed COVID-19 related anxiety (39.2%).

Preliminary Analysis

Prior to conducting a hierarchical regression, the appropriate assumptions of this statistical analysis were tested. Assumptions of normality, linearity, and homoscedasticity were met as indicated by residuals and scatter plots. Bivariate correlations between all independent variables and the dependent variable revealed small to large positive associations (see Table 2). The FIAD harmful and helpful subscales showed a relatively strong positive correlation with one another (Spearman's *rho* = .72; Table 2). Despite this correlation, regression model diagnostics

(i.e., VIF) indicated acceptable levels of collinearity for both the harmful (VIF = 3.61) and helpful (VIF = 2.87) subscales. Correlations between the number of people helping with diabetes self-care inside and outside the home indicated small to moderate positive correlations with both harmful (in-home: $r = .36$, $p < .001$; out of home: $r = .29$, $p < .001$) and helpful (in-home: $r = .46$, $p < .001$; out of home: $r = .40$, $p < .001$) family involvement. This finding provides further evidence that the FIAD subscales are confounded by overall level of family involvement. Thus, consistent with the initial validation of the FIAD, both subscales were included in a single model to better isolate the unique impacts of both harmful and helpful family support, which otherwise confounded greater levels of family involvement overall (Mayberry et al., 2019).

Emotion Regulation and Family Involvement

In the first step, both general life stress ($B = 0.77$, $SE = 0.08$, 95% CI [0.62, 0.93], $p < .001$) and insulin ($B = 0.54$, $SE = 0.12$, 95% CI [0.30, 0.79], $p < .001$) were significantly associated with diabetes distress, accounting for 26.5% of the variance in diabetes distress (Table 3). Difficulties in Emotion Regulation Scale (DERS), harmful and helpful family involvement were added in the second step. Difficulties in emotion regulation ($B = 0.02$, $SE = 0.00$, 95% CI [0.01, 0.02], $p < .001$) and harmful family involvement ($B = 0.42$, $SE = 0.08$, 95% CI [0.26, 0.58], $p < .001$) were significantly associated with diabetes distress, whereas helpful family involvement ($B = 0.05$, $SE = 0.07$, 95% CI [-0.08, 0.19], $p = .437$) was not. The second step accounted for 26.4% of variance. The interaction terms were added in the third step in two separate models. The interaction between difficulties in emotion regulation with harmful family involvement was not significant ($B = -0.01$, $SE = 0.00$, 95% CI [-0.01, 0.00], $p = .403$). The interaction between difficulties in emotion regulation with helpful family involvement was not

significant (B = 0.00, SE = 0.00, 95% CI [-0.01, 0.00], p = .148). Variance Inflation Factors (range: 1.03 to 3.52) were not indicative of multicollinearity.

CHAPTER IV

DISCUSSION

This study is the first to examine the direct and interactive associations between difficulties in emotion regulation, type of family involvement, and diabetes distress. Our results suggest that difficulty in regulating emotion is a strong predictor for diabetes distress. As predicted, greater harmful family involvement was significantly associated with greater diabetes distress. However, unexpectedly, helpful family involvement was not associated with lower diabetes distress after controlling for harmful family involvement, suggesting that the significant bivariate relationship between helpful family involvement and diabetes distress observed in this study is due to high levels of correlation between harmful and helpful family involvement. Contrary to expectations, our finding also suggests that emotion regulation difficulty does not moderate the relationship between the type of family involvement (i.e., harmful or helpful) and diabetes distress. That is, the association between harmful/helpful family involvement and diabetes distress did not differ across varying levels of difficulties in emotion regulation, as had been predicted.

Emotion Regulation and Diabetes Distress

Consistent with prediction, greater difficulties in regulating emotion were significantly associated with greater diabetes distress. This finding is consistent with previous research showing that negative emotionality and limited ability to regulate such emotions is associated with greater diabetes distress (Coccaro et al., 2020; Fisher et al., 2018). For example, one recent

study found that negative emotionality was directly related to diabetes distress, whereas the ability to regulate such emotions was reversely related to diabetes distress. Another recent study found that maladaptive emotion regulation was associated with the development of diabetes distress as well as poorer diabetes management and metabolic control among adults with type 1 diabetes (Fisher et al., 2018). However, these studies combined selected subscales of previously validated instruments to generate a composite measure of emotion regulation abilities. Because the authors did not use a model-based or validated measure of emotion regulation abilities, is not clear how these findings fit within the broader literature emotion regulation.

Other studies have used model-based measures of emotion regulation. For example, one prior study found that greater use of negative emotion regulation strategies was associated with higher baseline diabetes distress among adults with type 2 diabetes (Kane et al., 2018). The authors suggest that this seemingly paradoxical finding may be due to high levels of negative affectivity underlying both diabetes distress and use of cognitive emotion regulation strategies to regulate negative emotion. For example, both diabetes distress and the tendency to use cognitive strategies to regulate negative emotions may be higher in people with greater negative emotional experiences. That is, adults who experience more negative emotions may be more likely to have greater diabetes distress and are also more likely to use strategies in an attempt to regulate these negative emotions (Kane et al., 2018). Similarly, another study of adults with type 2 diabetes found that greater use of maladaptive (i.e., catastrophizing) *and* adaptive (i.e., positive reappraisal) emotion regulation strategies were associated with greater odds of depressive symptoms – which are closely linked with diabetes distress (Fisher et al., 2014; Mocan et al., 2018). However, these studies used the Cognitive Emotion Regulation Questionnaire which measures respondents' use of emotion regulation strategies rather than their ability to

successfully regulate their negative emotional experiences, which are associated with greater diabetes related emotional distress.

In contrast, the present study used a model-based measure of individuals' ability to effectively regulate their negative emotions. Rather than focus on the extent to which individuals use strategies to regulate emotions, the present study evaluated the effectiveness of the utilization of emotion regulation strategies. As a result, our finding provides evidence to suggest greater difficulties in regulating emotions to be significantly associated with greater diabetes distress. Notably, this finding supports the hypothesized positive relationship between emotion regulation and diabetes distress proposed in this study and in one previous study (Kane et al., 2018).

Family Involvement and Diabetes Distress

Harmful and helpful family involvement were strongly and positively correlated with each other with greater diabetes distress. This pattern of findings suggests more family involvement of any type is associated with greater distress. However, contrary to hypothesis, helpful family involvement was not significantly associated with diabetes distress when controlling for harmful family involvement. A previous study found a consistent suppression effect whereby the relationship of each FIAD subscale with diabetes related outcomes (e.g., diabetes self-efficacy, self-care behaviors, and HbA1c) was strengthened when adjusting for the variance shared between both FIAD subscales (Mayberry et al., 2019). In contrast, in this study, the bivariate relationship between helpful family involvement and diabetes distress was completely attenuated when controlling for harmful family involvement indicating that the observed bivariate association between helpful family involvement and diabetes distress is driven by the strong positive correlation between harmful and helpful involvement. This discrepancy may be due to differences in the way harmful and helpful family involvement

impact diabetes distress compared to other diabetes outcomes such as self-management behaviors and glycemic control. For example, controlling for shared variance between types of family involvement (harmful vs. helpful) may elucidate the unique positive or negative association of each type of family involvement with patients' diabetes self-management behaviors and/or glycemic control. In contrast, in the context of the present study controlling for harmful family involvement may eliminate a potentially artefactual positive correlation between helpful family involvement and greater diabetes distress resulting from the high positive correlation between both types of family involvement. Overall, this pattern of findings suggests that helpful family involvement is not associated with greater diabetes distress, however, harmful family involvement is robustly associated with higher levels of diabetes distress.

However, the directional nature of this relationship remains unclear. Harmful family involvement may lead to greater negative emotions (e.g., anger, frustration, hopelessness) which in turn may contribute to heightened diabetes distress. Alternatively, patients who have suboptimal diabetes self-management or exhibit higher levels of diabetes distress may garner more attention and assistance from concerned family members. Although well intentioned, these supporters' efforts to help may be perceived by support recipients as unhelpful or unsupportive and may interfere with support recipients' diabetes self-management. It is also plausible that harmful family involvement may function as an antecedent of diabetes distress whereas helpful family involvement may be a consequence of high diabetes distress. The possibility that family members may provide more helpful types of support to individuals expressing high levels of diabetes distress is supported by findings from a recent study of patient-supporter dyads which found that patients with higher diabetes distress reported more frequent assistance from their supporters with self-management activities and coordination of medical care (Lee et al., 2020).

Overall, these findings suggest that decreasing harmful family involvement may be a comparatively more potent target of intervention to reduce diabetes distress than increasing the amount of helpful family involvement.

Interaction

We did not find evidence to support the hypothesized interaction of family involvement and difficulties in emotion regulation. These null findings suggest the impact of family involvement on diabetes distress is consistent across individuals with varying emotion regulation skills. One potential reason for this null finding may be deficits in emotion regulation, as measured by the DERS, do not reflect interpersonal forms of emotion regulation, which may be more impacted by family involvement. Deficits in intrapersonal emotion regulation may not impact the ways in which individuals interact with family members or friends regarding their diabetes self-management. However, interpersonal emotion regulation may moderate the relationship between type of family involvement and diabetes distress. For example, the relationship between harmful family involvement and higher diabetes distress may be significantly stronger among patients with greater use of interpersonal strategies to regulate negative emotions, whereas the relationship between helpful family involvement and lower diabetes distress may be significantly stronger among patients with greater use of interpersonal strategies to regulate negative emotions. Further studies should examine the role of interpersonal emotion regulation and its impact on family involvement and diabetes distress among adults with type 2 diabetes.

Limitations

Findings from this study should be interpreted in the context of five notable limitations. First, this study used a validated measure of family involvement in adults' diabetes which were

based on participants' retrospective self-report which may be susceptible to recall bias. Future studies could make use of ecological momentary assessment of family behaviors from patients and their family members to develop a more accurate and objective appraisal of family members' helpful and harmful involvement in patients' diabetes self-management behaviors. Second, the FIAD focuses on the family and friend involvement in diabetes care over the past month and thus, prior impactful harmful or helpful family involvement may not be considered. Third, this study used a cross-sectional design which does not permit inferences about the directionality of the relationships among study variables. For example, it is unclear whether family members help more with diabetes care when they perceive the patient to be distressed about their diabetes or whether greater involvement in diabetes care contributes to greater diabetes distress (Lee et al., 2020). Fourth, it is unclear how the COVID-19 pandemic influenced the results of this study as about a third of participants reported at least moderate levels of impairment due to COVID-19. Fifth, although participants were comprised of individuals who were reportedly diagnosed with type 2 diabetes and an attention check asked participants to verify their diagnosis of type 2 diabetes, we did not objectively verify participants' diagnoses.

Clinical Implications

The pattern of findings found in this study suggests that targeting emotion regulation skills through empirically supported interventions may have the potential to improve diabetes distress in adults – regardless of the type of family involvement. For example, teaching emotion regulation skills to adults with high levels of diabetes distress may ameliorate both the impacts of diabetes distress and diabetes itself. These findings need to be corroborated by longitudinal experimental studies to establish the directionality of family involvement and diabetes distress. However, if corroborated by future studies, the present findings suggest that efforts may best be

aimed at decreasing harmful family involvement instead of increasing helpful family involvement. For example, dyadic or family-based training programs to improve patient-family member communication may decrease the amount of harmful family involvement in patient's diabetes self-management and thus may help reduce patients' diabetes distress and improve associated cardiometabolic health outcomes.

LIST OF REFERENCES

Adriaanse, M., Dekker, J., Heine, R., Snoek, F. J., Beekman, A., Stehouwer, C., Bouter, L., Nijpels, G., & Pouwer, F. (2008). Symptoms of depression in people with impaired glucose metabolism or Type 2 diabetes mellitus: The Hoorn Study. *Diabetic Medicine, 25*(7), 843-849.

Afkarian, M., Sachs, M. C., Kestenbaum, B., Hirsch, I. B., Tuttle, K. R., Himmelfarb, J., & De Boer, I. H. (2013). Kidney disease and increased mortality risk in type 2 diabetes. *Journal of the American Society of Nephrology, 24*(2), 302-308.

Aikens, J. E. (2012). Prospective associations between emotional distress and poor outcomes in type 2 diabetes. *Diabetes Care, 35*(12), 2472-2478.

American Diabetes Association (2019). 5. Lifestyle management: standards of medical care in diabetes—2019. *Diabetes Care, 42*(Supplement 1), S46-S60.

Baek, R. N., Tanenbaum, M. L., & Gonzalez, J. S. (2014). Diabetes burden and diabetes distress: The buffering effect of social support. *Annals of Behavioral Medicine, 48*(2), 145-155.

Baig, A. A., Benitez, A., Quinn, M. T., & Burnet, D. L. (2015). Family interventions to improve diabetes outcomes for adults. *Annals of the New York Academy of Sciences, 1353*(1), 89-112.

Beck, R. W., Riddlesworth, T. D., Ruedy, K., Ahmann, A., Haller, S., Kruger, D., McGill, J. B., Polonsky, W., Price, D., & Aronoff, S. (2017). Continuous glucose monitoring versus usual care in patients with type 2 diabetes receiving multiple daily insulin injections: a randomized trial. *Annals of Internal Medicine, 167*(6), 365-374.

Bernstein, E. E., & McNally, R. J. (2017). Acute aerobic exercise helps overcome emotion regulation deficits. *Cognition and Emotion, 31*(4), 834-843.

Bond, G. E., Burr, R. L., Wolf, F. M., & Feldt, K. (2010). The effects of a web-based intervention on psychosocial well-being among adults aged 60 and older with diabetes. *The Diabetes Educator, 36*(3), 446-456.

Carper, M. M., Traeger, L., Gonzalez, J. S., Wexler, D. J., Psaros, C., & Safren, S. A. (2014). The differential associations of depression and diabetes distress with quality of life domains in type 2 diabetes. *Journal of Behavioral Medicine, 37*(3), 501-510.

Chew, B.-H., Vos, R. C., Pouwer, F., & Rutten, G. E. (2018). The associations between diabetes distress and self-efficacy, medication adherence, self-care activities and disease control depend on the way diabetes distress is measured: comparing the DDS-17, DDS-2 and the PAID-5. *Diabetes Research and Clinical Practice, 142*, 74-84.

Chin, Y. W., Lai, P. S. M., & Chia, Y. C. (2017). The validity and reliability of the English version of the diabetes distress scale for type 2 diabetes patients in Malaysia. *BMC Family Practice, 18*(1), 25.

Coccaro, E. F., Lazarus, S., Joseph, J., Wyne, K., Drossos, T., Phillipson, L., & de Groot, M. (2020). Emotional Regulation and Diabetes Distress in Adults With Type 1 and Type 2 Diabetes. *Diabetes Care, 44*(1), 20-25.

Coccaro, E. F., Lazarus, S., Joseph, J., Wyne, K., Drossos, T., Phillipson, L., & de Groot, M. (2021). Emotional Regulation and Diabetes Distress in Adults With Type 1 and Type 2 Diabetes. *Diabetes Care, 44*(1), 20-25.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 385-396.

Cooper, C. L., Phillips, L. H., Johnston, M., Whyte, M., & MacLeod, M. J. (2015). The role of emotion regulation on social participation following stroke. *British Journal of Clinical Psychology, 54*(2), 181-199.

Corp, I. (2019). *IBM SPSS Statistics for Windows* (Version 26.0) IBM Corp.

Crockett, A. C., Myhre, S. K., & Rokke, P. D. (2015). Boredom proneness and emotion regulation predict emotional eating. *Journal of Health Psychology, 20*(5), 670-680.

Dall, T. M., Zhang, Y., Chen, Y. J., Quick, W. W., Yang, W. G., & Fogli, J. (2010). The economic burden of diabetes. *Health affairs, 29*(2), 297-303.

Davies, M., Brophy, S., Williams, R., & Taylor, A. (2006). The prevalence, severity, and impact of painful diabetic peripheral neuropathy in type 2 diabetes. *Diabetes Care, 29*(7), 1518-1522.

De Marco, R., Locatelli, F., Zoppini, G., Verlato, G., Bonora, E., & Muggeo, M. (1999). Cause-specific mortality in type 2 diabetes. The Verona Diabetes Study. *Diabetes Care, 22*(5), 756-761.

Dennick, K., Sturt, J., & Speight, J. (2017). What is diabetes distress and how can we measure it? A narrative review and conceptual model. *Journal of Diabetes and its Complications, 31*(5), 898-911.

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*(2), 175-191.

Fisher, L., Gonzalez, J., & Polonsky, W. (2014). The confusing tale of depression and distress in patients with diabetes: a call for greater clarity and precision. *Diabetic Medicine, 31*(7), 764-772.

Fisher, L., Hessler, D., Glasgow, R. E., Arean, P. A., Masharani, U., Naranjo, D., & Strycker, L. A. (2013). REDEEM: a pragmatic trial to reduce diabetes distress. *Diabetes Care, 36*(9), 2551-2558.

Fisher, L., Hessler, D., Polonsky, W., Strycker, L., Guzman, S., Bowyer, V., Blumer, I., & Masharani, U. (2018). Emotion regulation contributes to the development of diabetes distress among adults with type 1 diabetes. *Patient education and counseling, 101*(1), 124-131.

Fisher, L., Hessler, D. M., Polonsky, W. H., & Mullan, J. (2012). When is diabetes distress clinically meaningful?: establishing cut points for the Diabetes Distress Scale. *Diabetes Care, 35*(2), 259-264.

Fisher, L., Mullan, J. T., Arean, P., Glasgow, R. E., Hessler, D., & Masharani, U. (2010). Diabetes distress but not clinical depression or depressive symptoms is associated with glycemic control in both cross-sectional and longitudinal analyses. *Diabetes Care, 33*(1), 23-28.

Fisher, L., Polonsky, W., & Hessler, D. (2019). Addressing diabetes distress in clinical care: a practical guide. *Diabetic Medicine, 36*(7), 803-812.

Fisher, L., Skaff, M., Mullan, J., Arean, P., Glasgow, R., & Masharani, U. (2008). A longitudinal study of affective and anxiety disorders, depressive affect and diabetes distress in adults with type 2 diabetes. *Diabetic Medicine, 25*(9), 1096-1101.

Funnell, M. M., Bootle, S., & Stuckey, H. L. (2015). The diabetes attitudes, wishes and needs second study. *Clinical Diabetes, 33*(1), 32-36.

Funnell, M. M., Brown, T. L., Childs, B. P., Haas, L. B., Hosey, G. M., Jensen, B., Maryniuk, M., Peyrot, M., Piette, J. D., & Reader, D. (2008). National standards for diabetes self-management education. *Diabetes Care, 31*(Supplement 1), S97-S104.

Gianini, L. M., White, M. A., & Masheb, R. M. (2013). Eating pathology, emotion regulation, and emotional overeating in obese adults with binge eating disorder. *Eating Behaviors, 14*(3), 309-313.

Gonzalez, J. S., Shreck, E., Psaros, C., & Safren, S. (2014). Distress and Diabetes Treatment Adherence: A Mediating Role for Perceived Control in Adults with Type 2 Diabetes (822-P). *Nederlands Tijdschrift voor Diabetologie, 12*(4), 26-27.

Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment, 26*(1), 41-54.

Harris, M. A., Wysocki, T., Sadler, M., Wilkinson, K., Harvey, L. M., Buckloh, L. M., Mauras, N., & White, N. H. (2000). Validation of a structured interview for the assessment of diabetes self-management. *Diabetes Care, 23*(9), 1301-1304.

Hoaglin, D. C., & Iglewicz, B. (1987). Fine-tuning some resistant rules for outlier labeling. *Journal of the American Statistical Association, 82*(400), 1147-1149.

Hu, T., Zhang, D., Wang, J., Mistry, R., Ran, G., & Wang, X. (2014). Relation between emotion regulation and mental health: a meta-analysis review. *Psychological Reports, 114*(2), 341-362.

Jannoo, Z., Wah, Y. B., Lazim, A. M., & Hassali, M. A. (2017). Examining diabetes distress, medication adherence, diabetes self-care activities, diabetes-specific quality of life and

health-related quality of life among type 2 diabetes mellitus patients. *Journal of Clinical & Translational Endocrinology, 9*, 48-54.

Kane, N., Hoogendoorn, C., Tanenbaum, M., & Gonzalez, J. (2018). Physical symptom complaints, cognitive emotion regulation strategies, self-compassion and diabetes distress among adults with Type 2 diabetes. *Diabetic Medicine, 35*(12), 1671-1677.

King, D. K., Glasgow, R. E., Toobert, D. J., Strycker, L. A., Estabrooks, P. A., Osuna, D., & Faber, A. J. (2010). Self-efficacy, problem solving, and social-environmental support are associated with diabetes self-management behaviors. *Diabetes Care*, *33*(4), 751-753.

Langa, K. M., Vijan, S., Hayward, R. A., Chernew, M. E., Blaum, C. S., Kabeto, M. U., Weir, D. R., Katz, S. J., Willis, R. J., & Fendrick, A. M. (2002). Informal caregiving for diabetes and diabetic complications among elderly Americans. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 57*(3), S177-S186.

Lee, A. A., Heisler, M., Trivedi, R., Obrosky, D. S., Mor, M. K., Piette, J. D., & Rosland, A.-M. (2020). Diabetes Distress Among Dyads of Patients and Their Health Supporters: Links With Functional Support, Metabolic Outcomes, and Cardiac Risk. *Annals of Behavioral Medicine*.

Lee, A. A., Piette, J. D., Heisler, M., Janevic, M. R., Langa, K. M., & Rosland, A. M. (2017). Family members' experiences supporting adults with chronic illness: A national survey. *Families, Systems, & Health, 35*(4), 463.

Lee, A. A., Piette, J. D., Heisler, M., Janevic, M. R., & Rosland, A.-M. (2019). Diabetes self-management and glycemic control: The role of autonomy support from informal health supporters. *Health Psychology, 38*(2), 122.

Lee, A. A., Piette, J. D., Heisler, M., & Rosland, A. M. (2018). Diabetes distress and glycemic control: The buffering effect of autonomy support from important family members and friends. *Diabetes Care, 41*(6), 1157-1163.

Lee, R., Wong, T. Y., & Sabanayagam, C. (2015). Epidemiology of diabetic retinopathy, diabetic macular edema and related vision loss. *Eye and Vision, 2*(1), 17.

Lopes, P. N., Salovey, P., Côté, S., Beers, M., & Petty, R. E. (2005). Emotion regulation abilities and the quality of social interaction. *Emotion, 5*(1), 113.

Mayberry, L. S., Berg, C. A., Greevy Jr, R. A., & Wallston, K. A. (2019). Assessing helpful and harmful family and friend involvement in adults' type 2 diabetes self-management. *Patient education and counseling, 102*(7), 1380-1388.

Mayberry, L. S., & Osborn, C. Y. (2012). Family support, medication adherence, and glycemic control among adults with type 2 diabetes. *Diabetes Care, 35*(6), 1239-1245.

Mayberry, L. S., Rothman, R. L., & Osborn, C. Y. (2014). Family members' obstructive behaviors appear to be more harmful among adults with type 2 diabetes and limited health literacy. *Journal of Health Communication, 19*(sup2), 132-143.

McEwen, M. M., Pasvogel, A., Gallegos, G., & Barrera, L. (2010). Type 2 diabetes Self-Management social support intervention at the US-Mexico border. *Public Health Nursing, 27*(4), 310-319.

Mocan, A. Ş., Iancu, S. Ş., & Băban, A. S. (2018). Association of cognitive-emotional regulation strategies to depressive symptoms in type 2 diabetes patients. *Romanian Journal of Internal Medicine, 56*(1), 34-40.

Morrish, N., Wang, S.-L., Stevens, L., Fuller, J., Keen, H., & Group, W. M. S. (2001). Mortality and causes of death in the WHO Multinational Study of Vascular Disease in Diabetes. *Diabetologia, 44*(2), S14.

Nicklett, E. J., & Liang, J. (2010). Diabetes-related support, regimen adherence, and health decline among older adults. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 65*(3), 390-399.

Ogbera, A., & Adeyemi-Doro, A. (2011). Emotional distress is associated with poor self care in type 2 diabetes mellitus. *Journal of Diabetes, 3*(4), 348-352.

Peyrot, M., Egede, L. E., Campos, C., Cannon, A. J., Funnell, M. M., Hsu, W. C., Ruggiero, L., Siminerio, L. M., & Stuckey, H. L. (2014). Ethnic differences in psychological outcomes among people with diabetes: USA results from the second Diabetes Attitudes, Wishes, and Needs (DAWN2) study. *Current Medical Research and Opinion, 30*(11), 2241-2254.

Phillips, L. H., Saldias, A., McCarrey, A., Henry, J. D., Scott, C., Summers, F., & Whyte, M. (2009). Attentional lapses, emotional regulation and quality of life in multiple sclerosis. *British Journal of Clinical Psychology, 48*(1), 101-106.

Polonsky, W. H., Fisher, L., Earles, J., Dudl, R. J., Lees, J., Mullan, J., & Jackson, R. A. (2005). Assessing psychosocial distress in diabetes: development of the diabetes distress scale. *Diabetes Care, 28*(3), 626-631.

Rosland, A. M., Heisler, M., Choi, H. J., Silveira, M. J., & Piette, J. D. (2010). Family influences on self-management among functionally independent adults with diabetes or heart failure: do family members hinder as much as they help? *Chronic Illness, 6*(1), 22-33.

Rosland, A.-M., Heisler, M., & Piette, J. D. (2012). The impact of family behaviors and communication patterns on chronic illness outcomes: a systematic review. *Journal of Behavioral Medicine, 35*(2), 221-239.

Rosland, A.-M., Kieffer, E., Israel, B., Cofield, M., Palmisano, G., Sinco, B., Spencer, M., & Heisler, M. (2008). When is social support important? The association of family support and professional support with specific diabetes self-management behaviors. *Journal of General Internal Medicine, 23*(12), 1992-1999.

Rosland, A. M., Piette, J. D., Lyles, C. R., Parker, M. M., Moffet, H. H., Adler, N. E., Schillinger, D., & Karter, A. J. (2014). Social support and lifestyle vs. medical diabetes self-management in the Diabetes Study of Northern California (DISTANCE). *Annals of Behavioral Medicine, 48*(3), 438-447.

Sacco, W. P., & Yanover, T. (2006). Diabetes and depression: the role of social support and medical symptoms. *Journal of Behavioral Medicine, 29*(6), 523-531.

Sakib, N., Bhuiyan, A. I., Hossain, S., Al Mamun, F., Hosen, I., Abdullah, A. H., Sarker, M. A., Mohiuddin, M. S., Rayhan, I., & Hossain, M. (2020). Psychometric validation of the Bangla Fear of COVID-19 Scale: Confirmatory factor analysis and Rasch analysis. *International Journal of Mental Health and Addiction*, 1-12.

Shaw, B. A., Gallant, M. P., Riley-Jacome, M., & Spokane, L. S. (2006). Assessing sources of support for diabetes self-care in urban and rural underserved communities. *Journal of Community Health, 31*(5), 393-412.

Sloan, E., Hall, K., Moulding, R., Bryce, S., Mildred, H., & Staiger, P. K. (2017). Emotion regulation as a transdiagnostic treatment construct across anxiety, depression, substance,

eating and borderline personality disorders: A systematic review. *Clinical Psychology Review, 57*, 141-163.

Sowers, J. R., Epstein, M., & Frohlich, E. D. (2001). Diabetes, hypertension, and cardiovascular disease: an update. *Hypertension, 37*(4), 1053-1059.

Strom, J. L., & Egede, L. E. (2012). The impact of social support on outcomes in adult patients with type 2 diabetes: a systematic review. *Current Diabetes Reports, 12*(6), 769-781.

Sturt, J., Dennick, K., Hessler, D., Hunter, B. M., Oliver, J., & Fisher, L. (2015). Effective interventions for reducing diabetes distress: systematic review and meta-analysis. *International Diabetes Nursing, 12*(2), 40-55.

Tang, T. S., Brown, M. B., Funnell, M. M., & Anderson, R. M. (2008). Social support, quality of life, and self-care behaviors among African Americans with type 2 diabetes. *The Diabetes Educator, 34*(2), 266-276.

Torenholt, R., Schwennesen, N., & Willaing, I. (2014). Lost in translation—the role of family in interventions among adults with diabetes: a systematic review. *Diabetic Medicine, 31*(1), 15-23.

Trief, P., Sandberg, J. G., Ploutz-Snyder, R., Brittain, R., Cibula, D., Scales, K., & Weinstock, R. S. (2011). Promoting couples collaboration in type 2 diabetes: the diabetes support project pilot data. *Families, Systems, & Health, 29*(3), 253.

Tsujii, S., Hayashino, Y., & Ishii, H. (2012). Diabetes distress, but not depressive symptoms, is associated with glycaemic control among Japanese patients with type 2 diabetes: Diabetes Distress and Care Registry at Tenri (DDCRT 1). *Diabetic Medicine, 29*(11), 1451-1455.

van Middendorp, H., Geenen, R., Sorbi, M. J., Hox, J. J., Vingerhoets, A. J., van Doornen, L. J., & Bijlsma, J. W. (2005). Styles of emotion regulation and their associations with perceived health in patients with rheumatoid arthritis. *Annals of Behavioral Medicine, 30*(1), 44-53.

Wen, L. K., Parchman, M. L., & Shepherd, M. D. (2004). Family support and diet barriers among older Hispanic adults with type 2 diabetes. *Family Medicine, 36*, 423-430.

Wen, L. K., Shepherd, M. D., & Parchman, M. L. (2004). Family support, diet, and exercise among older Mexican Americans with type 2 diabetes. *The Diabetes Educator, 30*(6), 980-993.

Wierenga, K. L., Lehto, R. H., & Given, B. (2017). Emotion regulation in chronic disease populations: an integrative review. *Research and Theory for Nursing Practice, 31*(3), 247-271.

Winchester, R. J., Williams, J. S., Wolfman, T. E., & Egede, L. E. (2016). Depressive symptoms, serious psychological distress, diabetes distress and cardiovascular risk factor control in patients with type 2 diabetes. *Journal of Diabetes and its Complications, 30*(2), 312-317.

Wolever, R., Dreusicke, M., Fikkan, J., Hawkins, T., Yeung, S., Wakefield, J., Duda, L., Flowers, P., Cook, C., & Skinner, E. (2010). Integrative health coaching for patients with type 2 diabetes. *The Diabetes Educator, 36*(4), 629-639.

LIST OF APPENDICES

Table 1.

Participant Characteristics (N = 373)

	Type 2 Diabetes (*N* = 373)
	% (*n*)
Age[a]	54.9 (15.67)
Sex - Female	56.8 (212)
Race	
White	78.6 (293)
Black	12.6 (47)
Asian	3.5 (13)
American Indian	1.1 (4)
Ethnicity	
Hispanic/Latino	9.9 (37)
Education	
8th grade or less	.3 (1)
Some high school, but did not graduate	1.9 (7)
High school graduate or GED	20.1 (75)
Some college or 2-year college degree	35.1 (131)
4-year college graduate	25.5 (95)
More than 4-year college degree	17.2 (64)
Current Income	
< $15,000	9.4 (35)
$15,000-30,000	20.1 (75)
$30,000-50,000	19.8 (74)
$50,000-75,000	20.9 (78)
>$75,000	29.8 (111)
Insulin Use	38.9 (144)
Primary Care Provider	97.1 (362)
Health Insurance	95.2 (355)

Note. [a]Mean (*SD*)

Table 2.

Bivariate Correlations of Independent Variables

	M (*SD*)	1	2	3	4	5
1. DDS	2.40 (1.33)	-				
2. Insulin	0.39 (0.49)	.27**	-			
3. PSS-4	2.62 (0.77)	.48**	.16*	-		
4. DERS	83.71 (28.05)	.66**	.26**	.70**	-	
5. FIAD (Harmful)	1.87 (1.04)	.61**	.35**	.28**	.53**	-
6. FIAD (Helpful)	2.06 (1.17)	.51**	.33**	.19**	.44**	.80**

DDS = Diabetes Distress Scale; PSS-4 = Perceived Stress Scale 4; DERS = Difficulties in Emotion Regulation Scale; FIAD = Family and Friend Involvement in Adults' Diabetes.

Note: *$p < .01$, **$p < .001$

Table 3.

Hierarchical Linear Regression Model Examining the Interaction between Difficulties in Emotion Regulation (DERS) and Harmful Family Involvement (FIAD) to Predict Diabetes Distress (DDS-17)

	Diabetes Distress Scale (n = 370)				
	B	*SE*	*p*	*95% CI*	
Step 1					
General Stress (PSS-4)	0.77	0.08	<.001	0.62	0.93
Insulin Use	0.54	0.12	<.001	0.30	0.79
Step 2					
DERS	0.02	0.00	<.001	0.01	0.02
FIAD (Harmful)	0.42	0.08	<.001	0.26	0.58
FIAD (Helpful)	0.05	0.07	.437	-0.08	0.19
Step 3					
DERS x FIAD (Harmful)	0.00	0.00	.403	-0.01	0.00

PSS-4 = Perceived Stress Scale 4; DERS = Difficulties in Emotion Regulation Scale;
FIAD = Family and Friend Involvement in Adults' Diabetes.

Table 4.

Hierarchical Linear Regression Model Examining the Interaction between Difficulties in Emotion Regulation (DERS) and Helpful Family Involvement (FIAD) to Predict Diabetes Distress (DDS-17)

	Diabetes Distress Scale (n = 370)				
	B	*SE*	*p*	*95% CI*	
Step 1					
General Stress (PSS-4)	0.77	0.08	<.001	0.62	0.93
Insulin Use	0.54	0.12	<.001	0.30	0.79
Step 2					
DERS	0.02	0.00	<.001	0.01	0.02
FIAD (Harmful)	0.42	0.08	<.001	0.26	0.58
FIAD (Helpful)	0.05	0.07	.437	-0.08	0.19
Step 3					
DERS x FIAD (Helpful)	0.00	0.00	.148	-0.01	0.00

PSS-4 = Perceived Stress Scale 4; DERS = Difficulties in Emotion Regulation Scale;
FIAD = Family and Friend Involvement in Adults' Diabetes.

APPENDIX A: INFORMED CONSENT

Title: Cognitive and Affective Components of Diabetes Distress and Self-Management

Investigator
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(662) 915-2975

☐ *By checking this box I certify that I am 18 years of age or older.*

Description

The purpose of this research project is to determine how people tend to think and feel related to the way that they experience stress about their diabetes and diabetes self-care activities. We would like to ask you questions about the way you think and feel about your diabetes. You will not be asked for your name or any other identifying information.

Cost and Payments

It will take you approximately 20 minutes to complete this survey. You will be compensated by in the manner described on the website through which you reached the survey.

Risks and Benefits

It is possible that you may feel uncomfortable with some of the questions about your diabetes. We do not think that there are any other risks. Your participation in this study will help us to better understand the link between thoughts, emotions, diabetes related stress and self-care.

Confidentiality

No uniquely identifiable information will be recorded. Therefore, we do not think you can be identified from this study.

Right to Withdraw

You do not have to participate in this study, and there is no penalty if you refuse. If you start the study and decide that you do not want to finish, just end the online task. Whether or not you participate or withdraw will not affect your current or future relationship with the University of Mississippi, and it will not cause you to lose any benefits to which you are entitled.

IRB Approval

This study has been reviewed by The University of Mississippi's Institutional Review Board (IRB). If you have any questions, concerns, or reports regarding your rights as a participant of research, please contact the IRB at (662) 915-7482 or irb@olemiss.edu.

Statement of Consent

I have read and understand the above information. By completing the survey, I consent to participate in the study.

☐ **YES**

☐ **NO**

APPENDIX B: DIABETES DISTRESS SCALE (DDS-17)

1. Feeling that diabetes is taking up too much of my mental and physical energy every day.
2. Feeling that my doctor doesn't know enough about diabetes and diabetes care.
3. Not feeling confident in my day-to-day ability to manage diabetes.
4. Feeling angry, scared and/or depressed when I think about living with diabetes.
5. Feeling that my doctor doesn't give me clear enough directions on how to manage my diabetes.
6. Feeling that I am not testing my blood sugars frequently enough.
7. Feeling that I will end up with serious long-term complications, no matter what I do.
8. Feeling that I am often failing with my diabetes routine.
9. Feeling that friends or family are not supportive enough of self-care efforts (e.g. planning activities that conflict with my schedule, encouraging me to eat the "wrong" foods).
10. Feeling that diabetes controls my life.
11. Feeling that my doctor doesn't take my concerns seriously enough.
12. Feeling that I am not sticking closely enough to a good meal plan.
13. Feeling that friends or family don't appreciate how difficult living with diabetes can be.
14. Feeling overwhelmed by the demands of living with diabetes.
15. Feeling that I don't have a doctor who I can see regularly enough about my diabetes.
16. Not feeling motivated to keep up my diabetes self-management.
17. Feeling that friends or family don't give me the emotional support that I would like.

Response options: 1 – Not a Problem, 2 – A Slight Problem, 3 – A Moderate Problem, 4 – Somewhat Serious Problem, 5 – A Serious Problem, 6 – A Very Serious Problem

APPENDIX C: FAMILY AND FRIEND INVOLVEMENT IN ADULTS' DIABETES (FIAD)

How often do your friends or family members…

1. exercise with you or ask you to exercise with them?
2. point out in front of others when you are eating unhealthy foods, like at a party or get together?
3. gently talk with you about taking care of your diabetes?
4. help you decide if changes should be made based on your blood sugar testing results?
5. bring foods around that you shouldn't be eating?
6. tell you diabetes is your problem to deal with on your own?
7. ask how they can help you with your diabetes?
8. suggest things that might help you take your diabetes medicine when you are supposed to?
9. argue with you about your food choices or your health?
10. praise you for eating healthy foods or following your exercise routine?
11. criticize you for not testing your blood sugar?
12. help you choose healthy foods, by reading food labels or helping you choose from a menu?
13. criticize you for not exercising?
14. prepare or plan healthy foods to help with your recommended diet?
15. suggest you don't need to take your diabetes medicine?
16. take on one of your responsibilities, so you can have time to exercise?

Response options: 1 – Never in the past month, 2 – Once in the past month, 3 – Two or three times in the past month, 4 – Once each week, 5 – Twice or more each week

APPENDIX D: DIFFICULTIES IN EMOTION REGULATION SCALE (DERS)

Please indicate how often the following statements apply to you by selecting the appropriate option from the scale below:

1. I am clear about my feelings.
2. I pay attention to how I feel.
3. I experience my emotions as overwhelming and out of control.
4. I have no idea how I am feeling.
5. I have difficulty making sense out of my feelings.
6. I am attentive to my feelings.
7. I know exactly how I am feeling.
8. I care about what I am feeling.
9. I am confused about how I feel.
10. When I'm upset, I acknowledge my emotions.
11. When I'm upset, I become angry with myself for feeling that way.
12. When I'm upset, I become embarrassed for feeling that way.
13. When I'm upset, I have difficulty getting work done.
14. When I'm upset, I become out of control.
15. When I'm upset, I believe that I will remain that way for a long time.
16. When I'm upset, I believe that I will end up feeling very depressed.
17. When I'm upset, I believe that my feelings are valid and important.
18. When I'm upset, I have difficulty focusing on other things.
19. When I'm upset, I feel out of control.
20. When I'm upset, I can still get things done.
21. When I'm upset, I feel ashamed at myself for feeling that way.
22. When I'm upset, I know that I can find a way to eventually feel better.
23. When I'm upset, I feel like I am weak.
24. When I'm upset, I feel like I can remain in control of my behaviors.
25. When I'm upset, I feel guilty for feeling that way.
26. When I'm upset, I have difficulty concentrating.
27. When I'm upset, I have difficulty controlling my behaviors.
28. When I'm upset, I believe that there is nothing I can do to make myself feel better.
29. When I'm upset, I become irritated at myself for feeling that way.

30. When I’m upset, I start to feel very bad about myself.

Response options: 1 – Almost never to 5 – Almost always

APPENDIX E: SHORT FORM PERCEIVED STRESS SCALE (PSS-4)

1. How often have you felt that you are unable to control the important things in your life?
2. How often have you felt confident about your ability to handle your personal problems?
3. How often have you felt that things were going your way?
4. How often have you felt difficulties were piling up so high that you could not overcome them?

Response options: 1 – Never, 2 – Almost never, 3 – Sometimes, 4 – Fairly often, 5 – Very often

APPENDIX F: FEAR OF CORONAVIRUS-19 SCALE

1. I am most afraid of coronavirus-19.
2. It makes me uncomfortable to think about coronavirus-19.
3. My hands become clammy when I think about coronavirus-19.
4. I am afraid of losing my life because of coronavirus-19.
5. When watching news and stories about coronavirus-19 on social media, I become nervous or anxious.
6. I cannot sleep because I'm worried about getting coronavirus-19.
7. My heart races or palpitates when I think about getting coronavirus-19.

Response options: 1 – Strongly disagree, 2 – Disagree, 3 – Neither agree nor disagree, 4 – Agree, 5 – Strongly agree

APPENDIX G: CORONAVIRUS-19 INFLUENCE ON DIABETES

1. To what extent has the coronavirus pandemic negatively influenced your diabetes self-care activities?
2. To what extent has the coronavirus pandemic negatively influenced your ability to get help from family members and friends with your diabetes self-care?
3. To what extent has the coronavirus pandemic negatively influenced your ability to cope with the stress associated with having diabetes?

Response options: 1 – Very slightly or not at all, 2 – A little, 3 – Moderately, 4 – Quite a bit, 5 – Extremely

PATRIC JUSTIN LEUKEL
CURRICULUM VITAE

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EDUCATION

2019 – Present
Doctor of Philosophy, Clinical Psychology (expected May 2023)
Master of Arts, Clinical Psychology (expected May 2021)
University of Mississippi – Oxford, Mississippi
Advisor: Aaron Lee, Ph.D.

2014 – 2019
Bachelor of Science, Psychology
Bachelor of Science, Biology
Minor: Chemistry
Southern Utah University – Cedar City, Utah
Cumulative GPA: 3.8
Psychology GPA: 4.0

RESEARCH INTERESTS

- Emotion dysregulation disease self-management and outcomes
- Chronic disease related distress and its impact on disease self-management and quality of life

PUBLICATIONS

Witcraft, S. M., Dixon, L. J., **Leukel, P. J.**, & Lee, A. A. (2021). Anxiety sensitivity and respiratory disease outcomes among individuals with chronic obstructive pulmonary disease. *General Hospital Psychiatry*, *69*, 1-6.

Lee, A. A., Heisler, M., **Leukel, P. J.**, Mor, M., Obrosky, S., Rosland, A. M. (2020). Autonomy support from informal health supporters: Links with self-care activities, healthcare engagement, metabolic outcomes, and cardiac risk among patients with type 2 diabetes. *Manuscript under review*.

CONFERENCE TALKS

Leukel, P. J., Kollin, S. R., Lewis, B. R., & Lee, A. A. (2021, April). Interpersonal Emotion Regulation, Family Involvement, & Diabetes Distress. Virtual Blitz Talk at the 42nd Annual Meeting and Scientific Sessions of the Society of Behavioral Medicine, San Francisco, CA.

Leukel, P. J., Lim, C., Lee, A. A. (2020, October). The Influence of Emotion Regulation and Family Involvement on Diabetes Distress among Adults with Type 2 Diabetes. In C. Lim (Chair), *Psychological Functioning, Health Behaviors, and Cardiometabolic Outcomes: Research Findings from Across the Lifespan.* Symposium presented at the Mississippi Psychological Association Annual Conference, Virtual Meeting.

Lee, A. A., **Leukel, P. J.**, Lim, C., Rosland, A. M. (2020, October). Autonomy support among patients with diabetes: Links with diabetes self-care activities, metabolic outcomes, and 5-year cardiac risk. In C. Lim (Chair), *Psychological Functioning, Health Behaviors, and Cardiometabolic Outcomes: Research Findings from Across the Lifespan.* Symposium presented at the Mississippi Psychological Association Annual Conference, Virtual Meeting.

CONFERENCE POSTERS

Leukel, P. J., Rosland, A. M., Lee, A. A. (2020, April). *Examining differences in anxiety sensitivity and emotion regulation among adults with asthma and COPD*. Poster accepted at the 41st Annual Meeting and Scientific Sessions of the Society of Behavioral Medicine, San Francisco, CA.

Lee, A. A., **Leukel, P. J.**, Rosland, A. M. (2020, April). *Emotion regulation and anxiety sensitivity among adults with asthma and COPD: Links with symptoms and acute medical service use*. Poster accepted at the 41st Annual Meeting and Scientific Sessions of the Society of Behavioral Medicine, San Francisco, CA.

Lee, A. A., Heisler, M., **Leukel, P. J.**, Mor, M., Obrovsky, D. S., Rosland, A. M. (2020, April). *Autonomy support among patients with diabetes: Links with diabetes self-care, metabolic outcomes, and 5-year cardiac risk.* Poster accepted at the 41st Annual Meeting and Scientific Sessions of the Society of Behavioral Medicine, San Francisco, CA.

Leukel, P. J., Hatch, D. (2019, April). *The impact of religiosity and pornography addiction on shame, anxiety, and hope based on gender.* Poster session at the Rocky Mountain Psychological Association annual conference.

Leukel, P. J., Koenig, B. (2019, April). *Influence of cleanliness on moral judgements: A preregistered, direct replication of Schnall, Benton, and Harvey (2008).* Poster session at the Rocky Mountain Psychological Association annual conference.

Leukel, P. J., Timmons, T., Grimes, M. (2019, April). *Alternate form of the subjective happiness scale.* Poster session at the Rocky Mountain Psychological Association annual conference.

Leukel, P. J., Ashworth, A., Hatch, D. (2019, April). *The impact of religiosity and pornography Addiction on Shame, Anxiety, and Hope based on Gender*. Poster session at the Festival of Excellence (FoE) annual conference.

RESEARCH EXPERIENCES

Thesis Research 2019 - Present
Influence of Emotion Regulation and Family Involvement on Diabetes Distress among Adults with Type 2 Diabetes
Psychological and Social Influences of Chronic Health Conditions (PSICH) Lab
University of Mississippi, MS
Supervisor: Aaron Lee, Ph.D.

- Successfully defended the master thesis in April of 2021.

Research Assistant Fall 2019 – Present
Psychological and Social Influences of Chronic Health Conditions (PSICH) Lab
University of Mississippi, MS
Advisor: Aaron Lee, Ph.D.

- Provided mentorship to an undergraduate honors student including assistance with data analysis as well as with writing and editing drafts of honors thesis.
- Assisted with IRB applications
- Programming surveys in Qualtrics
- Contributed to the building of the lab (e.g., lab website, lab equipment, prospective research projects)

Research Assistant Fall 2017 – 2019
Sexual Perception Manipulation

- Leading research assistant for a project about sexual perception manipulation under the leadership of Dr. Bryan Koenig and Dr. Garrett Strosser. This study explored the influences of sexual interest on projecting those sexual interests towards the opposite sex. We did so by using an experimental manipulation of men's sexual interest towards women by manipulating the amount of make-up the women were wearing during a speed-dating event.
- I oversaw the IRB application, participated in the preregistration, and set-up the project in the Open Science Framework (OSF), conducted the literature review, and collected data.

Research Assistant Fall 2018 – 2019
The Impact of Religiosity and Pornography on Depression

- Leading research assistant for a project about the consequences of the association between religiosity and pornography use. Sequential multiple regression was conducted on already-collected data with the added variable of gender.

Research Assistant Fall 2018 - 2019

Alternate Form of the Subjective Happiness Scale

- Research on the alternate reliability and criterion validity of the Subjective Happiness Scale (Lyubomirsky & Lepper, 1999).
- Reviewed the literature, created the questionnaire for the alternate form and criterion variables in Qualtrics, and recruited participants on SONA.

Team Coordinator Spring 2018

Influence of Cleanliness on Moral Judgements: A Direct Replication

- Team coordinator for a direct replication study about the influence of cleanliness on moral judgements by Schnall, Benton, and Harvey (2008). The original study found that physical feelings of cleanliness significantly lessened the severity of moral judgements. We failed to replicate those results and instead found no evidence to suggest that physical cleanliness lessens the severity of moral judgements.
- Completed the preregistration, organized the data collection, collected and analyzed the data. I wrote an individual APA style research report on the study.

TEACHING EXPERIENCE

Teaching Assistant: General Psychology Spring 2019

University of Mississippi, Oxford, MS

Supervisor: Jennifer Caldwell, Ph.D.

- Graded weekly assignments and biweekly exams
- Assisted students with assignments

Teaching Assistant: Research Design Fall 2018

Southern Utah University, Cedar City, UT

Supervisor: Bryan Koenig, Ph.D.

- Assisted in the teaching of Research Design (Psy-3410 Psy-3415)
- Graded daily assignments, exams, and lab-related assignments
- Revised the syllabus
- Assisted students in their replication studies

Teaching Assistant: Lifespan Development Fall 2018

Southern Utah University, Cedar City, UT

Supervisor: Bryan Koenig, Ph.D.

- Assisted in the teaching of Lifespan Development (Psy-1100)
- Graded daily assignments, exams, and lab-related assignments.
- Revised the syllabus

CLINICAL WORK EXPERIENCE

Head Start Mental Health Consultant January 2021-Present

- I serve as a mental health consultant at several Head Start centers, which prepares vulnerable young children, age birth to 5, to succeed in school and in life beyond school.

North Mississippi Regional Center Intern Therapist July 2020-Present

- I counseled, provided functional assessments, as well as intellectual and ability assessments of individuals with intellectual and developmental disabilities.

Upward Bound Tutor/Supervisor Summer 2018

- My primary roles were to tutor, monitor, mentor, and interact with impoverished adolescent students with a Navajo background. The students attended college-level classes in German, English, Math, Biology, and Communication. I led daily tutoring sessions in German and English and lived among the students in order to provide guidance and encourage academic excellence. I worked closely with my supervisor to bridge the gap between student and professor. I provided weekly progress reports to the professor and informed the director of the program about students' socialization and academic progress.

CLINICAL VOLUNTEER EXPERIENCES

Canyon Creek Services Practicum Fall 2018 - 2019

- Worked alongside the staff at the shelter for victims of domestic violence and/or sexual abuse. I helped children with homework, helped emergency clients with basic requests, and overall ensured that the shelter felt safe and welcoming to the habitants.

Cultural Immersion Practicum – Four Corners Spring 2017

- As part of the Rural Health Scholars, I shadowed several physicians in four hospitals in Four Corners, New Mexico that served local Native American patients. The majority of cases were patients with chronic pain, teenage pregnancies, and individuals with substance abuse.

Camp Kesem Counselor and Member of the Operations Committee 2015-2017

- Camp Kesem is a national program that organizes a summer camp for children whose parents are currently suffering, have suffered, or have died from cancer. The camp provided a support network individuals who have had a family member affected by cancer. As part of the Operations committee, I created the schedule and organized the activities for the summer camps. I attended the camp as a counselor in the summers of 2016 and 2017. I was in charge of the 15 to 17-year-old male campers.

Delete Blood Cancer Volunteer Fall 2015 & 2016

- Delete Blood Cancer is a program that attempts to provide a matching donor for all blood cancer patients who are in need of a blood stem cell donation. I helped organize the blood drive at Southern Utah University. I assisted volunteers in filling out the required consent

forms and swabbed their cheeks for a saliva sample in order to determine a potential match.

HONORS AND AWARDS

Graduate School Fellowship Recruiting Award	Fall 2019 - Present
Academic Dean's List	Fall 2017
Steven & Pamela Crowther Scholarship	2015-2016

PROFESSIONAL MEMBERSHIPS

Member of Psi Chi	2017 - Present
Member of Rural Health Scholars	2015 – 2017

SPECIAL TRAINING

Proficiency in SPSS
Qualtrics Research Software
SONA
NIH Protecting Human Research Participants Certified
Microsoft Word, Excel, PowerPoint
First Aid certified

LANGUAGES

German: Native Language
English: Distinguished Listener, distinguished Speaker, distinguished Reading and Writing

OTHER

German citizenship and permanent residency in the United States of America.