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Understanding associations between chronic illness identity, psychological flexibility, and type 2 diabetes emotional, behavioral, and psychosocial functioning.

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UNDERSTANDING ASSOCIATIONS BETWEEN CHRONIC ILLNESS IDENTITY,

PSYCHOLOGICAL FLEXIBILITY, AND TYPE 2 DIABETES EMOTIONAL,

BEHAVIORAL, AND PSYCHOSOCIAL FUNCTIONING

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UNDERSTANDING ASSOCIATIONS BETWEEN CHRONIC ILLNESS

IDENTITY, PSYCHOLOGICAL FLEXIBILITY, AND TYPE 2 DIABETES

EMOTIONAL, BEHAVIORAL, AND PSYCHOSOCIAL FUNCTIONING

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DEDICATION

This dissertation is dedicated to my mother,

Beverly Bodziony, for her unwavering support

on my journey

of becoming Dr. Bodziony.

I am forever grateful.

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I simply could not have made it through graduate school without the support of my mom, Beverly Bodziony. From stressed out phone calls, to celebrating life and academic milestones, words are not enough to express my gratitude. I look up to you always! A special thank you to my life partner and best friend, Dr. Eric Schneider, for supporting me in life and in my career. We are both going to do great things, and I am blessed to have you by my side. I would also like to thank my grandpa, Dennis Bodziony, Sr. for always checking in on my dissertation progress in our monthly phone calls. Your support has meant so much to me, and I am thankful to have such an amazing grandfather. My utmost gratitude for my research mentor, Dr. Barbara Stetson for fueling my passion for health psychology while supporting my growth as a skilled researcher and clinician – I owe much of my professional growth to you! Thank you to my dissertation committee for offering your insight and guidance – many of you have seen my professional development from a first-year graduate student to a doctor, and I appreciate your help along the way. I would like to thank Dr. Paul Salmon, who in part inspired this dissertation by introducing me to acceptance-based treatments in the context of coping with chronic illness. You are one of my best and most cherished teachers and it was a pleasure working with you. To Dr. Bernadette Walter, thank you for being my sounding board and a trusted mentor. I would like to give a shout out to my family - Andrew, Lauren, Jude, Eric, Brian, and Megan, the Schneider Family, Oscar, and Hudson for your support throughout my graduate schooling. I would not be where I am today without such

ABSTRACT

UNDERSTANDING ASSOCIATIONS BETWEEN CHRONIC ILLNESS IDENTITY, PSYCHOLOGICAL FLEXIBILITY, AND TYPE 2 DIABETES EMOTIONAL, BEHAVIORAL, AND PSYCHOSOCIAL FUNCTIONING

Valery Bodziony

December 7, 2023

Introduction: Illness identity, defined as the extent to which one integrates their illness into their sense of self, may be a key psychological factor to consider in overall adjustment to and management of Type 2 Diabetes. Emerging research suggests illness identity integration is associated with aspects of diabetes-specific functioning. Psychological flexibility has also been found to be associated with positive diabetes-specific functioning. This modifiable cognitive factor may play a role in the relationship between illness identity and diabetes-specific functioning. This study aims to examine associations between illness identity enrichment, illness identity rejection, psychological flexibility, and aspects of diabetes-functioning, including self-management diet behavior, diabetes distress, and diabetes stigma in adults with Type 2 Diabetes.

Methods: Participants were 224 adults with Type 2 Diabetes (Mage = 54.94; 49.6% female, 87.9% White) recruited from an online crowdsourcing platform. Participants took an online survey consisting of demographic information, diabetes health characteristics, and well-validated self-report measures examining illness identity, psychological flexibility, and aspects of diabetes-specific emotional, behavioral, and psychosocial

functioning. Data was analyzed using descriptive statistics, bivariate Pearson correlations, and hierarchical multiple regression.

Results: Hierarchical multiple regression revealed enrichment was positively associated with general diet behavior (β = .560, p < .001). Rejection was negatively associated with diet behavior (β = -.410, p = .010), and positively associated with stigma (β = 3.56, p < .001). Psychological inflexibility was found to be positively associated with diabetes stigma (β = .694, p <.001) and distress (β = .206, p < .001) in all models. Depressive symptomology was associated with diet behavior (β = -.249, p = .011). Psychological flexibility was not found to be a moderator between illness identity enrichment, rejection, and diabetes-specific functioning.

Discussion: Findings suggest that dimensions of illness identity and psychological flexibility, when considered individually, play an important role in diabetes self-care behaviors, diabetes distress, and diabetes stigma. Consideration of illness identity integration in diabetes care may promote prevention and treatment efforts, as well as overall adjustment to living with Type 2 Diabetes. Future studies should examine associations between illness identity, specific facets of psychological flexibility, and diabetes-specific functioning. Longitudinal studies are needed to better understand the bidirectionality of associations, as well as how illness identity integration may change over time or across situations. Acceptance-based interventions focused on increasing illness identity enrichment and psychological flexibility may promote diabetes-specific functioning.

Keywords: illness identity, psychological flexibility, diabetes, stigma

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I: INTRODUCTION

Diabetes is a chronic health condition that impacts how the body turns food into energy (CDC, 2020). Nearly 34.2 million adults in the United States have diabetes, with prevalence rates doubling over the past 20 years, becoming a major public health concern (CDC, 2020). Diabetes is often coupled with severe comorbid health conditions, such as kidney disease, cardiovascular disease, neuropathy, and visual disability (WHO, 2021), and in 2017, diabetes was the seventh leading cause of death in the United States (CDC, 2020). Type 1 Diabetes is an autoimmune condition in which the body stops making insulin. It comprises 5-10% of people with diabetes, developing predominantly in children, teens, and young adults. Type 2 Diabetes is the most prevalent type of diabetes, comprising 90-95% of diabetes cases and is typically developed in adults over the age of 45. In Type 2 Diabetes, the body becomes resistant to insulin, or does not use insulin well, and cannot keep blood sugar at normal levels. Due to the high prevalence rates and significant health consequences, Type 2 Diabetes is the focus of this dissertation study.

Nearly 32 million adults in the United States have Type 2 Diabetes, with the prevalence rates steadily increasing, including in children, teens, and young adults (Nadeau et al., 2016). These rapidly escalating rates are due in part to risings rates of obesity and poor lifestyle behaviors, such as unhealthy diet and sedentarism (CDC, 2020). The American Diabetes Association's (2021) Standards of Care for the treatment and prevention of Type 2 Diabetes include health behavior change efforts promoting

positive diabetes self-care behaviors including healthy eating, regular exercise, checking blood glucose levels, and medical management via insulin or oral diabetes medication.

Over the past several decades, diabetes management and related research has not only focused on physical, behavioral, and medical management of Type 2 Diabetes, but also on the psychosocial functioning of persons living with diabetes and its self-care demands (Glasgow et al., 2001). Increasingly, diabetes clinical research has addressed functional status not only in terms of glucose control and physical comorbidity risk reduction, but also with regard to psychological comorbidities such as depression, anxiety, low levels of life satisfaction and reduced quality of life, as well as diabetes-related emotional distress (Glasgow et al., 2001). Rates of depression in people with Type 2 Diabetes are two times that in the general population (Khaledi et al., 2019), with rates of anxiety following suit. Awareness of the demands of the self-care regimen and elevated rates of psychological comorbidities in diabetes has led to burgeoning research examining diabetes-specific emotional distress, with studies often using this construct as a proxy for overall psychological functioning (Fisher et al., 2012). Diabetes distress is defined as psychological reactions associated with emotional burdens and worries about managing Type 2 Diabetes (Fisher et al., 2012). Research points to a bidirectional relationship between psychological functioning and diabetes self-management behaviors (Aikens, 2012; De Groot et al., 2016), with poorer psychological functioning leading to worse self-management behaviors, and vice versa, with the potential of leading to severe health outcomes. Understanding the importance of psychosocial functioning to the prevention and management of Type 2 Diabetes, the ADA's Standards of Care (2021) now recommend routine screening for diabetes distress in addition to anxiety and

depression. While current recommendations (e.g., the widely used Standards of Care; ADA, 2021) recognize the influence of environmental or social factors in Type 2 Diabetes care, other specific psychosocial aspects of living with chronic disease that have been identified in individual studies have not been well-examined in the field of behavioral diabetes. For example, little is known about the role of social factors such as stigma in life with diabetes (Schabert et al., 2013). To optimally promote well-being in diabetes, additional research is needed to understand the underpinnings of emotional, behavioral, and social aspects of diabetes-specific functioning more fully.

A diagnosis of Type 2 Diabetes may result in difficulties with adjusting to or adapting to one's illness, which not only includes changing lifestyle behaviors such as eating healthier and engaging in physical activity, but also having to form a new sense of self or identity as a person with a chronic illness. The way people perceive their illness and incorporate it into their sense of self may have important implications in the treatment and management of Type 2 Diabetes, including engagement in self-care activities, and coping with diabetes distress and experienced stigma. Concepts such as illness representations, or cognitive beliefs and labels one has about their illness (Hudson et al., 2014; Leventhal et al., 1997; Petrie and Weinman, 2006), and illness self-concept, or the degree to which a person is consumed by their illness (Morea et al., 2008), have been studied in people with Type 2 Diabetes, with findings indicating that more positive illness perceptions and illness self-concept is associated with better psychosocial and health outcomes (Costabile et al., 2020; Martinez et al., 2018).

Emerging research is pointing to the importance of *illness identity*, or the degree to which a person integrates their illness (including beliefs about their illness) into their

identity or sense of self (Oris et al., 2016). Positive illness identity integration may be conceptualized as accepting one's illness as a part of their sense of self or feeling that their life is enriched or has more value because of their illness. Negative illness identity integration may be conceptualized as rejecting or denying one's illness or feeling that one's sense of self is completely overwhelmed with or overcome by their illness. Recent research has linked illness identity dimensions to psychological functioning, diabetes-specific emotional distress, self-management behaviors, and medical outcomes in adults with Type 2 Diabetes (Ross, 2018). However, this preliminary research does not account for what psychological factors may be impacting the relationship between illness identity and diabetes-specific outcomes. Understanding *modifiable* psychological factors that may impact diabetes-specific functioning is integral to overall treatment and in promoting one's ability to live a valued life as a person with Type 2 Diabetes. *Psychological flexibility* has been conceptualized as a psychological process of adapting to situational demands and engaging in behaviors that are in line with one's values (Kashdan and Rottenberg, 2010; Hayes, 2009). Psychological flexibility has been identified as a *modifiable* psychological factor associated with positive psychological and physical health, including aspects of diabetes-specific functioning. Psychological flexibility may strengthen the relationship between positive illness identity dimensions and diabetes-specific functioning, while buffering the impact of negative illness identity states.

This introduction highlights preliminary evidence for associations between illness identity dimensions, psychological flexibility, and aspects of diabetes-specific behavioral and psychosocial functioning. The dissertation study is an attempt to replicate findings of illness identity associations with aspects of diabetes-specific functioning (Ross, 2018) to

4

add to the research literature by examining *psychological flexibility* as a key moderating variable. Additionally, this study considers diabetes stigma, as well as diabetes emotional distress and self-management behaviors, as relevant psychosocial and behavioral factors integral to optimal health and functioning in people with Type 2 Diabetes.

Chronic Illness Identity Conceptualization

Onset or diagnosis of a chronic illness is a transformative experience that may alter a person's sense of self or identity and lead to significant life changes, such as management of the disease through medication, hospital visits, and lifestyle behavior change. While most people can successfully adjust to and manage their chronic illnesses, some people experience adjustment difficulties that can negatively impact their physical, social, and psychological functioning.

Charmaz (1995) theorizes that the unity between the body and sense of self is disrupted when one develops a chronic illness. To successfully adapt and regain a sense of self as person with a chronic illness, one must acknowledge, accept, and accommodate the illness and related impairments into their lifestyle and behaviors. Charmaz (1995) highlights that reactions to chronic illness may range from ignoring, minimizing, or struggling against the illness, to embracing it and accepting it. Adaptation to chronic illness is a dynamic process that entails varying reactions and continual adaptation as people face new situational demands.

Chronic illness has been conceptualized as an impingement on sense of self and identity and may negatively impact an individuals' self-regulation and self-management of the disease (Leventhal et al., 1997). In the Common-Sense Model of Illness Self-Regulation, Leventhal and colleagues (1997) equated illness identity to a construct

known as "illness representations", or how one cognitively labels one's illness and related symptoms. While illness representation is a cognitive label of the illness, *illness identity* consists of how one *integrates* an illness into their sense of self. A meta-analysis conducted by Schulman-Green et al. (2012) found themes of "adjusting to illness" and "adjusting to a new self" to be important tasks in self-management of chronic illness. Specific skills of self-management included identifying role and personal identity, developing coping strategies, accepting a "new normal", dealing with stigma, reflecting on priorities and values, being flexible, and reframing expectations of the self (Schulman-Green et al., 2012). This meta-analytic study points to the importance of considering *identity* in adaptation to living with chronic illness (Schulman-Green et al., 2012).

Theoretical Background of the Illness Identity Construct

The construct of illness identity stems from several perspectives and can be traced back to Erikson's (1968) life-span ego-development theory. In his seminal work, Erikson (1968) describes identity as the degree to which an individual integrates self-assets into a coherent sense of self, which then translates into daily life, guiding behaviors, choices, and values and contributes to well-being. Similarly, social identity and personal identity theories posit that identity stems from social categorizations and roles (Tafjel et al., 1979) as well as personal meaning and values that sustain the self as an individual (Deaux, 1992). In attempts to bridge personal and social identity theories, Stets and Burke (2000) highlight that the two theories are highly intertwined, with both theories considering context in identity development, with personal and social identities being more or less salient depending on situation (Hogg et al., 1995).

Erikson's (1968) model of identity highlights that identity is not a "final outcome", rather it is something that continues to develop across the lifespan through developmental changes, and ongoing transactions with the social environment (Vignoles et al., 2011). Neo-Erikson models of identity development are process-oriented, and postulates that identity is fluid or transactional in nature. For example, Grotevant's (1987) model of identity development highlights the importance of identity exploration. When an individual gains new information about themselves, they can assimilate this information into an already existing identity structure, or use the new information to challenge an existing identity structure and transform it. Grotevant's (1987) model poses that identity development is a recurrent process of evaluations of one's identity commitments, influenced by situational demands, individual growth, or other new information (Schwartz, 2001). Similarly, Kerpelman and colleagues (1997) considered a model of identity that focuses on day-to day mechanisms and interactions between a person's personal standards and their functioning, as well as relational processes that drive identity exploration and development. This model theorizes that identity development and exploration is a series of feedback loops between oneself and others or the environment, intended to minimize discrepancies between one's own perceptions and feedback from others (Kerpelman et al, 1997). Kunnen and Metz (2015) theorize that identity is a reoccurring series of short-term interactions between a person and their context, with identity commitments being continuously evaluated, maintained, or changed based on one's evaluation. Luyckx and colleagues (2008) ultimately theorize that "identity" is an ongoing psychosocial task in which exploration of identity occurs in depth, one makes an identity commitment, one explores this commitment in breadth, and

then one chooses to identify with the identity commitment. To summarize, neo-Eriksonian theories of identity development state that identity is a constant evaluation and re-evaluation of a person's self-perceptions based on their context, environment, and even feedback from others. One's identity is not concrete, and certain identity commitments can be more or less salient over time and across situations. Identity evaluation is an important task of adulthood, in which one may have new identity commitments form, such as that of being a parent, grandparent, or a person who has developed a chronic illness.

Consideration of Social Context

Perceptions of illness and impairment are embedded in social constructions of what it means to be "ill," and "normal" or "appropriate" attitudes, actions, and activity levels that are expected when one has a chronic illness. Oftentimes, people who have a chronic illness may receive negative reactions from others because they cannot live up to societal expectations and standards. Goffman (1963) described having a chronic illness and associated impairments as having a "spoiled identity" that is at risk for negative reactions, prejudice, and stereotypes from society, being exclusively socially defined by their illness or impaired bodies. Drawing from a symbolic interactionist social perspective, Charmaz (1995) theorizes that peoples' meanings and perceptions of their chronic illness must be considered and understood in the social contexts in which they occur, and chronic illness identity develops in part from social identification.

Defining Illness Identity

Chronic illness identity has recently been defined as "the degree to which chronic illness becomes integrated into one's identity" (Oris et al., 2016, p. 758). Illness identity

is theorized to consist of positive and negative dimensions or states, reflecting the degree to which a person integrates their illness into their sense of self or identity. In this Illness Identity framework, negative dimensions of illness identity are conceptualized as reflecting rejection and engulfment, while positive dimensions of illness identity are acceptance and enrichment. Negative illness identity dimensions reflect a lack of integration or over-integration of illness into one's identity, while positive illness identity dimensions reflect adaptive illness identity integration (Oris et al., 2016). *Rejection* is defined as the degree to which a chronic illness is rejected as part of one's identity and is viewed as a threat or unacceptable to the self. *Engulfment* is the degree to which chronic illness dominates a person's identity and daily life, wherein people define themselves in terms of their illness, which invades all areas of life at the expense of other important aspects of the self. *Acceptance* is the degree to which individuals accept the illness as part of their identity without being overwhelmed and without the illness pervading all life domains. A person who accepts the illness as a part of their identity would try to live as normal a life as possible without denying that they have a chronic illness. *Enrichment* is the degree to which chronic illness enriches one's sense of self and enables one to grow as a person. Illness identity is a transactional construct, and consistent with identity theory, a person can both positively and negatively integrate certain aspects of their illness into their sense of self, and illness identity states may vary based on situational demands (Oris et al., 2016). These illness identity dimensions have been empirically supported via confirmatory factor analysis, and measurement-related aspects of this construct in diabetes-related functioning are described below.

Measurement of Illness Identity and Associations with Psychological and Health-

Related Functioning

The Illness Identity Questionnaire (IIQ, Oris et al., 2016) is a novel measurement of chronic illness identity first developed and evaluated in youth and young adults with Type 1 Diabetes. To date, this is the only questionnaire developed specifically to measure chronic illness identity as a construct. In a sample of 575 adolescents and emerging young adults (aged 14-25) with Type 1 Diabetes, Oris et al. (2016) aimed to develop and validate the Illness Identity Questionnaire (IIQ) and examine associations between illness identity, psychological functioning (CESD, Eaton et al., 2004; Satisfaction with Life Scale, Diener et al., 1985), diabetes-related problems (Problem Areas in Diabetes Scale, Welch et al., 1996), glycemic control measured by HbA1c), and adherence (Self-Care Inventory, Weinger, 2004). Confirmatory factor analysis revealed a valid four-factor structure of illness identity including: acceptance, enrichment, engulfment, and rejection (χ^2(316) = 659.583, p < .001; RMSEA = 0.047; CFI = 0.915; SRMR = 0.063). All factor loadings were significant (p < .001) and above .49, indicating the individual items fit well onto the factors. Structural equation modeling and path analysis were conducted to assess association between illness identity dimensions and relevant outcome variables, controlling for sex, age, illness duration, and insulin administration. Results revealed acceptance was significantly negatively associated with diabetes related problems (r = -0.32, p < .001) and depressive symptoms (r = -0.15, p < .01) and positively associated with satisfaction with life (r = 0.11, p <.05) and treatment adherence (r = 0.20, p <.01); enrichment was significantly positive associated with satisfaction with life (r = .014, p < .001); engulfment was significantly positive associated with depressive symptoms (r =

0.47, $p < .01$) and diabetes-related problems ($r = .41$, $p < .01$) and negatively associated with satisfaction with life ($r = -0.46$, $p < .01$); rejection was negatively associated with treatment adherence ($r = -0.16$, $p < .001$). Overall, results from this study suggest that positive illness identity integration (e.g., acceptance and enrichment) is more strongly related to positive psychological functioning and diabetes-related outcomes, while negative illness identity integration (e.g., rejection and engulfment) is associated with poorer psychological and diabetes-related functioning, including poorer treatment adherence. Additionally, univariate ANOVAs and MANOVAs were conducted to assess group differences based on demographic and clinical characteristics. Results found that women had significantly greater scores on Engulfment than men ($F = 7.20$, $p < .01$, $\eta^2 = 0.01$), and men had greater scores on Acceptance than women ($F = 9.46$, $p < .01$, $\eta^2 = 0.02$). People who took insulin using a pump scored higher on the engulfment dimension than those who used insulin injections ($F = 6.40$, $p < .05$, $\eta^2 = 0.01$). This cross-sectional study was the first to give empirical evidence of the importance of illness identity in psychological functioning and diabetes-related care.

Oris et al. (2018) provided additional validation of the IIQ in a cross-sectional study of two samples of adults with congenital heart disease (CHD; $N = 276$, $M_{age} = 36.8$) and multisystem connective tissue disorders (MSDs; $N = 247$; $M_{age} = 52.8$), such as systemic lupus erythematosus (SLE) and systemic sclerosis (SS). Exploratory and confirmatory factor analyses retained the four-factor structure of the IIQ found by Oris et al. (2016) in both samples. Cronbach's α for each subscale ranged from .75 to .95, suggesting good reliability. In people with CHD, age was positively correlated with engulfment ($r = .18$, $p = .003$), rejection ($r = .20$, $p = .001$) and enrichment ($r = .15$; $p =$

.018). Pearson correlations were conducted to examine relationships between illness identity and demographic and clinical characteristics. Age was correlated positively with rejection ($r = .23$, $p <. 001$) and disease duration was correlated positively with acceptance ($r = .24$, $p <.011$) in people with MSDs. Combining both samples, partial correlations controlling for age were conducted to assess relationships between illness identity and aspects of psychological functioning. Engulfment was positively associated with depressive symptoms ($r = .58$, $p <.001$), anxiety symptoms ($r = .45$, $p <. 001$) and illness symptoms/pain ($r = .40$, $p < .001$). There were no significant associations between rejection or enrichment and psychological functioning variables. Acceptance was negatively associated with depressive symptoms ($r = -.33$, $p < .001$), anxiety symptoms ($r = -.32$, $p <. 001$) and illness symptoms/pain ($r = -.17$, $p <.01$). Multivariate ANOVAs were used to assess for group differences based on clinical and demographic variables. There were no significant differences in illness identity based on sex. Significant differences in illness identity dimensions were found based on illness condition ($F(1, 500) = 20.02$, $p <.001$, $\eta2 = .14$), with people with MSDs scoring higher on engulfment and rejection and lower on acceptance than people with CHD. Significant differences were found in disease complexity in people with CHD ($F(2,267) = 2.73$, $p = .006$, $\eta2 =.04$), with people with more complex heart defects scoring higher on engulfment and enrichment than people with a moderate or simple heart defect. There was also a significant effect of diagnosis on illness identity in people with MSDs ($F(1,230) = 4.62$, $p = .001$, $\eta2 = .08$) with people with sclerosis scoring higher on engulfment and rejection and lower on acceptances than people with lupus. This study gives evidence that illness identity is important to consider in people with different types of chronic illness and may

be applicable across diagnoses. Results revealed there may be differences in illness

identity states depending on whether the chronic illness is congenital or acute.

Illness Identity in Type-2 Diabetes

A single study was located that has examined illness identity in adults with Type

2 Diabetes. This dissertation study (Ross, 2018) consisted of two samples: one national

sample of adults with Type 2 Diabetes ($N = 282$; $M_{age} = 54.14$) completed an IIQ

validation survey using confirmatory factor analysis, which confirmed the four-factor

structure of the IIQ (i.e., acceptance, enrichment, rejection, engulfment) consistent with

previous studies ($\chi^2(318) = 885.182$, $p < .001$, RMSEA = 0.080; CFI = 0.887; SRMR =

0.068). Additionally, results from the CFA revealed that acceptance was significantly

associated with Rejection ($r = -0.46$, $p < 0.001$) and Enrichment ($r = 0.27$, $p < 0.001$), but

not associated with engulfment. Rejection had a significant negative association with

Enrichment ($r = -0.27$, $p < 0.001$), but was not significantly associated with Engulfment.

Engulfment was positively associated with Enrichment ($r = 0.18$, $p = 0.003$). Pearson

correlations were conducted to assess for associations between IIQ dimensions and

demographic and clinical characteristics. Acceptance was significantly correlated with

age ($r = .292$, $p < .01$), diabetes duration ($r = .205$, $p < .01$), and medical visit adherence

($r = .149$, $p < .05$). Rejection was significantly negatively associated with diabetes

duration ($r = -.152$, $p < .05$) and medical visit adherence ($r = -.52$, $p < .05$). Engulfment

was found to be significantly associated with diabetes duration ($r = .149$, $p < .05$), self-

reported health ($r = .241$, $p < .05$, and comorbidity ($r = .232$, $p < .01$). Separate one-way

ANOVAS were conducted to assess group differences based on demographic and clinical

factors. Women ($M = 3.61$, $SD = 0.70$) reported lower Acceptance scores than men ($M =$

3.85, $SD = 0.60$); $F(1, 280) = 8.03$, $p = 0.005$). Results also showed that people who were taking insulin to manage their diabetes reported higher Enrichment scores ($M = 3.40$, $SD = 0.77$) than those who were taking oral medication ($M = 2.99$, $SD = 0.97$; $F(1, 244) = 10.74$, $p = 0.001$), and also higher Engulfment scores ($M = 2.18$, $SD = 0.98$) than those taking oral medication ($M = 1.92$, $SD = 0.73$; $F(1, 244) = 5.57$, $p = 0.019$).

A structural equation model (SEM) analysis was conducted to examine associations between IIQ dimensions and psychological (i.e., depression and life satisfaction) and diabetes-specific functioning (diabetes distress and diabetes self-care) outcomes. The SEM demonstrated good fit to the data a (χ^2 (5) = 506.566, $p < .001$; RMSEA = 0.000; CFI = 1.000; SRMR = 0.000). Results revealed engulfment was significantly associated with greater depression ($r = .33$, $p < .001$), lower life satisfaction ($r = -.24$, $p < .001$), and greater diabetes distress ($r = .58$, $p < .001$). Rejection was significantly associated with greater depression ($r = .17$, $p < .01$), greater diabetes distress ($r = .17$, $p < .001$), and lower self-care ($r = -.15$, $p < .05$). Acceptance was significantly associated with lower depression ($r = -0.14$, $p < .05$), greater life satisfaction ($r = .23$, $p < .001$), and lower diabetes distress ($r = -.15$, $p < .01$). Enrichment was associated with lower depression ($r = -.13$, $p < .05$), greater life satisfaction ($r = .29$, $p < .001$), and better diabetes-self-care behaviors ($r = 34$, $p < .001$).

In a second sample of adults with Type 2 Diabetes recruited from a primary care clinic ($N = 61$; $M_{age} = 58.84$; 60.7% female), Ross (2018) aimed to further examine associations between IIQ dimension and psychological (i.e., depression and life satisfaction) and diabetes related functioning (i.e., diabetes distress, diabetes self-care, HbA1c) using linear regressions. Results from the linear regressions revealed higher

Rejection was significantly associated with lower life satisfaction (β = - 0.262, p = 0.051), higher diabetes distress (β = 0.261, p = 0.052), and more depressive symptoms (β = 0.364, p = 0.006). Higher Enrichment was significantly associated with better diabetes self-care (β = 0.597, p < .001). Higher Engulfment was significantly associated with lower life satisfaction (β = - 0.292, p = 0.029), greater diabetes distress (β = 0.366, p = 0.006), and higher HbA1c scores (β = 0.374, p = 0.004).

Overall, this study made a significant contribution to understanding illness identity in adults with Type 2 Diabetes and validated the use of the IIQ in this population. Differences were found in IIQ dimension scores based on gender and diabetes treatment regimen, and the four dimensions of the IIQ demonstrated unique relationships with psychological and diabetes-specific functioning.

Summary of Studies of Identity Integration in Type 2 Diabetes

In summary, these studies provide evidence that understanding the extent to which Type 2 Diabetes is integrated into one's identity has important implications in diabetes-specific behavioral, medical, and psychological outcomes. There is evidence that positive illness identity dimensions (i.e., acceptance and enrichment) are positively associated with positive aspects of functioning (i.e., positive health behaviors; better adjustment to and management of chronic illnesses), while negative illness identity dimensions (i.e., rejection and engulfment) is associated with negative aspects of functioning. Assessing illness identity states may be important in understanding and promoting adjustment in adults with Type 2 Diabetes.

An important, but often overlooked, factor in adjusting to chronic illness is consideration of social context in navigating social and identity-related stressors. While it

has not yet been studied, fostering a positive illness identity may help individuals with

chronic illness to maintain a positive sense of self as a person with a chronic illness when

facing threats to their identity, such as stigma (Major and O'Brien, 2005). Stigma is

conceptualized as categorizing or labeling people based on salient undesirable

characteristics or attributes, resulting in negative stereotyping, ingroup/outgroup

comparisons, status loss, and discrimination (Link and Phelan, 2001). The construct of

stigma has been conceptualized as being experienced or perceived (Bos et al., 2013).

Perceived stigma refers to the beliefs and expectations that people who belong to the

stigmatized group have about the general population's stigmatizing attitudes towards the

specific group. *Experienced* stigma refers to people in the stigmatized group's actual

encounter with stigmatizing attitudes or behaviors. Experience of health-related stigma is

an inevitable part of living with chronic illness (Weiss et al., 2006), but remains an

understudied phenomenon in Type 2 Diabetes. There is growing evidence that Type 2

Diabetes is a highly stigmatized condition, due in part to social expectations that the

disease can be entirely preventable if the individual were to engage in healthy lifestyle

behaviors (Browne et al., 2006). The following section will describe nascent literature on

the experiences of stigma in people with Type 2 Diabetes

Type-2 Diabetes Stigma

The majority of research on the experience of stigma in Type 2 Diabetes has been

qualitative in nature. In a qualitative study of Pakistani and Indian adults with Type 2

Diabetes ($N = 32$), Lawton et al. (2006) examined experiences of engaging in physical

activity for diabetes self-management and found themes of individuals having negative

perceptions of themselves as a result of having Type 2 Diabetes, as well as worry about

perceptions of others, or what others may think of them or how they may view them when engaging in physical activity. Similarly, Browne et al. (2013) conducted semi-structured interviews with adults with Type 2 Diabetes ($N = 25$) to explore social experiences of people with Type 2 Diabetes, focusing on the perception and experience of Type 2 Diabetes. Findings from this study indicated 84% of participants believed Type 2 Diabetes was a stigmatized condition. The semi-structured interviews revealed themes of feeling blamed by others for causing their own condition, being stereotyped, discriminated against, or having restricted opportunities in life. Participants reported experiencing stigma from friends, family, colleagues, health professionals, and the media. Additionally, participants reported that experiencing stigma resulted in unwillingness to disclose their condition and increased psychological distress (Browne et al., 2013). A multinational diabetes study also provided evidence for these findings, with one in five participants reporting being discriminated against because of their diabetes (Nicolucci et al., 2017). However, stigma was assessed using only one question about discrimination.

A narrative literature review by Schabert et al. (2013) provides a comprehensive framework for understanding diabetes-related stigma based on theoretical models of social stigma, providing insight into causes, experiences, and consequences of stigma in people with Type 2 Diabetes. Results from the literature review found that features of diabetes (such as being overweight) and its management (such as using insulin), as well as attitudes and beliefs surrounding Type 2 Diabetes on an individual and community level, contribute to the development of negative stereotypes about having Type 2 Diabetes. Self-perception of stigma, social stigma enacted through others by way of stereotyping and discrimination, and stigmatizing practices within society result in

17

identity threat. Psychosocial mechanisms, such as blame, fear and disgust, perpetuate

stigma and lead to poor consequences. Such consequences may include poor

psychological well-being and suboptimal diabetes-specific self-care, potentially leading

to negative clinical outcomes and uncontrolled diabetes (Schabert et al., 2013).

Measurement of Stigma in Type 2 Diabetes

Empirical research on stigma in diabetes is in its infancy. Studies have used

general measures of health-related stigma, such as the Stigma Scale for Chronic Illness

(Rao et al., 2006) or unvalidated single item questions. Realizing the need for an

empirically validated measure of stigma in Type 2 Diabetes, Browne et al. (2016)

developed the Type-2 Diabetes Stigma Assessment Scale (DSAS-2) in a sample of adults

with Type 2 Diabetes ($N = 1,064$; $M_{age} = 61.2$, ($SD = 9.40$); 43% female). Scale items

were developed based on results from a qualitative study of individuals with Type 2

Diabetes (Browne et al., 2013) and adapted items from generic health-related stigma

questionnaires. A principal components analysis revealed a three-factor structure of

"Treated Differently", "Blame and Judgement", and "Self-Stigma", all with eigenvalues

greater than 1, as well as a stable forced one-factor structure for a total diabetes stigma

score.

A study by Browne et al. (2016) examined associations between diabetes stigma,

general chronic illness stigma, psychosocial outcomes (PHQ-8, GAD-7, Rosenberg Self-

Esteem Scale) and diabetes-specific distress (Problem Areas in Diabetes Scale). Results

revealed a significant positive association between diabetes stigma and general chronic

illness stigma ($r = 0.78$, $p < .001$), depression symptoms ($r = .44$, $p < .001$), anxiety

symptoms ($r = .46$, $p < .001$), and diabetes-specific distress ($r = .67$, $p < .001$). Type 2

Diabetes stigma was negatively associated with self-esteem ($r = -.51, p < .001$). The DSAS-2 is the first measure of diabetes-specific stigma in an adult Type-2 Diabetes sample. The results point to a reliable and valid measure of perceived and experienced stigma associated with having Type 2 Diabetes. Limitations of this study include correlational and cross-sectional analyses, and more research is needed on the predictive validity of the DSAS-2 for psychosocial and diabetes-specific outcomes.

Overall, there is preliminary quantitative and qualitative evidence that diabetes-related stigma is associated with poor psychosocial functioning and worse behavioral self-management in Type 2 Diabetes. Positive illness identity has been identified as related to an important component in promoting positive psychosocial, behavioral, and medical functioning in people with Type 2 Diabetes. Though it has not been studied, accepting one's illness as a part of their identity and sense of self, as well as feeling enriched by their illness and living a more valued life because of their illness, may also be associated with positive psychosocial functioning, including decreased perceived and internalization of stigma, ultimately protecting against negative stereotypes and identity threats that are inevitable when living with Type 2 Diabetes.

Research has provided sound evidence that positive illness identity integration is associated with positive functioning, while negative illness identity integration is associated with negative functioning, but there is little evidence as to what factors may be modifying the relationships between positive or negative illness identity and diabetes-functioning, specifically. To address this limitation, this dissertation focused on a *modifiable* psychological factor, psychological flexibility, that may be relevant in fostering positive illness identity integration, such as identity acceptance and identity

enrichment, while buffering the impact of negative illness identity integration on relevant emotional, behavioral, and psychosocial functioning in adults with Type 2 Diabetes. To this end, this dissertation reviews evidence of associations between psychological flexibility and diabetes-specific emotional and behavioral functioning and highlight several promising intervention studies promoting psychological flexibility in diabetes populations. The dissertation study considers psychological flexibility within an illness identity framework, as a psychological factor amenable to intervention that may be useful in understanding the relationships between illness identity dimensions and diabetes-related outcomes including diabetes distress, self-management behaviors, and diabetes-related stigma. Psychological flexibility may promote an enriched identity and living a valued live *with* Type 2 Diabetes, leading to positive or adaptive emotional, behavioral, medical, and psychosocial functioning.

Psychological Flexibility Conceptualization

    Psychological flexibility is a basic aspect of healthy adaptation, defined as a dynamic, contextually specific capacity to adapt to and balance situational demands, reconfigure mental resources, and shift perspectives (Kashdan and Rottenberg, 2010) and is often conceptualized within an Acceptance-Commitment Therapy (ACT) framework (Hayes, 2009). Within ACT, psychological flexibility is defined as an ability to connect with the present moment fully and consciously, and to change or persist in behavior that is in line with identified values (Hayes, 2009). Psychological flexibility has been difficult to conceptualize due to its' multifaceted nature and has been researched interchangeably with constructs such as ego-resiliency (Block, 1961), self-regulation (Carver and Scheier, 2000; Muraven and Baumesiter, 2000), regulatory flexibility (Bonanno and Burton,

2013), coping flexibility (Cheng, 2014), and adaptability (Waldeck et al., 2021). The maladaptive opposite of psychological flexibility is *psychological inflexibility*, conceptualized as when one's behaviors are guided by rigid cognitions rather than direct contingencies or chosen values, and when one's thoughts are cognitively fused with the self and are interpreted as "literal truths." *Psychological inflexibility* is associated with a broad range of psychological and behavioral health problems (Hayes et al. 2009; Levin et al., 2014; Tavakoli et al., 2019).

Measurement of Psychological Flexibility

The Acceptance and Action Questionnaire (AAQ; Hayes, 2004) and its revised version, the Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011) are the most widely used measures of psychological flexibility. The AAQ-II assesses negative evaluations of feelings, avoidance of thoughts and feelings, ability to distinguish thoughts as separate from "facts", and ability to change behaviors despite the presence of difficult thoughts/feelings. There are several variants of the AAQ and AAQ-II that have been validated for use in specific populations, including acquired brain injury (Whiting et al, 2015), chronic pain (Fish et al., 2010; McCracken, 2004), Type 1 Diabetes (Berlin et al., 2020), and Type 2 Diabetes (Gregg et al., 2007). Other measures of psychological flexibility include the Psychological Flexibility Questionnaire (PFQ) (Ben-Itzhak et al., 2014), the Open and Engaged State Questionnaire (OESQ) (Benoy et al., 2019), the multidimensional psychological flexibility inventory (Rolffs et al., 2018), and the personalized psychological flexibility index (Kashdan et al., 2020). Given that the AAQ-II has been validated for use in adults with Type 2 Diabetes and is a more general

measure of psychological flexibility, research evidence for associations between the AAQ-II and diabetes-specific outcomes, it has been chosen for use in this study.

Psychological Flexibility and Diabetes-Specific Functioning

Given the significant prevalence of Type 2 Diabetes, it is important to determine ways to improve health-related outcomes in this population by determining modifiable psychological factors. In the context of living with Type 2 Diabetes, psychological flexibility may be conceptualized as (1) growing acceptance of having diabetes, (2) engaging in valued behaviors or committed action to effectively manage one's condition, and (3) remaining psychologically and behaviorally flexible in situational demands and circumstances. Psychological flexibility may be a crucial factor in optimal adaptation to Type 2 Diabetes, as it may influence diabetes-specific psychosocial and behavioral outcomes. Specifically, psychological flexibility may improve diabetes-specific functioning, such as coping with diabetes-related emotional distress and engagement in valued diabetes-self management behaviors (i.e., optimal exercise and healthy diet).

Research on associations between psychological flexibility and diabetes-specific outcomes has been in its infancy and has been cross-sectional and correlational in nature. In a sample of children with Type 1 Diabetes, psychological flexibility was found to be positively associated with quality of life ($r = .40$, $p < .01$) and negatively associated with HbA1c levels ($r = -.19$, $p < .05$) (Berlin et al., 2020). A recent study examining psychological flexibility and diabetes-specific outcomes in an adult sample with Type 1 Diabetes ($N = 102$) (Maor et al., 2021) found a significant positive association between psychological flexibility, and mental well-being. Specifically, a hierarchical regression analysis revealed a specific facet of psychological flexibility, labeled "perception of

change as positive", significantly contributed to variance in mental well-being, above and beyond adjustment to diabetes as measured with the ATT-39, (Welch, 1995). In this study, it is important to note that psychological flexibility was measured by the Psychological Flexibility Questionnaire (PFQ; Ben-Itzhak et al., 2014), and only psychological constructs were measured, while no diabetes-specific behaviors were assessed.

A recent study of 105 adults with Type 2 Diabetes (M_{age} = 27 (SD = 7.1); 53% male), using validated instruments, found that those with greater psychological flexibility had higher self-efficacy (r = 0.34, $p < .01$) and less diabetes distress (r = -0.54, $p < .001$) and a 10-point (one SD) higher psychological flexibility score corresponded to a 0.5% lower HbA1c (Kilic et al., 2022). Hierarchical regressions revealed that self-efficacy and psychological flexibility accounted for 36% additional variance in diabetes distress above and beyond age and duration of diabetes. Additionally, psychological flexibility contributed significantly to the variance in Hba1c level above and beyond age and duration of diabetes ($F(4,95)$ = 4.81, $p < .001$, R^2 = .096). Similarly, in a sample of 102 adults with Type 2 Diabetes, Sadeghi et al. (2017) found that psychological flexibility was significantly negatively correlated with depression, anxiety and stress ($p < .05$) and predicted depression above and beyond self-compassion.

Psychological Flexibility Interventions in Diabetes Populations

There is evidence that psychological flexibility is *modifiable* through acceptance-based interventions and may promote one's ability to cope with diabetes-related distress, increase self-management behaviors, and promote psychological adjustment to living with diabetes. In a sample of adults with Type 2 Diabetes (N = 81), Gregg et al. (2007)

conducted a randomized controlled trial to evaluate the impact of a brief ACT intervention workshop on diabetes self-management behaviors and glucose control. Participants were either assigned to a control group ($N = 38$) that received diabetes education alone, or an intervention group ($N = 43$) that attended an ACT-based workshop including diabetes education, plus mindfulness and acceptance training. A one-way ANCOVA on follow-up diabetic control status (HbA1c $< 7.0\%$) using pre-treatment status as the covariate showed a significant and medium effect for ACT over education alone ($F(1, 78) = 7.14$, $p = .009$, partial $\eta^2 = .08$). An ANCOVA using self-management prescores as the covariate showed a statistically significant and medium effect for ACT over education alone on follow-up self-management scores ($F(1, 60) = 4.29$, $p = .043$, partial $\eta^2 = .07$). An ANCOVA using psychological flexibility prescores (Acceptance and Action Diabetes Questionnaire; Schmitt et al., 2014) as the covariate showed a statistically significant and large effect for ACT over education alone on follow-up psychological flexibility scores ($F(1, 52) = 23.87$, $p = .011$, partial $\eta^2 = .12$). A bootstrapped multivariate extension of the Sobel test found that changes in acceptance and self-management significantly reduced the impact of treatment on follow-up changes in Hba1c ($p < .05$). Changes in blood glucose from pretreatment to follow-up were mediated both by changes in self-management and in psychological flexibility related to having diabetes. Overall, this study gives promising evidence that a single-day intervention may enhance psychological flexibility and promote diabetes-specific medical and behavioral self-management outcomes.

A randomized controlled trial of 100 adults (aged 40-60; 60% female) with Type 2 Diabetes (Shayeghian et al., 2016) examined the effectiveness of an ACT intervention

on diabetes self-care activities, as measured by the Summary of Diabetes Self-Care Activities (SDSCA; Toobert et al., 2000), and psychological flexibility, as measured by the Acceptance and Action Questionnaire for Diabetes (AADQ; Schmitt et al., 2014), and Hba1C levels. A repeated-measures ANOVA was conducted to evaluate the effect of an ACT intervention on self-management and acceptance/psychological flexibility scores, controlling for scores at pre-treatment. Results revealed significant effects for hbA1c ($F(1,97) = 32.36$; $p < .001$; partial $\eta^2 = .25$), self-care activities ($F(1,97) = 26.74$; $p < .001$; partial $\eta^2 = .22$) and psychological flexibility/diabetes acceptance ($F(1,97) = 76.75$; $p < .001$; partial $\eta^2 = .44$) scores. Patients in the ACT intervention group ($N = 50$) obtained significantly lower glycated hemoglobin, higher self-care activities and higher acceptance scores than the control group ($N = 50$). Results were stable at a 3-month follow-up.

A dissertation study (Welch, 2014) examining the effects of a one-day ACT workshop on self-care behaviors and diabetes-related distress in adults with Type 2 Diabetes ($N = 20$; $M_{age} = 42.95(SD=9.09)$; 70% female) found significant differences in exercise scores as measured by the SDSCA pre- ($M = .78$, $SD = 1.40$) to post-treatment ($M = 2.9$, $SD = 1.21$), $t(19) = -7.16$, $p = .008$. Additionally, differences pre- ($M = 3.86$, $SD = 1.09$) to post-treatment ($M = 2.35$, $SD = .56$), $t(19) = 5.62$, $p = .0002$) were also found in diabetes distress scores. This pilot study showed preliminary evidence that an acceptance-based workshop may increase self-care activities (e.g., exercise) and decrease diabetes distress in adults with Type 2 diabetes. However, there was no control group, and mechanisms behind changes in exercise and diabetes distress scores from pre- to post-treatment were not examined.

Management of Type 2 Diabetes requires significant attention to diet, physical activity, blood glucose monitoring, as well as adherence to diabetes oral medications and/or taking insulin. Poor adherence to self-management behaviors may not only lead to poorer medical outcomes, such as increased hba1c levels and higher BMI, but also increased psychological or emotional distress. Engaging in self-management behaviors may evoke negative thoughts and feelings about their disease and changing or eliminating distressing thoughts and feelings related to one's diabetes may not be realistic. It is possible that acceptance-based interventions that foster psychological flexibility may help to reduce avoidance of engaging in self-care activities, such as exercising and eating a healthy diet, leading to better physical health and psychosocial outcomes.

Psychological Flexibility and Stigma

Psychological flexibility may help individuals to adapt to situational demands, such as experiencing stigma as a result of Type-2 Diabetes, by allowing individuals to change their relationship with distressing feelings and thoughts, such as experiences of shame, feelings of blame and judgment, self-evaluation, or fear (Hayes et al., 2002). Psychological flexibility allows individuals to mindfully reappraise their experience of stigma, defuse from negative thoughts and beliefs associated with the stigmatizing experience without trying to change the thoughts or avoid them, and helps to appraise thoughts as thoughts instead of seeing them as "literal truths".

Levin et al. (2014) conceptualize psychological flexibility within the context of coping with stigma as 1) flexible awareness of stigmatizing thoughts in the present moment; 2) defusion from stigmatizing thoughts (e.g., seeing thoughts as just thoughts, rather than literal truths about oneself); 3) willingness and acceptance of the fact that

26

stigmatizing thoughts will come up rather than avoiding such thoughts; 4) relating to oneself as distinct and separate from thoughts and feelings or "private experiences" (e.g., "you as a person are not your thoughts"); 5) clarifying valued actions and patterns of behavior in social interactions (e.g., acting in accordance to one's values in a situation or social interaction in which they are experiencing stigma or having stigma enacted towards them); and 6) continuing to act in accordance to one's values even when negative beliefs about oneself, internalized stigma, and negative feelings associated with internalized stigma seem to stand in the way (Hayes, et al., 2002; Levin et al, 2014).

Currently, there are no studies specifically examining associations between psychological flexibility and Type-2 Diabetes stigma. However, there is research showing promising evidence in the efficacy of acceptance-based interventions targeting psychological flexibility leading to improvements in the experience and internalization of stigma. In a critical review of 14 empirically based interventions targeting internalized stigma, Mittal et al. (2012) found two overarching, but contradictory, approaches of internalized stigma reduction: attempting to alter internalized stigmatizing attitudes and beliefs and increasing acceptance of and ability to cope with internalized stigma by improving self-esteem, empowerment, and increasing help-seeking behavior. Though not explicitly stated, cognitive strategies such as accepting thoughts (i.e., psychological flexibility) may be key in internalized-stigma reduction interventions.

A meta-analytic review (Kraft et al., 2018) summarized the results of 16 studies examining associations between psychological flexibility, experienced stigma and internalized stigma across a variety of populations. All studies measured psychological flexibility using either a general or specific version of the AAQ. Results revealed

27

significant associations between psychological flexibility and stigma towards others ($r =$ .20, $p < .001$) and internalized stigma ($r = .54$, $p < .001$) in people with severe mental illness (Chan et al., 2015), substance use disorder (Luoma et al., 2011; 2013), overweight/obesity (Lillis et al., 2011; Palmeira et al., 2016). The studies in this meta-analysis were cross-sectional, represented differing conceptualizations and measurement of stigma and had small, homogenous samples. Despite the limitations, overall, results from this meta-analysis indicate that interventions aimed at improving psychological flexibility may be important in the prevention and treatment of experienced or internalized stigma in minority groups, including people with chronic illness and Type 2 Diabetes.

While no study specifically examined psychological flexibility and stigma in a Type 2 Diabetes population, results may be similar in a Type 2 Diabetes population as in people with other chronic illnesses, such as obesity. Lillis et al. (2009) conducted a randomized-controlled trial of 84 participants who were classified as obese, in which participants who had completed at least six months of a weight loss program were assigned to a six-hour ACT workshop or waitlist control. Weight-stigma was assessed using the Weight Stigma Questionnaire, general psychological flexibility was measured using the AAQ, and weight-related psychological flexibility measured using the Acceptance and Action Questionnaire for Weight (AAQW). There were no pre-treatment differences between groups. ANCOVAs revealed at 3- month those in the ACT condition had lower levels of weight-related stigma. Using pre-scores as covariates, at follow-up those in the ACT condition had greater psychological flexibility as measured by the AAQ, and greater weight-specific psychological flexibility. A Sobel Test of mediation

(Preacher and Leondardelli, 2001) was conducted to test if the pre- to follow-up changes in the ACT condition group were mediated by psychological flexibility. Results revealed weight-specific and general psychological flexibility (AAQ) significantly mediated changes in weight-related stigma. Results from this study may provide preliminary evidence of psychological flexibility as a significant factor in helping people adjust to experiencing stigma specifically related to their chronic illness.

Synthesis of the Literature

Optimal care of persons living with Type 2 Diabetes requires greater understanding of the emotional, behavioral, medical, and social underpinnings of their diabetes management and well-being. Current research findings highlight the utility of an illness identity framework to better understand and promote optimal diabetes-related functioning. Positive identity integration, such as accepting Type 2 Diabetes into one's sense of self or feeling that one's life is enriched by Type 2 Diabetes, has been shown to be associated with better psychological and diabetes-specific functioning (Oris et al., 2016; Ross et al., 2018), including behavioral self-management and clinical health outcomes. Rejecting Type 2 Diabetes or feeling that one's sense of self is overwhelmed by Type 2 Diabetes has been found to be associated with poor outcomes, such as worse self-management and greater diabetes-specific emotional distress (Ross, 2018). It is also important to consider social context in illness identity integration, and what social factors may be associated with positive and negative identity states, such as stigma. Stigma is an understudied factor that negatively impacts adjustment and management of Type 2 Diabetes, and positive illness identity integration may buffer these effects.

Studies to date provide evidence that positive illness identity integration is integral to promoting positive diabetes-specific outcomes, and there is need to understand ways in which identity states may be modified. Psychological flexibility is a key factor in healthy adaptation (Kashdan and Rottenberg, 2010), and is modifiable through acceptance-based intervention (Hayes, 2009). Notably, several intervention studies with Type 2 Diabetes samples suggest that increased psychological flexibility is associated with better psychological functioning and diabetes-specific emotional, behavioral, and medical outcomes.

Importantly, there are no published studies specifically examining psychological flexibility and stigma in Type 2 Diabetes, though intervention studies show that psychological flexibility allows individuals to better cope with experiences of stigma (Levin et al., 2014). Remaining psychologically flexible in the face of situational demands, such as demands related to adjusting to Type 2 Diabetes, may allow people with Type 2 Diabetes to feel a more enriched identity or sense of self through engagement in valued behaviors. Additionally, psychological flexibility may promote positive changes in illness self-perceptions and by remaining psychological flexible, individuals may be able to integrate Type 2 Diabetes more positively into their sense of self and their lives.

Purpose of the Present Study

The present study aimed to further examine emotional, behavioral, and social factors in the adjustment and management of Type 2 Diabetes within an illness identity framework. This study aimed to further establish associations with positive (e.g., enrichment) and negative (e.g., rejection) illness identity dimensions and aspects of

diabetes-specific functioning, including diabetes distress, self-management behaviors, and Type 2 Diabetes stigma. Healthy diet is paramount in the prevention and management of Type 2 Diabetes and is the cornerstone treatment for managing Hba1c levels (ADA 2021; Forouhi et al., 2018). For these reasons, this present study focused specifically on diet as a diabetes self-management behavior of utmost importance.

The present study is the first to examine associations between illness identity dimensions and Type 2 Diabetes stigma, filling a need to address relationships between illness identity and social outcomes (e.g., stigma) that may impact Type 2 Diabetes adjustment and management. Additionally, this study proposed psychological flexibility as a modifiable factor that influences the associations between illness identity and diabetes-specific functioning. Understanding how psychological flexibility may promote positive illness identity states and positive emotional, behavioral, and psychosocial diabetes-specific functioning may lead to clinical implications of using person-centered, acceptance-based interventions to promote adjustment and management of Type 2 Diabetes.

Summary of Introduction

The way people view their illness and integrate it into their sense of self or identity is a continuous, transactional process that may be integral to the behavioral management and psychosocial adaptation to situational demands and lifestyle changes when living with a chronic illness, such as Type 2 Diabetes. To date, there is only one study (Ross et al., 2018) examining illness identity and diabetes-specific psychosocial and behavioral factors in Type 2 Diabetes. Overall, negative illness identity dimensions (e.g., rejection) are significantly associated with negative health outcomes and positive

illness identity dimensions are significantly associated with positive outcomes (e.g., enrichment). Little is known about psychological factors that may be influencing the relationship between illness identity and diabetes-specific psychosocial and behavioral functioning, necessitating further understanding of associations between aforementioned factors. Psychological flexibility is a *modifiable* psychological factor that has been associated with greater general acceptance and healthy behaviors (i.e., valued behavioral action), and may be an important modifiable factor in promotion of positive illness identity dimensions (e.g., enrichment) in people with Type 2 Diabetes, potentially leading to better psychosocial functioning and behavioral diabetes management. Psychologists or medical professionals working with people with Type 2 Diabetes may use acceptance-based interventions to promote psychological flexibility, as well as an enriched sense of self and living a valued life as a person with Type 2 Diabetes.

According to biopsychosocial models of disease, social factors are as important as biological and psychological factors in terms of coping with and managing chronic illness. There is growing evidence that people with Type 2 Diabetes experience stigma associated with their disease. Experiencing and internalizing stigma may negatively impact positive illness identity integration, leading to higher rejection and engulfment identity states. Psychological flexibility has also been associated with the experience of stigma and may be an important psychological tool in adapting to situational demands of managing diabetes, such as experiencing, perceiving, and internalizing diabetes-specific stigma. Understanding the associations between diabetes-related stigma and illness identity, as well as associations between stigma and diabetes-management behaviors, may also be important in terms of helping individuals to cope with and manage their

disease. Clinical implications may include promoting psychological flexibility and helping individuals to cope with diabetes-specific stigma, as well as educating the public and diabetes health care providers on diabetes stigma and implications for care.

Study Aims

The present study aimed to examine and characterize diabetes-specific functioning, psychological functioning, illness identity and Type-2 Diabetes Stigma in an adult clinical sample of patients with Type 2 Diabetes. An additional aim was to examine associations between illness identity dimensions of enrichment and rejection and diabetes-specific emotional, behavioral, and psychosocial outcomes, with psychological flexibility as a moderator variable and gender and diabetes duration as control variables.

It was hypothesized that there would be a moderate positive association between enrichment and diabetes self-care diet behavior, a large negative association between enrichment and diabetes-related emotional distress, and a moderate negative association between enrichment and Type 2 Diabetes stigma. It was also hypothesized that the associations between enrichment and diabetes-specific outcomes would be moderated by psychological flexibility, whereas higher psychological flexibility (i.e., lower scores on the AAQ-2) will strengthen the negative association between enrichment and diabetes distress, strengthen the positive association between enrichment and diabetes self-care diet behavior, and strengthen the negative association between diabetes stigma.

Additionally, it was hypothesized that there would be a large negative association between rejection and diabetes self-care diet behavior, a large positive association between rejection and diabetes distress, and a large positive association between rejection and diabetes stigma. Further, it was hypothesized that the associations between rejection

and diabetes-specific outcomes would be moderated by psychological flexibility. Specifically, higher psychological flexibility (i.e., lower scores on the AAQ-2), would decrease the strength of the association between rejection and diabetes distress, decrease the strength of the association between rejection and diabetes stigma, and decrease the strength of association between rejection and diabetes self-care diet behavior.

CHAPTER II: METHODOLOGY

Participants. Participants were 224 mid-life and older adults with Type 2 Diabetes recruited from an online participant recruitment and data collection platform, Prolific (prolific.co). Participants were pre-screened for the following inclusion criteria, using a prescreening functionality on Prolific: ages 40-70 and self-reported diagnosis of Type 2 Diabetes. According to the CDC (2017) middle-aged and older adults are at highest risk of developing Type 2 Diabetes, and Type 2 Diabetes is most common in people aged 45-64. In keeping with these prevalence statistics and the proposed online data collection format, the study focused on enrolling adults aged 40 to 70 years of age to maximize sample size. Additionally, participants had to be proficient in written English, have access to the internet via a computer, phone, or tablet, and have a Prolific.co user profile.

 Procedure. Once the study was published on the Prolific website, only interested persons who meet pre-screening criteria (age 40-70, diagnosis of Type 2 Diabetes) were able to view and access the study. Informed consent was obtained using an online informed consent preamble given when the participants began the study survey.

 Participants completed a brief online survey via the secure data collection site, REDCap. On average, the survey took approximately 7-12 minutes to complete. The survey asked about demographic information, clinical health information related to Type 2 Diabetes, and included validated self-report questionnaires that assessed diabetes-specific health behaviors and self-perceptions of living with Type 2 Diabetes.

The survey also included questions to establish sample validity. Participants were asked to confirm Type 2 Diabetes diagnosis, with the question explicitly stating that individuals with Type 1 Diabetes or gestational diabetes would be excluded from the study. There was an additional question about age, and several participants were excluded due to not meeting the age inclusion criteria. Additionally, participants were asked to self-report their height, weight, blood pressure, comorbid health conditions, and oral medications. These clinical health data points helped to ensure sample validity based on what would be expected in a person with Type 2 Diabetes (high BMI/obesity, high blood pressure, likely multiple comorbidities, and accurately reporting Type 2 diabetes management medications).

At the beginning of the survey, participants were required to provide their unique Prolific ID number, assigned by Prolific to participants. The unique Prolific ID number was used to prevent participants from taking the survey twice. Additionally, participants were automatically assigned a unique subject ID number via REDCap that was paired with their survey responses, including their Prolific ID number. There was a master identification list of matched Prolific ID and Subject ID. No directly identifying information was collected in this study. Once the survey was completed, participants were redirected to the Prolific website to type in a confirmation code given by Prolific to confirm study completion.

Participants were excluded from the study if the participant failed 2 out of 3 attention checks, if the confirmation of Type 2 Diabetes diagnosis was invalidated based on survey response, if they were outside of the 40-70 age range; if they completed the survey exceptionally fast (i.e., completion time 3 standard deviations below the mean), or

if there was a significant amount of missing data (i.e., participant only completed demographic information and no survey questionnaires). Participants were individually compensated for their time upon approval of their study submission. Payment occurred automatically upon approval via the Prolific website. Participants were paid $2.50 for completing the online questionnaire.

Measures. The following measures were collected to address cross-sectional relationships between illness identity dimensions, psychological flexibility, and diabetes-specific functioning.

General Background/Demographic Information. Participants completed a brief demographic questionnaire (approx. 15 items) assessing age, gender orientation, race/ethnicity, education status, type of insurance (i.e., private insurance vs. public), work status (part time, full time), marital/relationship status. Specific breakdown of demographic categories can be found in Table 1.

Clinical/Diabetes Health Characteristics. Participants completed a brief questionnaire to assess clinical and diabetes health-related characteristics, including self-reported hbA1C level and date of reading, blood pressure and date of reading, weight, height, and BMI. BMI was calculated using the CDC BMI calculator (weight (lb) / [height(in)]^2 x 703) (CDC, 2022). BMI was categorized descriptively using the CDC's (2022) obesity classifications: underweight (BMI < 18.5), normal/healthy weight (BMI 18.5 to 24.9), overweight (BMI 25.0 to 29.9), and obese (BMI 30.0 or higher) (CDC, 2022). Additionally, the questionnaire assessed duration of diabetes since diagnosis (months); diabetes treatment regimen (i.e., do you currently take insulin injections to manage your Type 2 Diabetes – yes or no?); relevant clinical health comorbidities

(hypertension, cardiovascular disease, poor renal function, hyperlipidemia, neuropathy); Type 2 Diabetes family history (immediate family/first-degree relative, extended family/second-degree relative; spouse; none). To corroborate inclusion criteria, a single question was asked to confirm diagnosis of Type 2 Diabetes (i.e., Do you have a diagnosis of Type 2 Diabetes?). This question was preceded with a subheading clarifying that if the participant had Type 1 Diabetes or a current diagnosis of gestational diabetes, that they were unable to participate and should have selected "no" for this question.

   Depressive Symptomology. Depressive symptomology was measured using the Patient Health-Questionnaire 2-item depressive symptomology screener (PHQ-2; Kroenke et al. 2003). The PHQ-2 asks participants to rate the frequency of depressed mood and anhedonia over the past 2 weeks on a 4-point Likert scale ranging from 0 ("not at all") to 3 ("nearly every day"). Scores greater than or equal to 3 may indicate significant symptoms consistent with clinical major depression (Kroenke et al., 2003).

   Illness Identity. Illness identity dimensions (acceptance, enrichment, engulfment, rejection) was measured using the well-validated Illness Identity Questionnaire (IIQ; Oris et al., 2016). The IIQ has been validated for use in adolescents and emerging young adults with Type 1 Diabetes (Oris et al., 2016) and adults with Type 2 Diabetes (Ross, 2018), as well as in adults with congenital heart disease and musculoskeletal diseases. The IIQ consists of 27 items in which participants are asked to rate each statement on a Likert scale from 1 (strongly disagree) to 5 (strongly agree). Items load onto four subscales: acceptance, enrichment, engulfment, and rejection and are summed and averaged to get a subscale score (Oris et al., 2016). For this study, the subscales of enrichment and rejection will be examined. In the original validation study (Oris et al.,

2016), items loading onto the enrichment factor had factor loadings ranging from .59 to

.79, with good internal consistency (Cronbach's α = .90); items loading onto the rejection

had factor loadings ranging from .58 to .80, with good internal consistency (Chronbach's

α = .84). The enrichment factor had higher factor loadings and better internal consistency

than the acceptance factor (Cronbach's α = .85). Additionally, items on the rejection

factor had higher factor loadings than items on the engulfment factor, though the

engulfment factor did have slightly higher internal consistency (Cronbach's α = .90).

Engulfment and enrichment were negatively correlated (r = -0.10, p <.012), enrichment

and rejection were negatively correlated (r = -.22, p <.001). In an adult Type 2 Diabetes

population, Ross (2018) found that rejection had a significant negative association with

enrichment (r = -.27, p <.001); however inconsistent with the previous study (Oris et al.,

2016), engulfment was positively associated with enrichment (r = 0.18, p = .003) and

there was no association found between rejection and engulfment. Given these

inconsistent findings, enrichment was chosen in this study to represent positive illness

identity, while rejection was chosen to represent negative illness identity. Additionally, in

an adult Type 2 Diabetes population, Ross (2018) found that enrichment had the highest

item factor loadings ranging from .826 to .894, all significant at the p<.001 level. Similar

to the previous study (Oris et al., 2016), Ross (2018) found good internal consistency for

the enrichment factor (Cronbach's α = .95) and rejection factor (Cronbach's α = .84).

Furthermore, acceptance was not chosen due to lower factor loadings and internal

consistency, as well as the potential for multicollinearity with other measures used in this

study (i.e., psychological flexibility). In this study, continuous scores of enrichment and

rejection were gained by summing and averaging Likert scale ratings on each of the subscales.

Psychological Flexibility. Assessment of psychological flexibility was conducted using the Acceptance and Action Questionnaire, second version (AAQ-II; Bond et al., 2011). The AAQ-II is the most widely used measure of psychological flexibility and has been validated for use in a variety of populations. The AAQ-II is 7-item questionnaire in which participants are asked to rate "how true" each statement is on a Likert scale of 1 (never true) to 7 (always true). Bond et al. (2011) found the AAQ-II to have good reliability and validity, with an average Cronbach's $\alpha = .84$ and a 3- and 12-month test-retest reliability of .81 and .79, respectively. Items on the AAQ-II are summed to create a continuous total score, *with lower scores indicating higher psychological flexibility,* and *higher scores indicating lower psychological flexibility/higher psychological inflexibility.* Total scores around 24-29 are associated with cutoffs on measures of depression and anxiety (Bond et al., 2011).

Diabetes Emotional Distress. Diabetes-related distress was assessed using the 5-item Problem Areas in Diabetes Scale-Short Form (PAID-5; McGuire et al., 2010). The PAID-5 has been found to be a reliable (Cronbach's $\alpha = .86$) and valid measure of emotional distress related to having diabetes, with satisfactory sensitivity (94%) and specificity (89%) for recognizing diabetes-related emotional distress. The original 20-item PAID scale (Polonsky et al., 2005) measures emotional problems, treatment-related problems, food-related problems, and social support-related problems), while the 5-item PAID exclusively assesses emotional distress related to management of diabetes in both people with Type 1 and Type 2 Diabetes, though the majority of respondents in the initial

validation study had Type 2 Diabetes (63.2%). On the PAID-5, participants are asked to indicate how much diabetes issues are currently a problem, on a scale of 0 (not a problem) to 4 (serious problem). Individual item scores are summed to get a total score of emotional distress, which can range from 0-20. A higher total score is indicative of higher emotional distress related to having diabetes. In this study, a total continuous score of diabetes emotional distress was used as a dependent variable.

Diabetes Self-Management Behavior. Diabetes self-management behaviors were assessed using the General Diet Scale of the Summary of Diabetes Self-Care Activities (SDSCA; Toobert et al., 2000). The SDSCA is a valid measure of self-care activities in people with Type-2 Diabetes, with average inter-item correlations within scales being high (average Cronbach's α = .47) and test-retest reliability was moderate (average 0.40). The SDSCA is the most widely used self-report instrument for measuring diabetes self-management in adults, including behaviors such as diet, exercise, blood sugar testing, foot care, and smoking. For the purposes of this study, *general* diet questions were used to conceptualize Type 2 Diabetes self-management, as diet is a key lifestyle behavior to promote in people with Type 2 Diabetes. The SDSCA also measures *specific* diet (i.e., items asking specifically about fruit and vegetable consumption), however the specific scale has low inter-item correlations (Toobert et al., 2000) and therefore was not used. The SDSCA General Diet subscale consists of 2 items, in which participants are asked to indicate in how many of the last seven days and how many days per week in the last month have they followed a healthful eating plan. Items are scored on a Likert scale from 0 (0 days) to 7 (7 days). Total scores for general diet are gained from averaging the two items on the subscale. The higher the score, the better the self-management of diabetes

41

through general diet behaviors. One continuous score of General Diet was used as a measure of behavioral functioning in this study.

Type 2 Diabetes Stigma. The Type 2 Diabetes Stigma Assessment Scale (DSAS-2) was used to examine perceived and experienced stigma. The DSAS-2 was developed specifically to measure perceived and experienced stigma for use in adults with Type 2 Diabetes. The DSAS-2 consists of 19-items in which each participant is to rate each statement on a scale of 1 (strongly disagree) to 5 (strongly agree). The average total stigma score in a sample of 1,064 adults with Type 2 Diabetes was 41.0 (SD =15.9), ranging from 19 to 90. The DSAS-2 consists of three subscales: treated differently (Cronbach's α = .88), blame and judgement (Cronbach's α = .90) and self-stigma (Cronbach's α = .90), as well as a total score of Type 2 Diabetes stigma (Cronbach's α = .95). The current study used a continuous total score of Type 2 Diabetes Stigma as a dependent variable.

Statistical Approach

Statistical Analyses for Description

Descriptive statistics (e.g., mean, standard deviation, frequency) were used to describe and characterize (1) demographic characteristics, (2) clinical health/diabetes characteristics , (3) illness identity dimensions, (4) psychological flexibility, and (5) diabetes-specific psychosocial, emotional, and behavioral functioning (e.g., diabetes distress, diabetes stigma, self-management general diet behavior) in sample of adults with Type 2 Diabetes. Associations between main variables of interested were assessed using bivariate Pearson Correlations.

Statistical Plan for Hierarchical Multiple Regressions

Associations between illness identity dimensions and diabetes-specific emotional, behavioral, and psychosocial factors with psychological flexibility as a moderator, controlling for gender, diabetes duration, and depression, were assessed using a series of 6 hierarchical multiple regressions. It is important to note that diabetes duration was used as a proxy for age in the hierarchical multiple regression analyses, as diabetes duration and age were positively associated. Each hierarchical regression had gender and diabetes duration in the first block, depressive symptomology score in the second block, illness identity dimension (enrichment or rejection) and psychological flexibility in the third block, and the product interaction term in the fourth block. To increase interpretability of regression coefficients and reducing multicollinearity (Afshartous and Preston , 2011), the continuous illness identity variables (rejection and enrichment), psychological flexibility, and the product interaction term were centered (i.e., subtracted mean values as a constant from every value of the variable). A total of 6 separate hierarchical regressions were conducted for each of the two illness identity dimensions (enrichment and rejection) with diabetes distress, general diet behavior, or diabetes stigma as the dependent variable. Given the risk of Type 1 Error when conducting multiple analyses and consistent with the power analysis conducted to detect sample size, the alpha level was adjusted using Bonferroni Correction, and all analyses were evaluated at a $p = 0.008$ level.

Research Aims and Hypotheses

The study aims and specific hypotheses are presented below, with specific hypotheses listed in advance of their respective analytic plans.

Aim 1. Examine and characterize diabetes-specific functioning, psychological functioning, illness identity and Type 2 Diabetes stigma in sample of adults with Type 2 Diabetes.

Aim 2. Examine associations between illness identity dimensions of enrichment and rejection and diabetes-specific emotional, behavioral, and psychosocial functioning, with psychological flexibility as a moderator variable and gender, diabetes duration, and depressive symptomology as control variables.

Hypothesis 1. There will be a moderate positive association between enrichment and diabetes self-care diet behavior, a large negative association between enrichment and diabetes-related emotional distress, and a moderate negative association between enrichment and diabetes stigma.

Statistical Approach. Associations were examined via bivariate Pearson correlations.

Hypothesis 2. The associations between enrichment and diabetes-specific functioning will be moderated by psychological flexibility, whereas higher psychological flexibility (i.e., lower AAQ-2 score) will strengthen the negative association between enrichment and diabetes distress, strengthen the positive association between enrichment and diabetes self-care diet behavior, and strengthen the negative association between Type 2 Diabetes stigma.

Statistical Approach. These questions were examined with 3 hierarchical regressions, with the control variables (gender and diabetes duration) in the first block, the PHQ-2 (depressive symptomology) in the second block, the centered independent variables identity enrichment (IIQ) and psychological flexibility (AAQ-II) in the third

block, and the centered moderator (identity enrichment x psychological flexibility product interaction term) in the fourth block. A hierarchical regression was conducted for each dependent variable: diabetes emotional distress (PAID-5), diabetes self-management: diet (SDSCA-Diet), and diabetes stigma (DSAS-2).

Hypothesis 3. There will be a large negative association between rejection and diabetes self-care diet behavior, a large positive association between rejection and diabetes distress, and a large positive association between rejection and diabetes stigma.

Statistical Approach. Associations were be examined via bivariate Pearson correlations.

Hypothesis 4. The associations between rejection and aspects of diabetes-specific functioning will be moderated by psychological flexibility. Higher psychological flexibility will decrease the strength of the association between rejection and diabetes distress, decrease the strength of the association between rejection and diabetes stigma, and decrease the strength of association between rejection and self-care diet behavior.

Statistical Approach. To address these study questions, 3 hierarchical regressions were conducted, with the control variables (gender and diabetes duration) in the first block, the PHQ-2 score (depressive symptomology) in the second block, the centered independent variables (identity rejection and psychological flexibility) in the third block, and the centered moderator (identity rejection x psychological flexibility product interaction term) in the fourth block. A hierarchical regression was conducted for each dependent variable: diabetes emotional distress, diabetes self-management diet behavior, and diabetes stigma.

A-Priori Power Analysis for Sample Size Consideration

A G*power a-priori power analysis was conducted to assess sample size needed to detect an effect. Results of the power analysis indicated a minimum sample size of 114 would be needed to detect a moderate effect (effect size $f^2 = 0.15$; alpha = .008; power = .80). Alpha level was corrected for number of analyses (6). To account for missing data, participants not completing the study, and participants who meet exclusion criteria, it was estimated that approximately 200 participants would need to be recruited in order to have an adequate sample of participants who completed all measures, and to achieve over the minimum sample size needed ($N = 114$) for power (.80) and to detect a moderate effect (.15).

CHAPTER III: RESULTS

Participant Recruitment and Final Sample Size

A total of 237 participants were recruited from Prolific. A flow chart (Figure 1)

detailing participant recruitment, completion vs. noncompletion rates, removal due to

exclusion criteria, and outliers can be found in the Appendix. A total of 12 participants

were removed from the study. One participant was removed from the study for

completing the survey too quickly (i.e., 3 standard deviations below average time to

complete). Three participants were excluded due to their reported age being outside of the

required study inclusion age range. One participant was removed due to self-reported

gender as non-binary and one participant was removed due to not reporting gender. Six

participants were removed due to having significant missing data, with these participants

only completing the demographic and/or clinical health information and not completing

any of the questionnaires. One participant was removed as an outlier on "diabetes

duration", a variable included in the primary analyses. Overall, the final sample size of

the study included in analyses following removal of these excluded participants was 224.

This sample size is sufficient for meeting the sample size assumption of 20 participants

per predictor variable for hierarchical multiple regression.

Testing of Hierarchical Multiple Regression Assumptions

Assumptions of hierarchical multiple regression analyses were assessed via

examining outliers (z scores > 3 SDs; boxplots); normality of dependent variables

(skewness and kurtosis descriptive statistics; normal probability plots); linearity between

independent and dependent variables (scatterplots); independence of the error distribution (Durbin-Watson statistic between 1.5 and 2.5); multicollinearity (no associations greater than $r = .7$; Cook's distance < 1; standard residuals between -3 and 3; Tolerance $< .1$; VIF < 10; interaction term variables centered); and homoscedasticity (P-P plots) (Kelly & Bolin, 2013).

Overall, all assumptions of hierarchical multiple regression were met with the exception of outliers. Of the variables included in the primary analyses, outliers were only detected on the Diabetes Duration (in months) variable. Five outliers were found with z-scores greater than three. These outliers all had reported diabetes durations of greater than or equal to 360 months. Upon further examination of these outliers, the majority of participants were of older age, suggesting that they were likely diagnosed with Type 2 Diabetes in their 20-30s, which is clinically plausible. One of the 5 outliers reported the highest diabetes duration of 408 months which translated to a diabetes diagnosis at age 14. This was considered to be clinically unlikely and due to outlier status both statistically and clinically, this participant was excluded from data analyses.

Demographic Information

The average age of this sample was 54.94 ($SD = 8.13$) with an even gender distribution (50.45 male, $N =113$ and 49.6% female, $N =111$). The majority of participants were White (87.9%; $N=197$); 197), 7.1% were Black/African American ($N=16$), 3.1% were are Asian/Asian American ($N=7$) , 2.7% were Native American/American Indian/Native Alaskan ($N=3$), and 1.3% reported their race as "other" ($N=3$). More information on participant demographics, including work status, socioeconomic status, and marital status can be found in Table 1.

Clinical/Diabetes-Health Information

Clinical and diabetes-health related information is summarized in Table 2. Average time since diagnosis of Type 2 Diabetes was 8.71 ($SD = 6.67$; range =.42 to 31.50) years. Average BMI = 34.24 ($SD = 8.87$), which falls within the class 1 obesity category. The majority of participant BMIs fell into high-risk clinical classification categories with overweight (24.6%), obese (41.1%) or severely obese (22.3%). Average participant reported Hba1C and blood pressure levels were within medically recommended ranges (Standards of Medical Care in Diabetes; American Diabetes Association, 2022). Regarding family history of Type 2 Diabetes (with the exclusion of Type 1 Diabetes), the majority of participants reported having a first degree relative (55.4%, $N = 124$) or second degree relative (28.6%, $N = 64$) with Type 2 Diabetes. Family history of Type 1 or gestational diabetes was not assessed. Regarding medical management of Type 2 Diabetes, 23.9% of participants ($N = 53$) reported currently taking insulin, while the majority (76.1%, $N = 169$) reported not using exogenous insulin. The most frequently reported oral medications used for diabetes management (by $N = 43$ participants) were Aloglipton and Farxiga (Dapagliflozin). Obesity (reported by 57.1%) and hypertension (reported by 54.0%) were the most prevalent health comorbidities reported.

Hypotheses Testing

Aim 1

The first aim of this study was to examine and characterize diabetes-specific functioning, psychological functioning, illness identity and Type 2 Diabetes stigma in a sample of adults with Type 2 Diabetes. Descriptive information was examined using

descriptive statistics including means, standard deviations, and frequency counts. Descriptive information is highlighted in Tables 3 and 4.

Descriptive Information on Variables in Primary Analyses

Illness Identity Dimensions. Participants (N =224) scored an average of 2.74 (SD = .93 on the Rejection subscale, 2.77 (SD = .96) on the Enrichment Subscale, 3.59 (SD = .67) on the Acceptance subscale, and 2.00 (SD = .71) on the Engulfment subscale. Overall, as compared to a separate Type 2 Diabetes sample (Ross et al., 2018), the average score on the Rejection subscale was higher, the Enrichment subscale score was lower, and the Engulfment and Acceptance scores were about the same. Subscale scores from this study and the Ross et al. (2018) study found an illness identity pattern of Engulfment as the lowest scoring subscale, Acceptance as the highest scoring subscale, and Rejection and Enrichment scores falling in between. Subscale ranges and internal consistencies (Cronbach's α) can be found in Table 3.

Diabetes-related Functioning. Participants (N = 224) scored an average of 6.09 (SD = 4.64) on diabetes emotional distress (PAID-5), which falls below the clinical cutoff score of 8 (McGuire, 2010). Average number of days per week participants reported eating the recommended serving of fruits and vegetables was 4.29 (SD = 2.12), while average number of days participants reported engaging in physical activity was 2.43 (SD = 2.28). Participants reported an average score of 44.61 (SD = 15.47) on perceived stigma associated with having Type-2 Diabetes (DSAS-2). Specifically, average score on the Treated Differently subscale was 10.57 (SD = 4.67), average Blame and Judgment subscale score was 20.18 (SD = 7.25), and average Self-Stigma subscale score was 13.87 (SD = 6.38). Overall, this sample scored higher on the DSAS-2 as compared to an adult

Type 2 Diabetes sample that the measure was initially validated on (Browne et al., 2016). Ranges for measure scoring and internal consistencies (Cronbach's α) can be found in Table 3.

   Psychological Functioning. Participants scored an average total PHQ-2 of 1.56 (*SD* = 1.88), which is not indicative of significant depressive symptoms. Participants scored an average psychological flexibility (AAQ-2) score of 20.56 (*SD* = 11.01), falling in the middle of the range of scores possible on the AAQ-2. See Table 3 for ranges and internal consistencies (Cronbach's α).

Aim 2

   The second aim of this study was to examine associations between illness identity dimensions of enrichment and rejection and diabetes-specific emotional, behavioral, and psychosocial functioning, with psychological flexibility as a moderator variable and gender, diabetes duration, and depressive symptomology as control variables. Associations between primary constructs of interest were first examined using bivariate Pearson correlations (Hypotheses 1 and 3). Then, the relationship between illness identity dimensions and aspects of diabetes-related functioning with psychological flexibility as a moderator variable (Hypotheses 2 and 4) were examined using hierarchical multiple regressions.

Hypothesis 1: There will be a moderate positive association between enrichment and diabetes self-care diet behavior, a large negative association between enrichment and diabetes-related emotional distress, and a moderate negative association between enrichment and diabetes stigma.

Bivariate Pearson Correlation Results. Two-tailed bivariate correlations were conducted to examine associations between illness identity enrichment and diabetes-related functioning (See Table 4). A small, negative association was found between enrichment and Type 2 Diabetes stigma, r = -.175, p = .009. A moderate, positive association was found between enrichment and diabetes self-care general diet behavior, r = .318, p < .001. A small, negative association was found between between enrichment and diabetes emotional distress r = -.173, p = .010.

H2. The associations between enrichment and diabetes-specific functioning will be moderated by psychological flexibility, whereas higher psychological flexibility (i.e., lower scores on the AAQ-2) will strengthen the negative association between enrichment and diabetes distress, strengthen the positive association between enrichment and diabetes self-care diet behavior, and strengthen the negative association between Type 2 Diabetes stigma.

Hierachical Multiple Regression 1 (HMR1): Examining associations between enrichment and general diet behavior with psychological flexibility as a moderator.

Model 1. The first model included gender and diabetes duration in the first block of the analysis. This model was not significant, indicating that gender and diabetes duration did not signficantly contribute to the variance in general diet scores. Neither variable was significantly related to general diet behavior when controlling for the other. Model 2 yielded different results. These results, as well as the results for every model in the hierarchical multiple regression, can be found in Table 5.

Model 2. For the second block of the analysis, depression (PHQ-2) was added. This model significantly accounted for 7% of the variance in general diet score, $F(3,213)$

= 5.33, p = .001, R^2 = .070, with depression alone accounting for 6.7% more variance in general diet scores above and beyond gender and diabetes duration (ΔR^2 = .067). When controlling for gender and diabetes duration, depression was significantly related to general diet score (p <.001), with every additional unit increase in depression scores, general diet scores decreased by .294 (β = -.294). Model 3 yielded different results.

Model 3. In this model, illness identity enrichment (IIQ) and psychological flexibility (AAQ-2) were added into the third block of the analysis. Overall, this model significantly accounted for 12.8% of the variance in general diet scores $F(5, 211)$ = 6.18, p < .001, R^2 = 0.128. Adding illness identity enrichment and psychological flexibility into the model significantly accounted for 5.8% more variance in general diet scores above and beyond gender, diabetes duration, and depression (ΔR^2 = .058). Depression was still significantly related to general diet scores when controlling for all other variables (p = .037), and with every one unit increase in depression scores, general diet scores decreased by .201 (β = -.201). Illness identity enrichment was significantly related to general diet scores when controlling for all other variables (p < .001), with every one unit increase in illness identity enrichment, general diet scores increased by .560 (β = .560). Psychological flexibility, gender, and diabetes duration were not found to be signfiicantyl associated with general diet scores when controlling for all other variables.

Model 4. In this model, the product interaction term (psychological flexiblity x enrichment) as the moderator was added in the fourth block. This model significantly accounted for 13.0% of the variance in general diet scores, $F(6,210)$ = 5.23, p < .001, R^2 = .130. However, the model did not signifcantly explain more variance in general diet scores than the previous model (ΔR^2 = .002). Similar to the third model, depression was

found to be significantly related to general diet behavior when controlling for all other variables ($p = .049$), and with every additional unit increase in depression, general diet behaviors decreased by .191 units ($\beta = -.191$). Additionally, illness identity enrichment was found to be significantly associated with general diet behavior ($p < .001$), and with every additional unit increase in enrichment there was a .564 unit increase in general diet scores ($\beta = .564$). Psychological flexibiltiy was not found to be significantly related to general diet behavior when controlling for all other variables. Notably, the product interaction term (psychological flexibility x enrichment) did not signficantly contribute to the model when controlling for all other variables, indicating that psychological flexibility is *not* a moderator variable in the associations between illness identity enrichment and diabetes stigma when controlling for gender, diabetes duration, and depressive symptomology.

Hierarchical Multiple Regression 2 (HMR 2): Examining associations between enrichment and diabetes distress with psychological flexibility as a moderator.

Model 1. The results of the model that included gender and diabetes duration in the first block was not statistically significant ($p = .092$). This model accounted for 2.2% of the variance in diabetes distress scores ($R^2 = .022$), which means that 97.8% of the variance in diabetes distress scores cannot be explained by gender and diabetes duration alone. Different results were found in the second model. Results of this model, as well as all other models included in this hierarchical multiple regression, can be found in Table 6.

Model 2. Depression was added into the second block of this analysis. This model statistically contributed to 22.2% of the variance in diabetes distress, $F(3, 213) = 20.22$, $p < .001$, $R^2 = .222$. Depression scores significantly accounted for 20% of the variance in

diabetes distress scores above and beyond gender and diabetes duration ($\Delta R^2 = .200$).

Controlling for gender and diabetes duration, for each additional unit increase of

depression, diabetes distress increased by 1.11 units ($\beta = 1.11$). The third model yielded a

different result.

     Model 3. In this model, illness identity enrichment and psychological flexibility

were added into the third block of the analysis. This model signficantly accounted for

37.0% of variance in diabetes distress scores, $F(5,211) = 24.79$, $p < .001$, $R^2 = .370$.

Adding enrichment and psychological flexibility significantly contributed to 14.8% more

variance in diabetes distress above and beyond that of gender, diabetes duration, and

depression ($\Delta R^2 = .148$). Psychological flexibility was found to be significantly

associated with diabetes distress ($p < .001$) when controlling for all other variables. With

each additional unit increase of psychological flexibility, diabetes distress scores

increased by .218 units ($\beta = -.218$) Higher scores on the AAQ-2 indicate *less*

psychological flexibility (i.e., greater psycholigical inflexibility), indicating with every

unit increase in psychological *inflexibility*, diabetes distress increased by .218 units.

Illness identity enrichment did not significantly contribute to the model when controlling

for the other variables. The fourth model yielded similar results.

     Model 4. In this model, the product interaction term (psychological flexibility x

illness identity enrichment) was added as the moderator variable in the fourth block of the

analysis. Overall, this model significanlty contributed to 37.0% of the variance in

diabetes distress scores, $F(6,210) = 20.56$, $p < .001$, $R^2 = .370$. Adding in the moderator

variable did not significantly account for more variance in diabetes distress scores than

the previous model ($\Delta R^2 = .000$). Similar to the third model, psychological flexibility

was found to be significantly associated with diabetes distress ($p < .001$) when controlling for the other variables. With every additional unit increase in psychological inflexibility, diabetes distress increased by .218 units ($\beta = .218$). Illness identity enrichment did not significantly contribute to the model when controlling for all other variables. The product interaction term did not signficantly contribute to the model when controlling for all other variables, indicating that psychological flexibility is *not* a moderator variable in the associations between illness identity enrichment and diabetes distress when controlling for gender, diabetes duration, and depression.

Hierarchical Multiple Regression 3 (HMR 3): Examining associations between enrichment and diabetes stigma, with psychological flexibility as a moderator.

Model 1. This model included gender and diabetes duration in the first block of the analysis. This model contributed to 2.9% of the variance in diabetes stigma scores, $F(2,214) = 3.22$, $p = .042$, $R^2 = .042$. However, this study is using a *p*-value of .008 to determine significance in order to eliminate risks of Type 1 Error when running multiple analyses. Using this rule, this model would no longer be considered significant. The second model yielded different results. Results from this model, as well as all other models in this hierarchical multiple regression, are highlighted in Table 7.

Model 2. In this model, depression was added to the second block. This model signfiicantly accounted for 9.0% of the variance in diabetes stigma, $F(3, 213) = 6.99$, $p < .001$, $R^2 = .090$. Depression significantly contributed 6.0% more variance in diabetes stigma scores above and beyong that of gender and diabetes duration ($\Delta R^2 = .060$). Depression significantly contributed to the amount of variance explained in diabetes stigma, when controlling for gender and diabetes duration ($p < .001$). With each

additional unit increase of depression, diabetes stigma score increased by 2.04 units ($\beta =$ 2.04). The third model yielded different results.

Model 3. In this model, illness identity enrichment and psychological flexiblity were included in the third block. This model significantly accounted for 26.9% of the variance in diabetes stigma, $F(5, 211) = 15.51$, $p < .001$), $R^2 = .269$. Adding in illness identity enrichment and psychological flexibility scores accounted for 17.9% more variance in diabetes stigma scores ($\Delta R^2 = .179$) above and beyond that of gender, diabetes duration, and depression alone. When controlling for all other variables in this model, psychological flexiblity was significantly related to diabetes stigma ($p < .001$). With every additional unit increase in psychological *inflexibility* (i.e., increase in AAQ-2 score), diabetes stigma scores increased by .780 ($\beta = .780$). Illness identity enrichment was not significantly associated with diabetes stigma when controlling for all other variables. Depression was also no longer significantly associated with diabetes stigma when controlling for all other variables. The fourth model yielded similar results.

Model 4. In this model, the product interaction term (psychological flexibility x illness identity enrichment) was added as the moderator variable in the fourth block of the analysis. This model signfiicanlty contributed to 26.9% of the variance in diabetes stigma, $F(6, 210) = 12.89$, $p < .001$, $R^2 = .269$. Notably, adding in the product interaction term did not significantly account for more variance in diabetes stigma scores than the previous model ($\Delta R^2 = 0.00$). Similar to the third model, when controlling for all other variables, psychological flexibility was significantly associated with diabetes stigma ($p < .001$). With every additional unit increase in psychological *inflexibility,* diabetes stigma increased by .780 units ($\beta = .780$). Illness identity enrichment was not significantly

associated with diabetes stigma when controlling for all other variables in the model. Additionally, the product interaction term did not signficantly contribute to the model when controlling for all other variables, indicating that psychological flexibility is *not* a moderator variable in the associations between illness identity enrichment and diabetes stigma when controlling for gender, diabetes duration, and depression.

Hypothesis 3: There will be a large negative association between rejection and diabetes self-care diet behavior, a large positive association between rejection and diabetes distress, and a large positive association between rejection and diabetes stigma.

Bivariate Pearson Correlation Results. Two-tailed bivariate correlations were conducted to examine associations between illness identity rejection and diabetes-related functioning (See Table 5). A small, negative association was found between rejection and diabetes self-care general diet behavior, $r = -.238$, $p < .001$. A small, positive association was found between rejection and diabetes distress, $r = .239$, $p < .001$. A moderate, positive association was found between rejection and diabetes stigma, $r = .337$, $p < .001$.

H4: The associations between rejection and diabetes-specific functioning will be moderated by psychological flexibility. Higher psychological flexibility (i.e., lower AAQ-2 scores) will decrease the strength of the association between rejection and diabetes distress, decrease the strength of the association between rejection and diabetes stigma, and decrease the strength of association between rejection and self-care diet behavior.

Hierarchical Multiple Regression 4 (HMR 4): Examining associations between rejection and general diet behavior, with psychological flexibility as a moderator.

Model 1. This model includes gender and diabetes duration in the first block of the analysis. This model was not significant ($p = .774$), indicating that gender and diabetes duration alone did not account for a significant amount of variance explained in general diet scores. Within this model, neither gender nor diabetes duration were significantly related to general diet behavior. The second model yielded different results. Results from this model, and for all models included in this hierarchical multiple regression, are highlighted in Table 8.

Model 2. In this model, depression was added into the second block. Overall, the model was significant, $F(2,213) = 5.33$, $p = .001$ and explained 7.0% of the variance in general diet scores ($R^2 = .070$). Adding depression into the model resulted in the model accounting for 6.7% more variance above and beyond that of gender and diabetes duration alone ($\Delta R^2 = .067$). Within this model, depression was significantly related to general diet behavior ($p < .001$) when controlling for gender and diabetes duration. This indicates that with every additional unit increase in depression score, general diet score decreased by .294 units ($\beta = -.294$). Model 3 yielded different results.

Model 3. In this model, illness identity rejection and psychological flexibility were added into the third block of the analysis. Overall, the model was significant, $F(5, 211) = 4.71$, $p < .001$, and explained 10.0% of the variance in general diet scores ($R^2 = .100$). Adding illness identity rejection and psychological flexibility into the model allowed for 3.1% more variance accounted for in general diet scores ($\Delta R^2 = .031$). Similar to the previous model, depression was significantly associated with general diet behavior ($p = 0.010$) when controlling for all other variables, and with every one unit increase in depression scores, there was a .250 unit decrease in general diet scores ($\beta = -$

.250). Illness identity rejection was also found to be a significantly associated with general diet scores ($p = .010$) when controlling for all other variables, and with every one unit increase in illness identity rejection, there was a .410 decrease in general diet scores ($\beta = -.410$). Psychological flexibility was not found to be a significantly related to general diet when controlling for all other variables. Model 4 yielded similar results.

Model 4. This model added the product interaction term (psychological flexibility x illness identity rejection) as the moderator variable into the fourth block. Overall, this model was significant $F(6,210) = 3.91$, $p < .001$, and accounted for 10.1% of variance in general diet scores ($R^2 = .101$). However, the ΔR^2 from the previous model was not significant ($\Delta R^2 = .000$), indicating that adding the moderator into the model did not significantly account for any more variance in general diet scores above and beyond the previous model. Similar to model 3, depression was found to be significantly related to general diet scores ($p = .011$) when controlling for all other variables, and with every additional unit increase of depression score, there was a .249 unit decrease in general diet score ($\beta = -.249$). Additionally, identity rejection was found to be significantly related to general diet scores ($p = .011$) when controlling for all other variables, with every additional unit increase in identity rejection, there was a .400 unit decrease in general diet scores ($\beta = -.400$). Psychological flexibility was not significantly associated with diet behavior when controlling for all other variables. Notably, the product interaction term did not signficantly contribute to the model when controlling for all other variables, indicating that psychological flexibility is *not* a moderator variable in the associations between illness identity rejection and general diet behavior when controlling for gender, diabetes duration, and depression.

Hierarchical Multiple Regression 5 (HMR 5): Examining associations between

rejection and diabetes distress, with psychological flexibility as a moderator.

Model 1. This model included gender and diabetes duration in the first block. This model did not account for a significant amount of variance in diabetes distress scores ($p = .092$). Neither gender nor diabetes duration were significantly associated with diabetes distress when controlling for the other variable. The second model yielded different results. Results from this model, and for all models included in this hierarchical multiple regression, are highlighted in Table 9.

Model 2. This model included depression in the second block. Overall, this model significantly accounted for 22.2% of the variance in diabetes distress scores, $F(3, 213) = 20.22, p < .001, R^2 = .222$. Adding in depression to the model accounted for 20.0% of variance in diabetes distress scores above and beyond that of gender and diabetes duration alone ($\Delta R^2 = .200$). When controlling for gender and diabetes duration, depression was found to be significantly related to diabetes distress ($p < .001$), and with every additional unit increase of depression, there was a 1.11 unit increase in diabetes distress ($\beta = 1.11$). Model 3 yielded different results.

Model 3. In Model 3, illness identity rejection and psychological flexibility were added into the 3rd block of the model. Overall, this model significantly accounted for 37.4% of the variance in diabetes distress scores, $F(5,211) = 25.22, p < .001, R^2 = .374$. Adding psychological flexibility and illness identity rejection into the model accounted for 15.2% more variance explained in diabetes distress ($\Delta R^2 = .152$). In this model, neither depression nor illness identity rejection were found to be significantly associated with diabetes distress when controlling for the other variables. Psychological flexibility

was found to be significantly related to diabetes distress ($p < .001$) when controlling for the other variables, with every additional unit increase in psychological inflexibility, there was a .207 unit increase in diabetes distress scores ($\beta = .207$). Model 4 yielded similar results.

Model 4. In this model, the product interaction term (psychological flexibility x identity rejection) was added as moderator variable in the fourth block of the analysis. Overall, this model significantly accounted for 37.4% of the variance in diabetes distress scores, $F(6, 210) = 20.95$, $p < .001$, $R^2 = .374$. However, there was no change in R^2 ($\Delta R^2 = .000$) from the previous model, indicating that the moderator variable did not significantly contribute to the amount of variance explained in diabetes distress scores. Similar to the previous model, only psychological flexibility was found to be significantly related to diabetes distress ($p < .001$) when controlling for all other variables, with every one unit increase in psychological flexibility, there was a .206 unit increase in diabetes distress scores ($\beta = .206$). Notably, the product interaction term was not significantly associated with diabetes distress when controlling for all other variables, indicating that there is no interaction between psychological flexibility and illness identity rejection, and that psychological flexibility is *not* a moderator in the associations between illness identity rejection and diabetes distress when controlling for gender, diabetes duration, and depression.

Hierarchical Multiple Regression 6 (HMR 6): Examining associations between rejection and diabetes stigma, with psychological flexibility as a moderator.

Model 1. Gender and diabetes duration were included in the first block. This model accounted for 4.2% of the variance in diabetes stigma scores, $F(2,214) = 3.22$, $p <$

.042, $R^2 = .042$. However, in order to eliminate the risk of Type 1 Error in conducting multiple analyses, significance was set at the $p < .008$ level. Therefore, this model was not considered significant. Results for this model, and for all models included in this hierarchical multiple regression, can be found in Table 10. Model 2 yielded different results.

Model 2. In this model, depression was added into the second block of the analysis. This model significantly accounted for 9.0% of the variance in diabetes stigma scores, $F(3,213) = 6.99$, $p < .001$, $R^2 = .090$. Within this model, depression alone significantly contributed to 6.0% of the variance in diabetes stigma scores above and beyond that of gender and diabetes duration ($\Delta R^2 = .060$). Depression was found to be significantly related to diabetes stigma ($p<.001$) when controlling for gender and diabetes duration. With every additional unit increase in depression, diabetes stigma increased by 2.04 units ($\beta = 2.04$). Gender was also found to be significantly associated with diabetes stigma ($p = .043$, $\beta = 4.12$). Model 3 yielded different results.

Model 3. In this model, illness identity rejection and psychological flexibility were added into the third block of the analysis. This model significantly accounted for 30.9% of the variance in diabetes stigma scores, $F(5, 211) = 18.84$, $p < .001$, $R^2 = .309$. Adding rejection and psychological flexibility into the model significantly contributed to 21.9% of the variance in diabetes stigma scores, above and beyond that of depression, gender, or diabetes duration ($\Delta R^2 = .219$). Within this model, illness identity rejection was found to be a significantly associated with diabetes stigma ($p <.001$) when controlling for all other variables. With every additional unit increase in illness identity rejection, diabetes stigma increased by 3.56 units ($\beta = 3.56$). Psychological inflexibility

was also significantly associated with diabetes stigma ($p < .001$) when controlling for all other variables. With every additional unit increase in AAQ-2 scores, indicating higher *psychological inflexibility*, diabetes stigma increased by .694 units ($\beta = .694$). The fourth model yielded similar results.

Model 4. This model included the product interaction term (psychological flexibility x rejection) as the moderator variable in the fourth block. Overall, this model significantly contributed to 30.9% of the variance in diabetes stigma scores, $F(6, 210) = 15.63$, $p < .001$, $R^2 = .309$. However, adding the moderator variable did not significantly contribute to the model and there was no change in R square ($\Delta R^2 = .000$). Similar to model 3, rejection was found to be a significantly associated with diabetes stigma ($p < .001$) when controlling for all other variables. With every additional unit increase in illness identity rejection, diabetes stigma increased by 3.56 units ($\beta = 3.56$). Additionally, psychological *inflexibility* was found to be significantly associate with diabetes stigma ($p < .001$) when controlling for all other variables. With every additional unit increase in AAQ-2 scores, indicating higher *psychological inflexibility*, diabetes stigma increased by .693 units ($\beta = .693$). Notably, the moderator variable was not significantly associated with diabetes distress, indicating that there is no significant interaction between psychological flexibility and illness identity rejection.

CHAPTER IV: DISCUSSION

The purpose of this dissertation study was to examine the associations between chronic illness identity dimensions and diabetes-related emotional, behavioral, and psychosocial functioning within an illness-identity and acceptance-based framework. Specifically, this study examined the role of psychological flexibility as a moderator in the relationships between two dimensions of chronic illness identity (i.e., enrichment and rejection) and diabetes emotional distress, diabetes self-management diet behavior, and diabetes stigma. Additionally, this study added to the limited published research on associations between chronic illness identity and diabetes-related functioning in adults with Type 2 Diabetes. It was hypothesized that enrichment would be associated with positive diabetes functioning (i.e., lower levels of diabetes distress, better diet behavior, lower stigma) and rejection would be associated with poor diabetes functioning (i.e., higher diabetes distress, poor diet behavior, increased stigma). Furthermore, it was hypothesized that psychological flexibility would strengthen the relationships between enrichment and positive diabetes functioning, while buffering the negative impact of rejection on diabetes functioning.

Overview of Sample Demographics, Clinical Characteristics, and Diabetes-Specific Functioning

This cross-sectional study focused on adults aged 40-70 with Type 2 Diabetes. Data were collected through an online platform using self-report questionnaires.

Participants were predominantly White and had a range of socioeconomic, employment, education, and relational statuses. This sample was split evenly between male and female identifying participants and the majority were overweight/obese and inactive. Additionally, the majority of participants had a family history of Type 2 Diabetes and were taking medication (i.e., using exogenous insulin or oral medication) for diabetes management.

Overall, this sample reported high levels of Type 2 Diabetes stigma, relative to samples in prior research (Browne et. al., 2016). This sample scored higher on the Total Stigma score and slightly higher on all subscales of the DSAS-2 (Treated Differently, Blame and Judgement, and Self-Stigma), with the Blame and Judgement average score being the highest. This finding is consistent with previous literature that conceptualized Type 2 Diabetes as a "disease of shame and blame", given that many adults with Type 2 Diabetes feel that others believe they "bring it upon themselves" (Browne et al., 2013) .

Research has consistently shown that adults with Type 2 Diabetes tend to have low levels of psychological flexibility (Kilic et al., 2022). The current sample reported slightly lower psychological inflexibility than a recent normative sample of adults with Type 2 Diabetes (Kilic et al., 2022) with an average score of 20.56 as compared to 24.27. However, the current study's sample scored relatively higher than a normative non-diabetes sample (Bond et al., 2011) on the AAQ-2, indicating higher psychological inflexibility. Taken together, research on psychological flexibility in adults with Type 2 Diabetes may indicate that those with Type 2 Diabetes have higher levels of *psychological inflexibility* than that of the general population; however, there have been no studies directly comparing levels of psychological flexibility or the impact of

acceptance-based interventions in adults with Type 2 Diabetes as compared to a "healthy", non-diabetes control group.

Participants in this sample reported average depressive symptom scores on the PHQ-2 that fell below clinical significance, as scores greater than 3 on the PHQ-2 may indicate clinically significant levels of depressive symptomology (Lowe et al., 2005). When looking at diabetes-specific emotional distress, results of this study indicate that this sample reported an average level of diabetes distress that is below the clinical cut off, and lower than the normative adult Type 2 Diabetes sample (McGuire et al., 2010).

This sample reported chronic illness identity dimension scores consistent with findings from the only other study examining chronic illness identity in adults with Type 2 Diabetes (Ross et al., 2018). Specifically, this dissertation study sample scored comparably to that of Ross and colleagues' (2018) sample on the engulfment and acceptance subscales. The current study participants scored slightly lower than Ross and colleagues' (2018) sample on enrichment, and slightly higher on rejection. Overall, the current sample scored the lowest on engulfment, followed by enrichment, rejection, and acceptance. A summary of these scores is highlighted in Table 3. Interestingly, both this study sample and that of Ross and colleagues (2018) scored lowest on engulfment and highest on acceptance, with rejection and enrichment scores falling in between. This could indicate that there is standard pattern of how illness identity dimensions may look in adults with Type 2 Diabetes, though more research is needed.

Support for an Illness Identity Framework in Type 2 Diabetes Treatment and Self-Management

Diabetes Self-Management Behavior

Consideration of illness identity in treatment and management of chronic illness is a new concept. Results of the present study highlight the importance of examining one's sense of identity as it relates to diabetes self-management behaviors. This study focused on a single aspect of the diabetes self-management regimen- eating a healthy diet. The ADA guidelines highlight eating a healthy diet, along with awareness and knowledge of a healthful diabetes diet, as integral to self-management (American Diabetes Association Nutrition Guidelines Report; Evert et al., 2019). Notably, this study's sample had an average BMI in the obese range. The ADA highlights obesity not only as a risk factor for developing diabetes, but also a risk factor for people with Type 2 Diabetes to develop further diabetes complications, including higher Hba1C levels and high blood pressure (American Diabetes Association, 2022). The ADA highlights eating a healthy diet as key to managing weight and preventing further diabetes complications (American Diabetes Association Nutrition Guidelines Report; Evert et al., 2019). In order to understand individual differences in engagement in healthy diabetes self-management behaviors, it may be necessary to first examine illness identity integration and factors that may be contributing to whether or not an individual integrates their diabetes into their sense of self.

The present study found that illness identity dimensions of enrichment and rejection predicted general diet behavior above and beyond that of psychological flexibility, which has found to be associated with diabetes self-care behaviors in previous research (Shayeghian et al., 2016). These results suggest the way one integrates their Type 2 Diabetes into their sense of self may have a stronger impact on diabetes self-management behavior than the tendency to remain cognitively flexible in the face of

distressing demands. Engaging in diabetes self-management behaviors is demanding and can often be accompanied by distress. When a person feels more enriched by their Type 2 Diabetes and views their illness as an experience that has led to personal growth, they may be more inclined or willing to engage in healthy self-management behaviors that will allow them to better live and continue to grow as a person with Type 2 Diabetes. On the other hand, if one has high illness identity rejection, they may see their Type 2 Diabetes, and the self-management behaviors that accompany it, as a threat to their sense of self (Leventhal, 1999). Individuals with high illness identity rejection may be at risk of engaging in poor self-management behaviors, putting them at greater risk for poor outcomes, including uncontrolled diabetes and other related diabetes complications. In the context of engaging in healthy self-management behaviors, such as eating a healthy diet, rejecting one's Type 2 Diabetes as a part of one's identity may be conceptualized as a sense of denial or lack of awareness or general knowledge of the importance of engaging in healthy diet behaviors to diabetes self-management, and to overall health.

The current study provides preliminary evidence that supports considering illness identity in the treatment and management of Type 2 Diabetes in adults. Findings support the positive aspects of illness identity (i.e., enrichment) as associated with healthier self-management behaviors. Negative aspects of illness identity (i.e., rejection) may lead to maladaptive health behaviors that impede diabetes-specific functioning overall. Results of this dissertation study are consistent with findings of the only published study of illness identity in adults with Type 2 Diabetes to date (Ross et al., 2018). Ross et al. (2018) found enrichment was associated with better diabetes self-care behaviors (as measured by the SDSCA); and while associations were found between rejection and self-

care behaviors using univariate correlational analyses, no significant relationship was found using linear regression in that particular study. Notably, Ross and colleagues (2018) included several aspects of diabetes self-care in the analyses, while the present study considered only the associations between illness identity and diet.

The results of this study build upon the evidence for associations between illness identity dimensions and general diet behavior. Given the importance of engaging in healthy diet behaviors to diabetes self-management and prevention of diabetes-related complications and health comorbidities, it is important to consider how these associations may contribute to health behavior change in individuals who may have poor diet behaviors and associated health risks, including obesity, high blood pressure, and high HbA1c levels. It could be that illness identity dimensions are specifically important to consider when understanding an individual's general diet behavior and adherence to following a diabetes-specific diet, or lack thereof. Perhaps illness identity enrichment is closely related to other aspects of the process of health-behavior change, as well, such as self-efficacy, and may bolster an individual's confidence and motivation to engage in healthy self-management behaviors. For example, from a motivation theory perspective, the last stage of lifestyle behavior change is characterized as "identification", or the incorporation of change into one's typical routine *and* their view of their self (Miller and Rollnick, 2004). From this perspective, perhaps engagement in health disease management behaviors could also lead to more positive illness identity integration.

It is possible that illness identity dimensions may also be associated with other diabetes self-care regimen behaviors, including exercise, blood glucose monitoring, and medication adherence, though future studies are needed. Overall, illness identity,

specifically rejection and enrichment, are important psychosocial factors to consider in Type 2 Diabetes management and engagement in health-promoting behaviors.

Associations between Illness Identity Rejection and Diabetes Stigma

Type 2 Diabetes is a highly stigmatized disease, and the experience of stigma may lead to further internalization of stigma and impact the extent to which a person integrates their illness into their identity. Results of this study provide preliminary evidence that poor illness identity integration is associated with the experience and internalization of Type 2 Diabetes stigma. Specifically, illness identity rejection was positively associated with diabetes stigma, whereas higher rejection was associated with greater stigma. It is important to note that due to the cross-sectional nature of this study, directionality of this relationship cannot be determined. It could be that the more one rejects Type 2 Diabetes as a part of their identity, the more experiences and internalization of stigma one reports; and the more a person experiences stigma related to their Type 2 Diabetes, the more likely they may be to reject their diabetes as part of their identity. Results of this dissertation study fit within theorized models of coping with stigma that highlight the role of "identity threat appraisal" (Major and O'Brien, 2005). To briefly summarize this model, when one experiences stigma, they may view it as a threat to their identity and may lack the internal and external resources to cope with such threats (Major and O'Brien, 2005). Perhaps high illness identity rejection is associated with higher perceived stigma in adults with Type 2 Diabetes because they view stigma associated with their diabetes as an identity threat. Individuals may reject their illness as a part of their identity in attempts to cope with experiences of being blamed, judged, treated differently, or manage negative feelings about themselves as a person with Type 2 Diabetes; however;

71

rejection may be considered a maladaptive coping mechanism, as it puts individuals at risk of poor self-management behaviors and ongoing experiences of stigma despite one's efforts to reject it. It was hypothesized that psychological flexibility may be a cognitive factor to consider in buffering the relationship between illness identity rejection and diabetes stigma, however results did not support this. More research is needed to examine potential underlying mechanisms of this relationship.

Support for Associations between Psychological Flexibility, Diabetes Distress, and Diabetes Stigma

The current study adds to the literature on associations between psychological flexibility and aspects of diabetes-related functioning, specifically diabetes distress and diabetes stigma. Higher scores on the AAQ-2, which indicate greater psychological *inflexibility* were associated with higher diabetes distress and higher Type 2 Diabetes stigma. Previous studies have found that mindfulness- and acceptance-based therapies, including ACT, have been promising interventions in terms of increasing diabetes self-management behaviors and decreasing diabetes distress (Ngan et al., 2021). While this study was cross-sectional and not treatment-based like the aforementioned studies, results do provide preliminary evidence that *psychological inflexibility* is associated with diabetes distress above and beyond that of gender, diabetes duration, depression, and illness identity rejection and enrichment. These results highlight that when one has a rigid tendency or psychologically maladaptive reaction to aversive and distressing internal and external experiences, they may have greater emotional distress in the form of worry, fear or concern over their illness. Psychological inflexibility may lead to avoidance of

distressing thoughts, feelings, and experiences; therefore exacerbating, rather than alleviating, one's distress related to their Type 2 Diabetes.

Within the context of coping with stigma specifically, psychological flexibility may be seen as a cognitive coping mechanism by way of reappraising the experience of stigma and buffering against negative internal and external experiences. On the contrary, psychological *inflexibility* could be seen as a maladaptive response to stigma, and inability to cope in the face of distressing demands or experiences. Consistent with previous studies on weight-related stigma or mental health-related stigma (Kraft et al., 2018), results from the current study indicate that psychological inflexibility is positively associated with greater experience and internalization of Type 2 Diabetes stigma. When a person has high psychological inflexibility, they may be less able to adapt and adjust to stigmatizing situations and distressing thoughts related to the experience of stigma and may be more likely to internalize such thoughts. Psychological flexibility may allow individuals with Type 2 Diabetes to adapt more flexibly to distressing experiences where they may feel blame or judgment or being treated differently as a result of their Type 2 Diabetes. Though not explored in the current study, it may be that different facets of psychological flexibility, such as cognitive fusion (Trindade et al., 2018), are mechanisms of action underlying this relationship. The more a person experiences stigma as a result of their Type 2 Diabetes, the more they may fuse their thoughts and beliefs about themselves to maladaptive societal views on what it means to be a person with Type 2 Diabetes. Type 2 Diabetes stigma may lead an individual to not seek medical or mental health care related to the management of their Type 2 Diabetes, therefore creating risk for medical diabetes complications and poor psychosocial functioning.

Consideration of Depressive Symptoms in Adults with Type 2 Diabetes

It is well-documented that depression is associated with worse diabetes self-management behaviors, including diet and exercise, in adults with Type 2 Diabetes (Semenkovich et al., 2015). A recent study showed that depression and diabetes distress jointly impacted self-management behaviors and HbA1c levels (Schmitt et al., 2021), suggesting that individuals with depression and comorbid distress specifically relating to their diabetes may be at greater risk for diabetes complications and poorer health overall. Similar to previous studies, this dissertation study found associations between depression and general diet behavior, even when including illness identity enrichment and illness identity rejection in the model. Although directionality of relationships cannot be determined from this study, results indicate that adults with Type 2 Diabetes and comorbid depressive symptoms may engage in worse diet behaviors, whether or not they feel their identity is enriched by their diabetes or whether or not they reject their diabetes as part of their identity. Perhaps adults with Type 2 Diabetes and depression find it difficult to engage in healthy behaviors due to lack of motivation or using unhealthy foods as a maladaptive coping mechanism for their depressive symptoms or distress related to having diabetes.

Participant Characteristics with Potential Influence on Study Findings

Diabetes Duration. This sample has a reported diabetes duration (i.e., time since diagnosis of Type 2 Diabetes) ranging from 5 months to 31.5 years. Previous studies have found associations between diabetes duration and illness identity, with longer duration of illness being associated with higher enrichment and acceptance, whereas rejection and engulfment were associated with shorter diabetes duration (Ross et al., 2018). Contrary to

findings in the literature, results of the present study found that diabetes duration was not significantly associated with identity rejection, though a significant *negative* association was found between enrichment and diabetes duration, suggesting that the longer one has been diagnosed with Type 2 Diabetes, the less identity enrichment they may feel. Identity enrichment is conceptualized as feeling a sense of personal growth from the illness; perhaps the older one gets or the longer they have diabetes, the less sense of personal growth they feel. Perhaps there is a recency effect in illness identity integration, where there is more of a sense of enrichment or personal growth sooner after initial diagnosis; individuals who are recently diagnosed may be grasping ways to cope with and adjust to the disease, and may be seeking out ways in which they can grow and continue to grow as a person with Type 2 Diabetes. It is also important to note that the sample of the current study was limited to adults aged 40-70, whereas previous studies (Oris et al., 2016; Ross et al., 2018) had samples with ages ranging from 18 to 90 years old. Being an adolescent or emerging young adult with Type 2 Diabetes may impact illness identity enrichment differently than being an adult or older adult with Type 2 Diabetes.

     Medical Health Comorbidities. This sample had an average BMI that fell in the category 1 obesity range – a health marker that is highly related to significant medical comorbidity. A recent study found that 75% of adults with Type 2 Diabetes have at least one medical comorbidity (Nowakowska et al., 2019). The health history of participants in the present study reflects the high comorbidity burden that on adults with Type 2 Diabetes. Obesity and hypertension were the most prevalent health comorbidities reported in this sample, followed by neuropathy and CVD. High medical comorbidity may increase risk of diabetes complications and morbidity. Individuals with multiple

comorbid conditions in addition to Type 2 Diabetes may report increased feelings of distress, whether related to their diabetes or their health in general, as well as poorer health behaviors and increased depressive symptoms. People with multiple health comorbidities also may experience greater stigma, including weight-related stigma for those who are obese, stigma associated outward signs of physical comorbidities, stigmatization from medical providers, and stigma associated with management of comorbid conditions. Regarding illness identity, it may be that an individual identifies more with one health comorbidity than the other; for example, an individual with comorbid obesity and Type 2 Diabetes may more strongly identify as a person with obesity rather than a person with Type 2 Diabetes. Illness identity with comorbid illnesses would need to be further explored qualitatively and quantitatively to better understand these relationships.

Family History of Type 2 Diabetes. The majority of participants reported having a family history of Type 2 Diabetes (i.e., a first or second degree relative with Type 2 Diabetes). Previous studies have shown that those who have a family history of Type 2 Diabetes may continue patterns of poor diabetes self-management behaviors, including eating unhealthily (Degefa et al., 2020) and may also experience greater diabetes distress (Parsa et al., 2019). Conversely, family history of Type 2 Diabetes may impact illness identity integration. Those with a family history of Type 2 Diabetes may be more aware of or knowledgeable about treatment recommendations and negative complications of not engaging in self-management behaviors; they may also be more aware of the stigma surrounding Type 2 Diabetes having potentially seen a family member stigmatized due to

their illness. These factors can all impact whether or not an individual integrates their Type 2 Diabetes positively or negatively into their sense of self and identity.

Exogenous Insulin Use. Previous studies have found associations between insulin use, diabetes specific distress (Fisher et al., 2019), and diabetes stigma (Holmes-Truscott et al., 2018). Those who use exogenous insulin may have more worries about the management of their diabetes and what may happen if they are not adherent to checking blood glucose levels and using insulin. Additionally, the use of devices such as a wearable insulin pump may be an outward marker to others that one has diabetes and may be associated with greater feelings of being judged, treated differently, or perceiving more stigma from others as a result of having to use insulin, especially in public spaces. Previous research (Ross et al., 2018) found that those who were using exogenous insulin to manage their diabetes, as compared to those using oral medications, had higher enrichment *and* higher engulfment scores. The authors theorized that those who use insulin may feel more overwhelmed by their insulin regimen, thus reporting higher engulfment; and they also may feel more supported by others, thus endorsing higher enrichment. Using exogenous insulin outwardly identifies an individual as a person with Type 2 Diabetes, and this outward identification may impact the choices one makes for oneself about the extent to which a person integrates their illness into their identity (i.e., rejects it, or feels enriched by it).

Study Strengths

Contribution to the Literature

This dissertation study added to the nascent research on associations between chronic illness identity and diabetes-specific functioning, as it was the first to examine

associations between illness identity dimensions of enrichment and rejection, psychological flexibility and diabetes-related functioning, taken together. Additionally, this study is the first to examine associations between illness identity, psychological flexibility, and Type 2 Diabetes stigma, specifically. This study found that negative illness identity integration (i.e., rejection) and *psychological inflexibility* were associated with greater report of experienced stigma (i.e., being treated differently or feeling blame and judgement because of Type 2 Diabetes). While these findings are not causal in nature, they provide preliminary evidence that promoting positive illness identity and psychological flexibility in adults with Type 2 Diabetes may allow individuals to *respond* more adaptively (whether emotionally, cognitively, or behaviorally) to the inevitable experience of stigma surrounding the disease. Positive illness identity integration and psychological flexibility may allow individuals to adapt and cope with situations or social contexts in which they experience stigma or interactions that lead to self-stigma.

Results of this dissertation support previous research findings of associations between psychological flexibility, diabetes distress and self-management behaviors. Psychological flexibility, and perhaps its underlying mechanisms, appears to be an important psychological factor to consider in promoting better diabetes-related functioning, and those with low psychological flexibility (i.e., psychological inflexibility) may be at greater risk for greater diabetes-related distress and poor self-management behaviors.

An overall strength of this study is that it uses a holistic theoretical model and framework that considers personal factors and external factors in diabetes-related functioning. The measurement instruments considered one's identity as a person with

Type 2 Diabetes, how one cognitively adapts to situational demands, and emotional, behavioral, and psychosocial factors.

Use of Validated and Novel Measurements.

This study used well-validated, self-report questionnaires, including two novel measurements of chronic illness identity (IIQ; Oris et al.) and Type-2 Diabetes stigma (DSAS-2). The findings from this study provide further validation for their use in adults with Type 2 Diabetes.

Representative Type 2 Diabetes Sample

Another strength of this study was the successful online recruitment of a sample that is representative of adults living with Type 2 Diabetes. This sample was majority overweight/obese, inactive, taking medication for diabetes symptom management, and had a self-reported family history of Type 2 Diabetes. Though this self-report data could not be corroborated via participant medical record, the online data collection appears to have achieved recruitment of a valid and representative sample of adults with Type 2 Diabetes. Additionally, this sample has good stratification by gender (approximately 50% male, 50% female). According to the CDC 2017-2020 National Health and Nutrition Examination Survey (CDC, 2020), the prevalence of Type 2 Diabetes in adult males is 15.4%, while the prevalence in adult females is 14.1%. Given these similar prevalence rates, it is essential that Type 2 Diabetes research continues to include representative samples of males and females.

Study Limitations

Study Design

This study used a cross-sectional design, which limits understanding of potential causal relationships between constructs. Longitudinal study designs may allow for a better understanding of bidirectional associations between chronic illness identity, psychological flexibility, and aspects of Type 2 Diabetes functioning. Additionally, longitudinal research would give researchers a better understanding of the reliability and validity of construct measures, and how they hold up over time.

Additionally, this study consisted of quantitative self-report survey data only. Future studies may benefit from collecting qualitative data in addition to quantitative, as qualitative research can give researchers insight into the unique lived experiences of adults with Type 2 Diabetes. Constructs such as chronic illness identity may not be adequately captured via questionnaire only, and qualitative data would allow researchers to gather individual differences in illness identity integration and may possibly inform further measurement development and validation. Additionally, health behavior research has often used diary methods and ecological momentary assessment to better capture and understand behaviors in the moment, rather than having participants recall their experiences and respond to items on a questionnaire measure.

This study used a series of 6 hierarchical multiple regressions to analyze the data. Future studies may benefit from using structural equation modeling to examine associations between all constructs at once and reduce the risk of Type 1 Error.

Sample Considerations

This sample had an over-representation of White participants and does not adequately represent the racial/ethnic distribution of Type 2 Diabetes in the United States. According to the CDC's 2017-2020 National Statistics Report (CDC, 2020),

prevalence of Type 2 Diabetes in the U.S. is highest in Black adults (17.4%), followed by Asian (16.7%) and Hispanic (15.5%) adults, then White adults (13.6) with the lowest prevalence. More research in the prevention, management, and treatment of Type 2 Diabetes is needed in minority populations, given the higher prevalence rates. Future studies should seek a more heterogenous sample in terms of race and ethnicity, to better match the prevalence rates in the United States. Research has found significant differences in diabetes emotional distress and diabetes self-management, whereas individuals belonging to minoritized racial groups have increased emotional distress and worse self-management behaviors as compared to White counterparts (Hausmann et al., 2010; Johnson et al., 2014). Ross and colleagues (2018) found cultural differences in illness identity integration, in which individuals of a reported minority race/ethnicity were more likely to endorse that they have benefited from their Type 2 Diabetes in some way (i.e., reported higher enrichment). Additionally, research has found racial and ethnic differences in diabetes illness perceptions, with minoritized racial groups seeing their diabetes as less of a threat than White counterparts (Ledford et al., 2019). A larger, more diverse sample may allow for examination of group differences by race in chronic illness identity, psychological flexibility, and diabetes-specific functioning.

While the online crowd sourcing platform recruitment approach appears to have yielded a valid diabetes sample, the limitations of recruitment of an online convenience sample of adults who self-reported having Type 2 Diabetes are recognized, This method of sample recruitment greatly enhanced study feasibility and ease of data collection, however, future studies would benefit from recruiting participants from clinical settings, such as outpatient diabetes or endocrinology clinics or primary care. In this way,

researchers could obtain more accurate and valid medical chart data to corroborate participants' self-reported clinical health information. Having access to medical chart data may improve the rate of missing data, as participants would not have to rely on recalling medical information and self-reporting. Although this study's sample seems valid according to the demographic and clinical data obtained, having access to medical chart data would improve the accuracy of clinically-relevant data and allow researchers to confirm that participants do, in fact, have a diagnosis of Type 2 Diabetes.

Measurement Considerations

Contrary to hypotheses, this study did not find empirical support for psychological flexibility as a moderating variable in the relationship between illness identity integration and aspects of diabetes-specific functioning, though there were unique associations found between psychological flexibility, diabetes emotional distress, and diabetes stigma. Though no significant multicollinearity was found, self-report measures used to assess psychological flexibility, or rather psychological *inflexibility*, diabetes emotional distress, and diabetes stigma may all be tapping into the same underlying construct. Data from this study indicate strong associations between diabetes distress, diabetes stigma, and psychological flexibility (see Table 4). Additionally, results from a hierarchical multiple regression (See Table 5) point to preliminary correlation evidence for psychological flexibility as a potential mediator between depressive symptoms and diabetes distress, as when psychological flexibility was added into the model, depression was no longer significantly associated with diabetes distress. More research is needed to assess psychological flexibility as a mediating variable in the association between depressive symptoms and diabetes distress; however, these results

give preliminary evidence that psychological flexibility may buffer diabetes distress in individuals who express heightened depressive symptoms.

This study has highlighted psychological flexibility as an important concept that has been difficult to define and measure. A narrative review on psychological flexibility and its measurements argues that psychological flexibility lacks "definitional consensus" and popular measures of psychological flexibility, such as the AAQ-2, may not adequately capture the true nature of the construct (Cherry et al., 2021). Cherry and colleagues (2021) conclude that the AAQ-2 may capture psychological distress more broadly, and that psychological flexibility cannot be inferred from psychological *inflexibility*, as the AAQ-2 purports to measure. Similarly, Doorley and colleagues (2020) highlight that many studies on psychological flexibility show that the AAQ-2 is more strongly related to measures of psychological distress rather than *flexible responses* to distress, and that existing measures fail to consider psychological flexibility in the pursuit of valued goals.

A promising measure of psychological flexibility is the Personalized Psychological Flexibility Index (PPFI; Kashdan et al., 2020). The PPFI is a well-validated self-report questionnaire that measures ways of managing distress in the pursuit of meaningful or valued life goals, through avoiding, accepting, or harnessing (Kashdan et al., 2020). This measure is the first to examine psychological flexibility on an individualized, personal level; and rather than measuring distress itself, this questionnaire measures three *ways* of managing distress. The PPFI has been found to be distinct from negative emotionality and positively associated with more positive or adaptive emotional and regulatory responses to distressing situations or stressful life events (Kashdan et al.,

2020). Future studies may consider how dimensions of the PPFI (i.e., accepting, harnessing, and avoiding) may be associated with dimensions of chronic illness identity and aspects of diabetes-related functioning.

The Illness Identity Questionnaire (Oris et al., 2016) is a new measure that has been validated for use in Type 2 Diabetes populations by one dissertation study (Ross et al., 2018). While the present study certainly contributes to the use and validation of the IIQ in adults with Type 2 Diabetes, future studies are needed to see whether IIQ scores hold up over time.

The current study used a general measure of Type 2 Diabetes stigma (DSAS-2; Browne et al., 2016), which includes measurement of both perceived experienced stigma and self-stigma, in the primary analyses. Future studies could examine specific facets of Type 2 Diabetes stigma, such as self- or-internalized stigma. Overall, this study has several strengths and limitations. The following section will discuss recommendations for future research to address limitations posed in the current study.

Recommendations for Future Research

Findings from this study highlight relationships between illness identity enrichment and rejection and general diet behaviors. Future studies should further examine associations between illness identity dimensions and additional key diabetes self-management behaviors, including both general and specific diet behaviors, physical activity, glucose monitoring, and medication adherence, as the research is limited in these areas. Understanding relationships between illness identity and diabetes-self management behaviors may be a starting point for understanding overall why some people easily engage in self-management behaviors, while others do not.

Results from this study found preliminary evidence for associations between illness identity dimensions, psychological flexibility, and Type 2 Diabetes stigma, as measured by the DSAS-2 (Browne et al., 2016). The DSAS-2 is a comprehensive self-report measure that assesses both perceived experienced stigma, and self-stigma (otherwise known as internalized stigma). The current study focused on a Total Stigma score as a way to assess associations more broadly; however, future studies may benefit from examining associations using specific subscales of the DSAS-2, rather than a total score, to gain a narrower view of associations between facets of stigma and diabetes-specific functioning. Stigma is a multifaceted construct, consisting of many different "types" of stigma – including experienced stigma, internalized stigma, and perceived stigma. Future studies may benefit from assessing associations between specific facets of Type 2 Diabetes stigma (i.e., experienced vs. internalized) and aspects of diabetes-specific functioning. For example, there may be unique differences when looking at Type 2 Diabetes stigma one *perceives* to experience, such as blame or judgement or being treated differently by others, versus the stigma that one internalizes or integrates as part of their thoughts and beliefs about themselves.

In order to address the measurement issues associated with the construct of psychological flexibility and the non-significant findings of psychological flexibility as a moderating factor in the associations between illness identity and diabetes-specific functioning, future studies may benefit from using alternative recommended measures of psychological flexibility, as well as specific measures of mechanisms underlying the construct of psychological flexibility. Specifically, future studies may benefit from using the Personalized Psychological Flexibility Index (PPFI; Kashdan et al., 2020), as

85

recommended by Cherry and colleagues (2021) in their systematic review. Additionally, within the ACT model, psychological flexibility is theorized to be a multi-faceted construct with six underlying mechanisms that are conceptualized as either acceptance-based processes, or commitment and behavior change processes (Hayes et al., 2004). Future studies may specifically choose to examine associations between specific facets of psychological flexibility, such as acceptance, cognitive fusion, or committed/valued action. Perhaps acceptance, cognitive fusion, or committed/valued action play a moderating role in the relationship between illness identity integration and aspects of diabetes-specific functioning. One way to examine acceptance-based processes in individuals with chronic illness could be to use the Chronic Illness Acceptance Questionnaire (Beacham et al., 2015), which specifically measures willingness and activity engagement, and has been found to be associated with reported illness-related disability. Willingness is defined as the degree to which chronic illness, and associated aversive internal and external stimuli, is allowed in one's experience without avoidance or efforts to control it; while Activity Engagement refers to participating in daily activities while acknowledging the presence of aversive stimuli associated with chronic illness (Vowles et al., 2008). In adults with Type 2 Diabetes, this may encompass engaging in valued or meaningful activities despite experiencing diabetes distress or stigma. Individuals who have high illness identity enrichment may also have higher levels of willingness and activity engagement, contributing to better diabetes psychosocial, behavioral, and emotional functioning. Additionally, cognitive fusion has been a recently researched construct specifically in adults with chronic illness. Maladaptive coping with chronic illness may be tied to one regarding thoughts as literal

representations of reality and have trouble separating the verbal content of such thoughts with their idea of their "self" as a person with chronic illness (Gillanders et al., 2014). Trindade and colleagues have developed a well-validated questionnaire to specifically measure chronic illness cognitive fusion in individuals with irritable bowel disease, cancer, and with mixed chronic comorbidities (Trindade et al., 2018; Trindade et al., 2020). It could be that there are associations between chronic illness identity integration and chronic illness cognitive fusion, with higher cognitive fusion association with greater illness identity rejection; as one who is cognitively fused to thoughts about their illness may engage in maladaptive behaviors instead of valued activities, or positive self-management behaviors, in effort to avoid such thoughts, further contributing to diabetes emotional distress and poorer diabetes-specific functioning overall. Additionally, another facet of psychological flexibility that is being researched in chronic illness populations is that of "valued living" (Jensen et al., 2019). Individuals with chronic illness may experience increased disability, increased medical symptoms, and loss of functioning, making it difficult to engage in activities that they value or enjoy (Jensen et al., 2019). Wilson and colleagues (2010) have developed a well-validated self-report questionnaire to measure valued-living, or valued action, to more sensitively assess mechanisms underlying behavioral change processes. There are no known studies examining associations between valued action and illness identity, though it could be that engagement in valued behaviors, which may include positive self-management behaviors, may positively impact chronic illness identity integration.

Future studies should aim to obtain a larger sample size, as recommended to examine group differences. With a larger sample size and inclusive representation,

researchers may better understand individual differences in illness identity integration and identify individuals who belong to groups that may put them at greater risk for poor illness identity integration and subsequent poorer diabetes-specific functioning. It may be that people who belong to multiply-marginalized groups (such as identifying as a Black Woman with Type 2 Diabetes) may be at greater risk for poorer illness identity integration and associated poorer diabetes-specific functioning, though more research is needed on the role of intersecting identities in diabetes prevention, treatment, and management. Furthermore, a larger sample size would allow for consideration of variables that may be impacting primary associations of interest, such as controlling for demographic variables and clinical diabetes health characteristics.

Chronic illness identity and its measurement (IIQ; Oris et al., 2016) is a novel construct, and more research is needed to understand the construct and validate its measurement. Future research would benefit from the examination of potential "cut points" for IIQ dimensions in order to better understand the multi-dimensional nature of chronic illness identity. For example, an individual may score high on the rejection subscale and also high on the enrichment subscale; or they may score low on the engulfment subscale but also score high on the acceptance subscale. Establishing cut points may better allow researchers to both categorize and conceptualize the nature of chronic illness identity and individual differences in illness identity integration. It would be particularly interesting for future longitudinal studies to examine chronic illness identity over time, as a recent four-wave longitudinal study in adults with Type 2 Diabetes found that certain dimensions of chronic illness identity, including acceptance and enrichment, had slight increases over time, and rejection had slight decreases over

time (Rassart et al., 2021). Given that identity is a continuous, transactional process, it would be interesting to see how illness identity dimensions may change over time, especially given that previous studies and the present study have noted associations between illness identity dimensions, diabetes duration, and age.

Clinical Implications

Research has found ACT to be a promising intervention in decreasing diabetes distress in adults with Type 2 Diabetes, and perceived experienced stigma in other chronic illness populations, such as people with obesity. When working with adults who are struggling with adjusting and adapting to their Type 2 Diabetes, perhaps as evidenced by experiencing diabetes distress, poor self-management behaviors, or reported experiences of stigma due to their illness, health psychologists should consider the use of acceptance-based interventions in prevention and management efforts. It is theorized that ACT works by way of increasing psychological flexibility (Hayes et al., 2004); however, research critiques point out that psychological flexibility is a multifaceted construct (Cherry et al., 2021), and due to these highlighted measurement issues, more research is needed on *which facet* of psychological flexibility may be the most pertinent treatment mechanism of ACT.

Findings from this study highlight that psychological flexibility, or rather *inflexibility*, is an important factor to consider in treatment due to its' associations with diabetes distress and diabetes stigma. Given that psychological flexibility is modifiable, psychologists and other health providers can conduct brief assessments of psychological flexibility to target individuals with Type 2 Diabetes that may experience more psychological inflexibility or rigidity in their thinking. Brief interventions may be used to

enhance psychological flexibility by increasing cognitive coping skills in addition to behaviors that align with one's values and goals. It is important to note that potential useful intervention strategies in the management of Type 2 Diabetes is not limited to ACT. Mindfulness-based interventions may help to increase psychological flexibility by increasing present moment awareness of internal and external experiences and helping individuals to adaptively respond to distressing events. In the context of the findings of the present study, mindfulness-based interventions may help individuals become more aware of distressing thoughts and feelings they have about their Type 2 Diabetes and experience of stigma as they arise, and in turn help them to respond in the moment in an adaptive way.

Implications of findings also include the importance of using holistic, person-centered care in the treatment of Type 2 Diabetes. The ADA recommends consideration of psychosocial factors in diabetes care, with emphasis on a patient-centered, collaborative approach in the assessment and treatment (Young-Hyman et al., 2016). Treatment for Type 2 Diabetes is enhanced by healthcare providers' consideration of the *whole* person in diabetes treatment and management, including their thoughts, feelings, behaviors, social experiences, and their identity as a person with Type 2 Diabetes. Often, medical treatment recommendations fall short of considering how one may integrate their Type 2 Diabetes into their illness or sense of self. Findings of this study highlight the importance of assessing and understanding how one integrates their Type 2 Diabetes into their sense of self, and how identity integrate may positively or negatively impact diabetes self-management diet behaviors and experience of diabetes stigma. In this way, providers may be able to identify people who may be at risk for poorer outcomes due to

rejecting their Type 2 Diabetes as a part of their identity or feeling engulfed or overwhelmed by it. Providers taking the time to ask how a person identifies with their Type 2 Diabetes may also allow them to feel more accepted and enriched by their diabetes, rather than stigmatized, rejected, overwhelmed, and overall distressed.

Healthcare providers, including psychologists and social workers, may also have the ability to provide individuals with resources and opportunities to enhance enrichment and personal growth as a person with Type 2 Diabetes, as well as opportunities to educate patients, family members, other providers, and the general public on diabetes stigma. From a systemic viewpoint, if an individuals' microsystem and macrosystem (i.e., family, friends, providers, communities) are more aware of the stigma people with Type 2 Diabetes may experience and internalize via education, then perhaps an individual may feel less stigmatized and at a decreased risk for feeling distressed, isolated, blamed, or judged due to their chronic illness. Those with multiple-marginalized identities (for example, identifying as a Black, adult female with Type 2 Diabetes) may have experiences that uniquely impact their diabetes-related functioning, including experience of diabetes stigma and stigma towards other identities. By considering the whole person and their contexts, providers may gain a better understanding of how identity may impact one's overall functioning and subsequent adjustment to and management of Type 2 Diabetes.

Overall, findings from this study highlight the importance of *jointly* assessing emotional, psychosocial, and behavioral functioning in adults with Type 2 Diabetes, in tandem with cognitive factors including illness identity integration and psychological flexibility. Interventions that target illness identity integration and psychological

flexibility upstream from diabetes-specific functioning may aid in prevention efforts and overall management of the disease. This study provides preliminary evidence that those with poor illness identity integration, psychological inflexibility, and depressive symptoms may be at higher risk for poor diabetes-related emotional, psychosocial, and behavioral functioning. Clinical health psychologists have a unique role on multidisciplinary diabetes care teams, as they can provide holistic, person-centered, acceptance-based interventions, with consideration of how a person's illness identity may be impacting their diabetes-related functioning.

Summary of Conclusions

In an effort to understand psychological factors that impact the adjustment to and management of Type 2 Diabetes, the present study examined associations between illness identity, psychological flexibility, and diabetes emotional, behavioral, and psychosocial functioning. There are no known studies that have examined these associations in tandem; this study is the first to examine associations between illness identity, psychological flexibility and Type 2 Diabetes stigma, specifically. Findings suggest that dimensions of illness identity and psychological flexibility, when considered individually, play an important role in diabetes self-care behaviors, diabetes distress, and diabetes stigma. Illness identity enrichment and rejection were both found to be associated with general diet behavior, with results providing preliminary evidence of the importance of considering illness identity integration in engagement of diabetes self-management behaviors. Psychological flexibility was associated with diabetes distress and diabetes stigma, and further research is needed to understand the underlying facets of psychological flexibility that may be driving these relationships.

Overall, this study provides preliminary evidence that illness identity integration is an important psychosocial concept to consider in Type 2 Diabetes prevention, treatment, and management. Individuals who positively integrate their illness into their identity may be more likely to engage in positive self-management behaviors, and those who struggle to integrate their Type 2 Diabetes into their identity may be at greater risk of engaging in poor self-management behaviors and respond maladaptively to experiences of stigma related to their disease. Psychological flexibility, when considered on its' own, is a modifiable cognitive factor that has associations with level of diabetes distress and diabetes stigma. Findings from this study highlight the need for healthcare providers to assess illness identity integration in individuals with Type 2 Diabetes, especially if they are struggling to adjust as evidenced by experiencing poor diabetes-related functioning overall. Psychologists may play an important role on multidisciplinary healthcare teams to intervene using acceptance-based interventions within an illness identity framework.

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                    ┌──────────────────────────┐
                    │ Participants Recruited    │
                    │ via Prolific = 237        │
                    └──────────────────────────┘
```

# of participant surveys removed from data set = 6

(1 completed too fast; 3 excluded due to age; 1 removed due to non-binary status; 1 removed due to not reporting gender)

# of participants removed to due being outliers = 1

(outlier on diabetes duration)

# of participants removed due to significant missing data = 6

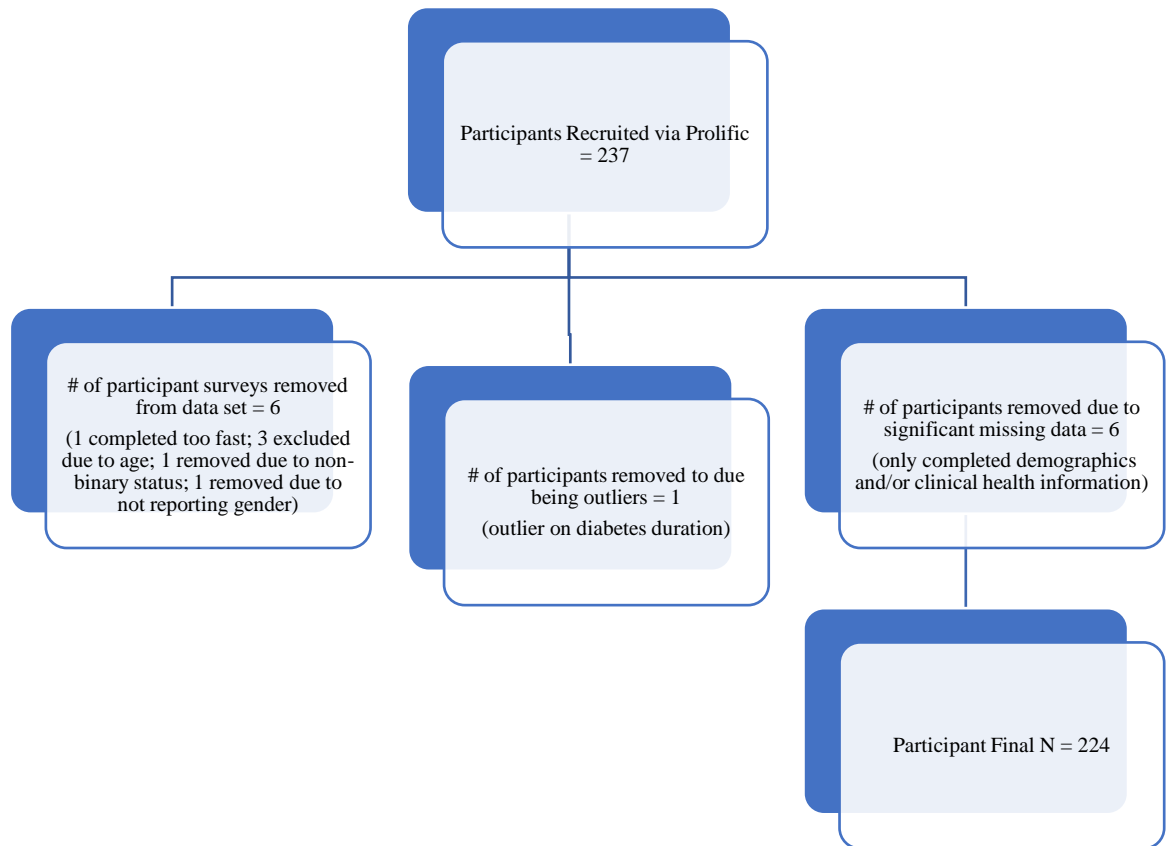(only completed demographics and/or clinical health information)

Participant Final N = 224

Figure 1. Recruitment and Participation Flow Chart.

TABLES

Table 1. Sample Demographics.

Demographics	% (*N*)	*M(SD)*
Age		54.94(8.13)
Gender		
Male	50.4% (*N* = 113)	
Female	49.6% (*N* = 111)	
Race/Ethnicity	87.9% (*N* = 197)	
White (Non-Hispanic)	7.1% (*N* = 16)	
Black	7.1% (*N* = 16)	
Other		
Current Marital Status		
Single	21.3% (*N* = 47)	
Married	49.3% (*N* = 109)	
Domestic Partnership	8.1% (*N* = 18)	
Separated	1.4% (*N* = 3)	
Divorced	13.6% (*N* = 30)	
Widowed	6.3% (*N* = 14)	
Education Level		
High School	.	
Incomplete or less	9% (*N* = 2)	
High School Graduate		
or GED	12.9% (*N* = 29)	
Some College		
College Degree	35.7% (*N* = 80)	
Some Post-Graduate	25.8% (*N* = 58)	
Post-Graduate Degree	4.5% (*N* = 10)	
	20.1% (*N* = 45)	
Work/Employment Status		
Full-Time	48.0% (*N* = 107)	
Part-Time	9.9% (*N* = 22)	
Un-Employed	42.2% (*N* = 94)	
Total Yearly Income		
Less than $30,000	28.7% (*N* = 64)	
$30,000 - $49,999	18.4% (*N* = 41)	
$50,000 - $74, 999	19.7% (*N* = 44)	
$75,000 - $99,999	13.0 % (*N* =29)	
$100,000 - $149,999	11.7% (*N* = 26)	
$150,000 or more	8.5% (*N* = 19)	

Table 2. Clinical and Diabetes-related Health Characteristics.

Health Information	% (N)	M(SD)
Diabetes Duration (Years)		8.17 (6.74)
Age of T2D Diagnosis		46.28 (9.8)
HbA1C Level		7.71 (1.51)
Height (inches)		67.61 (4.43)
Weight (lbs)		221.73 (63.93)
BMI		34.24 (8.87)
Blood Pressure (Systolic/Diastolic)		127.99(13.40)/78.96 (9.57)
BMI Categories		
Underweight	.9% (N = 2)	
Normal Weight	9.8% (N = 22)	
Overweight	24.6% (N = 55)	
Class 1 Obesity	23.2% (N = 52)	
Class 2 Obesity	17.9% (N = 40)	
Severe Obesity	22.3% (N = 50)	
Health Insurance		
Private Insurance	52.1% (N = 113)	
Public Insurance	47.9% (N = 104)	
Family History of T2D		
No Family History	29.0% (N = 65)	
First-Degree Relative	55.4% (N = 124)	
2nd-Degree Relative	28.6% (N = 64)	
Spouse	8.9% (N = 20)	
Use Insulin to Manage T2D		
Yes	23.9% (N = 53)	
No	76.1% (N = 169)	
Health Comorbidities		
Hypertension	54.0% (N = 121)	
CVD	13.4% (N = 30)	
Poor Renal Function	7.1% (N = 16)	
Hyperlipidemia	15.2% (N = 34)	
Neuropathy	29.5% (N = 66)	

*T2D = Type 2 Diabetes; BMI = Body Mass Index, CVD = cardiovascular disease

Table 3. Descriptive Information on Chronic Illness Identity, Psychological Functioning, and Diabetes-Related Functioning

Illness Identity Subscales	M(SD)	Range	Cronbach's α
Rejection	2.75 (.93)	1.00-5.00	.826
Enrichment	2.77 (.96)	1.17-5.00	.940
Engulfment	2.00 (.71)	1.00-4.25	.883
Acceptance	3.59 (.67)	1.00-5.00	.782
Psychological Functioning	**M(SD)**	**Range**	**Cronbach's α**
AAQ-2 Psychological Flexibility Total Score	20.56 (11.01)	6.00-49.00	.948
PHQ-2 Total Score	1.56 (1.88)	0.00-6.00	.906
Diabetes-Related Functioning	**M(SD)**	**Range**	**Cronbach's α**
PAID Diabetes Distress Total Score	6.09 (4.64)	0.00-20.00	.901
SDSCA General Diet Total Score	4.23 (2.13)	0.00-7.00	.934
SDSCA Exercise Total Score	2.43 (2.28)	0.00-7.00	.898
DSAS-2 Diabetes Stigma Total Score	44.62 (15.47)	17.00-93.00	.934
Treated Differently Subscale	10.57(4.67)	5.00-28.00	.888
Blame and Judgement Subscale	20.18 (7.25)	6.00-35.00	.898
Self-Stigma Subscale	13.87(6.38)	5.00-30.00	.917

Table 4. Associations between Primary Constructs using Bivariate Pearson Correlations.

	Diabetes Duration (years)	PHQ-2	IIQ Rejection	IIQ Enrichment	AAQ-2	PAID-5	SDSCA General Diet
PHQ-2	.165*						
IIQ Rejection	-.069	.186**					
IIQ Enrichment	-.162*	-.305**	-.443**				
AAQ-2*** Psychological Flexibility	.082	.656**	.301**	-.291**			
PAID-5 Diabetes Distress	.061	.462**	.239**	-.173**	.603**		
SDSCA General Diet	-.003	-.236**	-.238**	.318**	-.188**	-.182**	
DSAS-2 Total Stigma	.064	.282**	.337**	-.175**	.520**	.638**	-.077

N =217

*Correlation is significant at the .05 level

**Correlation is significant at the .01 level

***Higher scores on AAQ-2 indicate greater psychological *inflexibility*

Table 5. Hierarchical Multiple Regression Assessing Associations between Enrichment and Psychological Flexibility with General Diet Behavior as the Dependent Variable

Independent Variables	β	t	sig.	R^2	ΔR^2	F	F sig
MODEL 1				.002	.002	.257	.774
Gender	-.204	-.715	.475				
Diabetes Duration	-.001	-.036	.971				
MODEL 2				.070	.067	5.333	.001
Gender	-.094	-.339	.735				
Diabetes Duration	.013	.608	.544				
PHQ-2	-.294	-3.93	<.001				
MODEL 3				.128	.058	6.178	<.001
Gender	-.142	-.510	.611				
Diabetes Duration	.022	1.054	.293				
PHQ-2	-.201	-2.096	.037				
Enrichment	.560	3.672	<.001				
Psych. Flexibility	-.003	-.157	.875				
MODEL 4				.130	.002	5.233	<.001
Gender	-.139	-.501	.617				
Diabetes Duration	.022	1.053	.294				
PHQ-2	-.191	-1.978	.049				
Enrichment	.564	3.692	<.001				
Psych. Flexibility	-.002	-.148	.882				
Interaction*	.010	.756	.450				

*Interaction = Illness Identity Enrichment * Psychological Flexibility

Table 6. Hierarchical Multiple Regression Assessing Associations between Enrichment and Psychological Flexibility with Diabetes Distress as the Dependent Variable Regression

Independent Variables	β	t	sig.	R^2	ΔR^2	F	F sig.
MODEL 1				.022	.022	2.414	.092
Gender	1.0249	2.005	.046				
Diabetes Duration	.041	.868	.387				
MODEL 2				.222	.200	20.215	<.001
Gender	.832	1.485	.139				
Diabetes Duration	-.011	-.255	.799				
PHQ-2	1.112	7.390	<.001				
MODEL 3				.370	.148	24.786	<.001
Gender	.068	.131	.896				
Diabetes Duration	.000	-.009	.993				
PHQ-2	.316	1.763	.079				
Enrichment	.080	.280	.780				
Psych. Flexibility	.218	7.007	<.001				
MODEL 4				.370	.000	20.558	<.001
Gender	.068	.132	.895				
Diabetes Duration	.000	-.009	.993				
PHQ-2	.317	1.75	.082				
Enrichment	.080	.281	.779				
Psych. Flex	.218	6.991	<.001				
Interaction*	.001	.044	.965				

*Interaction = Illness Identity Enrichment * Psychological Flexibility

Table 7. Hierarchical Multiple Regression Assessing Associations between Enrichment and Psychological Flexibility with Diabetes Stigma as the Dependent Variable

Independent Variables	β	t	Sig.	R^2	ΔR^2	F	F sig
MODEL 1				.029	.029	3.223	.042
Gender	4.884	2.357	.019				
Diabetes Duration	.141	.906	.366				
MODEL 2				.090	.060	6.985	<.001
Gender	4.118	2.037	.043				
Diabetes Duration	.047	.305	.761				
PHQ-2	2.042	3.757	<.001				
MODEL 3				.269	.179	15.513	<.001
Gender	1.484	.795	.428				
Diabetes Duration	.068	.490	.625				
PHQ-2	-.956	-1.483	.140				
Enrichment	-.702	-.685	.494				
Psych. Flexibility	.780	6.976	<.001				
MODEL 4				.269	.000	12.892	<.001
Gender	1.491	.797	.426				
Diabetes Duration	.068	.489	.625				
PHQ-2	-.928	-1.424	.156				
Enrichment	-.690	-.671	.503				
Psych. Flexibility	.780	6.965	<.001				
Interaction*	.028	.331	.741				

*Interaction = Illness Identity Enrichment * Psychological Flexibility

Table 8. Hierarchical Multiple Regression Assessing Associations between Rejection and Psychological Flexibility with General Diet Behavior as the Dependent Variable

Independent Variables	β	t	$sig.$	R^2	ΔR^2	F	$F\ sig.$
MODEL 1				.002	.002	.257	.774
Gender	-.204	-.715	.475				
Diabetes Duration	-.001	-.036	.971				
MODEL 2				.070	.067	5.333	.001
Gender	-.094	-.339	.735				
Diabetes	.013	.608	.544				
Duration	-.294	-3.931	<.001				
PHQ-2							
MODEL 3				.100	.031	4.710	<.001
Gender	-.089	-.316	.752				
Diabetes	.007	.334	.739				
Duration	-.250	-2.599	.010				
PHQ-2	-.410	-2.583	.010				
Rejection	-.001	-.043	.966				
Psych. Flexibility							
MODEL 4				.101	.001	3.913	<.001
Gender	-.087	-.310	.757				
Diabetes	.007	.315	.753				
Duration	-.249	-2.572	.011				
PHQ-2	-.400	-2.568	.011				
Rejection	.000	-.027	.978				
Psych. Flexibility	-.002	-.186	.853				
Interaction*							

*Interaction = Illness Identity Rejection * Psychological Flexibility

Table 9. Hierarchical Multiple Regression Assessing Associations between Rejection and Psychological Flexibility with Diabetes Distress as the Dependent Variable

Independent Variables	β	t	sig.	R^2	ΔR^2	F	F sig
MODEL 1				.022	.022	2.414	.092
Gender	1.249	2.005	.046				
Diabetes Duration	.041	.868	.387				
MODEL 2				.222	.200	20.215	<.001
Gender	.832	1.485	.139				
Diabetes Duration	-.011	-.255	.799				
PHQ-2	1.112	7.390	<.001				
MODEL 3				.374	.152	25.223	<.001
Gender	.111	.215	.830				
Diabetes Duration	.003	.075	.941				
PHQ-2	.309	1.747	.082				
Rejection	.344	1.206	.229				
Psych. Flexibility	.207	6.551	<.001				
MODEL 4				.374	.000	20.954	<.001
Gender	.106	.205	.838				
Diabetes Duration	.004	.106	.915				
PHQ-2	.304	1.713	.088				
Rejection	.340	1.190	.235				
Psych. Flexibility	.206	6.486	<.001				
Interaction*	.008	.359	.720				

*Interaction = Illness Identity Rejection * Psychological Flexibility

Table 10. Hierarchical Multiple Regression Assessing Associations between Rejection and Psychological Flexibility with Diabetes Stigma as the Dependent Variable

Independent Variables	β	t	*sig.*	R^2	ΔR^2	F	*F sig.*
MODEL 1				.029	.029	3.223	.042
Gender	4.884	2.357	.019				
Diabetes Duration	.141	.906	.366				
MODEL 2				.090	.060	6.985	<.001
Gender	4.118	2.037	.043				
Diabetes Duration	.047	.305	.761				
PHQ-2	2.042	3.757	<.001				
MODEL 3				.309	.219	18.837	<.001
Gender	1.686	.931	.353				
Diabetes Duration	.127	.944	.346				
PHQ-2	-.893	-1.439	.152				
Rejection	3.559	3.556	<.001				
Psych. Flexibility	.694	6.256	<.001				
MODEL 4				.309	.000	15.626	<.001
Gender	1.681	.926	.356				
Diabetes Duration	.128	.947	.345				
PHQ-2	-.898	-1.439	.152				
Rejection	3.555	3.542	<.001				
Psych. Flexibility	.693	6.212	<.001				
Interaction*	.008	.104	.918				

*Interaction = Illness Identity Rejection * Psychological Flexibility

CURRICULUM VITAE
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EDUCATION

July 2023-July 2024 **Post-Doctoral Fellowship in Clinical Health Psychology**
The Osher Center for Integrative Health at Vanderbilt
Vanderbilt University Medical Center, Nashville, Tennessee
Director of Training: Elizabeth Walsh, Ph.D.

June 2022-June 2023 **Pre-Doctoral Internship in Clinical Psychology**
Tennessee Valley VA Health Care System, Nashville, Tennessee
Director of Training: Maria Cottingham, Ph.D., ABPP-CN

2018-Present **Doctor of Philosophy in Clinical Psychology**
University of Louisville, Louisville, Kentucky
Ph.D. Expected: August 2023
Dissertation Title: *Understanding Associations between Chronic Illness Identity, Psychological Flexibility, and Type 2 Diabetes Emotional, Behavioral, and Psychosocial Outcomes*
Faculty Advisor: Barbara Stetson, Ph.D.

2016-2018 **Master of Science in Clinical Psychology**
Morehead State University, Morehead, Kentucky
Faculty Advisor: Timothy Thornberry, Jr., Ph.D.

2012-2016 **Bachelor of Arts in Psychology**
Honors Diploma, Summa Cum Laude
University of Dayton, Dayton, Ohio

HONORS AND AWARDS

2022 **Senior Level Excellence in Clinical Work Award**
Department of Psychological and Brain Sciences
University of Louisville, Louisville, KY
Awarded to senior student who has demonstrated exceptional skills in clinical work in the Psychological Services Center and external practicum experiences.

2018-2020 **University Fellowship**
University of Louisville Graduate School, Louisville, KY
Fully funded stipend awarded to the most qualified new doctoral students.

2018	**Outstanding Graduate Student in Clinical Psychology**
	Department of Psychology, Morehead State University, Morehead, KY
	Awarded to student with exceptional academic and professional performance.

2016	**Honors Diploma, Summa Cum Laude**
	University of Dayton, Dayton, OH

2016	**Kenneth J. Kuntz Award for Outstanding Service**
	Department of Psychology, University of Dayton, Dayton, OH
	Awarded to student who showed dedication to service in psychology.

2012-2016	**Trustee's Merit Scholarship**
	University of Dayton, Dayton, OH

PROFESSIONAL MEMBERSHIPS

2019-2022	APA Division 38: Society of Health Psychology
2018-2022	Society of Behavioral Medicine
	Special Interest Groups: Physical Activity, Diabetes**,** Obesity and Eating Disorders**,** Sleep**,** Student
2017-2022	American Psychological Association
2016-2018	APA Division 54: Society of Pediatric Psychology

RESEARCH EXPERIENCE

June 2022-Present	**Predoctoral Intern Research Assistant**
	Tennessee Valley Health Care System, Palliative Care Service
	Engagement in pre-doctoral internship research project examining access to mental health care at end-of-life in Veterans with lung cancer. The goal of this project is to understand how mental healthcare at end-of-life improves quality of care through initiation of mental health services or psychotropic medications and reducing further hospitalizations. Project data will result in a final intern research project and manuscript to be published.
	(Supervisor: Daniel Kearns, Psy.D.)
2018-Present	**Graduate Research Assistant**
	Health Behavior Change Research Lab, Department of Psychological and Brain Sciences
	University of Louisville, Louisville, KY
	Program Objectives and Focus:

Study cognitive, affective, behavioral, psychological, and motivational domains of health-related behavior change within a biopsychosocial model of risk prevention, disease management, and health promotion in adults with Type 2 Diabetes and emerging young adults and community populations at-risk of developing Type 2 Diabetes. Specific research projects include:

2018-2020   *Technology Use and Well-being in Emerging Young Adults Study*
University of Louisville, Louisville, KY
Role: Co-Investigator

Description: Multi-phase study designed to (1) characterize patterns of bedtime technology use patterns (2) characterize health behavior patterns and related thoughts and behavior change goals (sleep, diet/caffeine, physical activity, smoking/vaping) (3) characterize emotional well-being and physical well-being as measured by functional fitness (4) examine health risk beliefs and perceptions relative to actual risk in the development of Type 2 diabetes (5) examine associations between technology use and health behavior patterns and well-being at baseline and 2-week follow-up (6) examine 2-week stability in health behaviors and emotional-well-being and intention to change health behaviors.

Duties: Designed study to test specific hypotheses. Assisted in writing Institutional Review Board (IRB) study proposal and received IRB approval. Created and managed study survey utilizing REDCAP survey software. Developed manualized study protocol for study procedures. Coordinated and implemented all study procedures and activities, including informed consent, participant contacting and follow-up scheduling. Conducted standardized functional fitness examinations, including the Queens College Step test. Trained in structured, functional fitness data collection, including measurement of blood pressure, heart rate, and waist-to-hip ratio measurement. Responsible for data management and analysis using SPSS, evaluation of results and development of conference presentations and manuscript development. *(Supervisor: Barbara Stetson, Ph.D.)*

2018-2020   *Study of Physical Activity Continuity and Associations with Social Cognitive and Behavioral Risk Factors Community Exercisers*
University of Louisville, Louisville, KY
Role: Graduate Research Assistant

Description: Theoretically driven examination of physical activity behavior patterns in the context of high-risk situations pertaining to exercise cessation, including suboptimal sleep, affect and relapse-related schemas. Participant recruitment from community-based sites, university undergraduate subject pool.

129

Duties: Conceptualized, developed and implemented analyses of associations between sleep patterns and physical activity and their dual relationships with well-being using the archival data set. Conducted data coding and univariate and multivariate analyses using SPSS. *(Supervisor: Barbara Stetson, Ph.D.)*

2018-2020

Psychology and Health Risks Study
University of Louisville, Louisville, KY
Role: Graduate Research Assistant

Description: Multi-phase study of characteristics of diabetes risk and risk perceptions in emerging young adult university students with a family history of diabetes. Diabetes and global health perceptions and beliefs and objective risk factors assessed for comparison via self-report of health-related behaviors and structured functional fitness evaluations. A message framing intervention was conducted with follow up assessments to evaluate intervention impact on physical activity intentions and behavior.

Duties: Conducted data recording, measure scoring and data analyses in SPSS, using the data set. Developed an enhanced functional assessment protocol manual to facilitate replication of physical fitness assessments of standardized measurements of blood pressure, pre-post activity heart rate, waist-hip ratio, height and weight and implementation of the Queens College Step Test. Identification of key measures for use in a follow up study of emerging young adult functional fitness and well-being in participants both with and without a family history of diabetes (See *Technology Use and Well-being in Emerging Young Adults Study)*. Conceptualized and conducted joint data set analyses examining the role of diabetes family history in health-behavior intentions and associations of health perceptions with dietary behaviors. Evaluated results of analyses and developed conference presentations. *(Supervisor: Barbara Stetson, Ph.D.)*

2016-2018   **Graduate Research Assistant**

Parent-Child Research Lab, Department of Psychology,
Morehead State University, Morehead, KY

Assisted in running a variety of research projects in the Parent-Child Lab. Supervised and trained undergraduates in conducting standardized PCIT observations, interacted with local families and parent-child dyads, assisted with data collection and family observations. Trained to reliably code with the Dyadic Parent-Child Interaction Coding System (DPICS) and learned how to integrate coding into Parent-Child Interaction Therapy (PCIT) services. Conducted focus groups assessing attitudes

about anxiety, depression, and coping with stress in honors students. Surveyed medical providers on perceptions and attitudes of the assessment and treatment of pediatric obesity in Appalachian Kentucky. Conducted bivariate and multivariate analyses using SPSS statistical software. Research projects presented via posters at regional conferences and a peer-reviewed manuscript.
(Supervisor: Timothy Thornberry, Jr., Ph.D.)

2016   **Undergraduate Research Assistant – Behavioral Coder**

Department of Psychology, University of Dayton

Assisted in behavioral data coding for a masters-level thesis examining externalizing behaviors as a risk factor for unintentional home-injury in pre-school aged children. Specifically coded for externalizing behaviors including hyperactivity levels, physical aggression acts, and verbal aggression acts taking place in a simulated hazard room.
(Supervisors: Keri Brown Kirschman, Ph.D., Sally Askar, M.A.)

2013-2015   **Undergraduate Research Assistant**

Self and Social Relationships Lab
Department of Psychology, University of Dayton

Assisted with data collection and entry in research examining self-enhancement, task performance, and self-efficacy in undergraduate students.
(Supervisor: Erin O'Mara, Ph.D.)

DOCTORAL RESEARCH PROGRAM COMPETENCIES

Dissertation Defense: Successfully defended on December 7th, 2022.

Dissertation Proposal

September 2021   **Chronic Illness Identity, Psychological Flexibility, and Associations with Diabetes-Specific Emotional, Behavioral, and Psychosocial Functioning**
Department of Psychological and Brain Sciences, Louisville, KY

Orally defended and approved dissertation proposal. Cross-sectional, online study of associations between chronic illness identity, psychological flexibility, and diabetes-specific functioning in adults with Type 2 Diabetes. Study includes original data collection using an online recruitment platform, full university IRB approval, data management via REDCap, and multivariate data analyses using SPSS and AMOS.

May 2021   **Internalized Stigma, Positive Disability Identification, and Psychological Flexibility: A Biopsychosocial Conceptualization of Disability and Coping**
Department of Psychological and Brain Sciences, Louisville, KY

Completed an empirically based integrative review paper examining constructs of internalized stigma, positive disability identification, and psychological flexibility and associated theoretical models and measurement. Proposed a novel theoretical model of psychological flexibility moderating the impact of internalized stigma on positive disability identification.

MANUSCRIPTS

Bodziony, V., Stetson, B. (2022). Associations between Sleep, Physical Activity, and Well-being in Emerging Young Adults. *Journal of American College Student Health*, 1-11.

Gonzalez, C.M., McDonough, S.R., **Bodziony, V.R.**, Stetson, B.A. (Under Review). Dietary Motivation and Competence in University Students at Risk for Diabetes. Submitted to the *British Journal of Health Psychology*.

Thornberry, J. T., **Bodziony, V. R.,** & Gross, D. A. (2019). Provider Practice and Perceptions of Pediatric Obesity in Appalachian Kentucky. *Southern Medical Journal*, *112*(11), 553-559. doi: 10.14423/SMJ.0000000000001031

PUBLISHED ABSTRACTS AND CONFERENCE PRESENTATIONS

Bodziony, V., Gonzalez, C., Stetson, B. (2021). Pilot Student of Sleep Quality and Well-being: Associations with Pre-Sleep Technology Routines in Young Adults. *Annals of Behavioral Medicine,* 55 (Suppl 1): S363.

Bodziony, V., Gonzalez, C., McDonough, S., Stetson, B. (2021). Diabetes Family History Status, Health Behaviors, and Intentions in Emerging Young Adults. *Annals of Behavioral Medicine,* 55 (Suppl 1): S:148.

Gonzalez, C., **Bodziony, V.**, McDonough, S., Stetson, B. (2021). Personal Risk Perception for Developing Diabetes in Sedentary Emerging Adults. *Annals of Behavioral Medicine,* 55 (Suppl 1): S: 354.

Gonzalez, C.M., McDonough, S., **Bodziony, V.**, Stetson, B. (2020). Self-determination theory construct associations with dietary behavior in emerging adults at risk for diabetes. *Annals of Behavioral Medicine*, 54 (Suppl 1): S731.

Bodziony, V., Stetson, B. (2019, August). Contributions of Positive Psychology and Social Cognition to Understanding Physical Activity Level. Presented at the American Psychological Association 2019 Annual Convention, Chicago, IL.

Bodziony, V., Stetson, B. (2019). Associations between Sleep, Physical Activity Level, and Well-being in Emerging Young Adults. *Annals of Behavioral Medicine*, 53 (Suppl 1): S387.

Thornberry, T.S., **Bodziony, V.**, Thomas, M., Barker, L., Bellew, C., Estes, S., Phipps, J. (2018, March). Focus Groups Exploring Mental Health, Stress, and Coping in Honors Students. Presented at the Southeastern Psychological Association Regional Conference, Charleston, SC.

Bodziony, V., Thornberry, T.S., Wilson, K.B. (2017, May). The Relationship between Smoking and Negative Parenting Behaviors. Poster presented at the UK Center of Excellence in Rural Health Appalachian Research Day, Hazard, KY.

Thornberry, T.S., **Bodziony, V.** (2017, March). Provider Practice and Perceptions of Pediatric Obesity in Appalachian Kentucky. Poster presented at the Southeastern Psychological Association Regional Conference, Atlanta, GA.

CLINICAL EXPERIENCE
Internship Experience

July 2022-October 2022	**Clinical Psychology Pre-Doctoral Intern; Palliative Care Rotation** Tennessee Valley VA Health Care System, Nashville, TN.

Rotation Description: The Palliative Care rotation included both inpatient and outpatient work with veterans who have who have life-limiting illness including, but not limited to, cancer, ALS, COPD, renal failure, dementia, chronic pain, and cardiac disease. Inpatient care occurs in all wards of the hospital, including medical floors, the medical intensive care unit, the surgical intensive care unit, and occasionally in dialysis treatment or transplant services. The outpatient palliative care clinic consists of patient follow-ups and consultations.

Duties: Worked on an interdisciplinary team consisting of psychology, physicians, nurse practitioners, a social worker, chaplains, and a pharmacist. Participated in daily rounds to review cases and provide feedback to aid in patient conceptualization and treatment plan. Occasionally worked alongside physicians and nurse practitioners for comprehensive visits in the outpatient setting. Completed brief assessments of mood, anxiety, PTSD, and decision-making capacity and

comprehensive intakes in the inpatient and outpatient settings. Conducted brief, time-limited psychotherapeutic interventions and techniques including, but not limited to, supportive therapy, cognitive-behavioral therapy, mindfulness-based techniques, acceptance-commitment therapy, and grief/bereavement therapies. Gained exposure to providing support to individuals and their families during emotionally challenging situations in end-of-life care and near time of death or after veteran's death. Attended Palliative Care Journal club and didactics.

(Supervisor: Daniel Kearns, Psy.D.)

Nov. 2022-February 2023   **Clinical Psychology Pre-Doctoral Intern; Pain Psychology**
Tennessee Valley VA HealthCare System, Murfreesboro, TN

Rotation Description: The Pain Psychology clinic is in outpatient psychology as a specialty service. Veterans are referred from the medical pain clinic, Primary Care Mental Health Integration clinics, and outpatient psychology (BHIPs), and other specialty mental health clinics. Veterans are of diverse identities and socioeconomic backgrounds.

Duties: Work as a member of an interdisciplinary outpatient chronic pain team and provide direct consultation to other providers. Implement an integrative, mind-body approach to treatment and management of pain. Treat Veterans with a variety of chronic pain conditions, including low back pain, headaches, cancer pain, and centralized regional pain syndrome, and comorbid mental health conditions including depression, anxiety, grieving the loss of functioning, substance use, PTSD, and other medical challenges. Conduct evidence-based treatments including cognitive-behavioral and mindfulness-based interventions, including CBT-CP, ACT-CP, MBSR, and motivational interviewing. Conduct comprehensive biopsychosocial assessments and diagnostic clinical interviews to aid in treatment conceptualization and planning. Co-lead pain management groups based on MBSR that integrates problem-solving, MI, and ACT skills. Conduct psychological assessments for Spinal Cord Stimulator pre-surgical evaluations and ketamine infusion evaluations. Engage in introduction to biofeedback.

(Supervisor: Daniel Broderick, Ph.D.)

March 2023-June 2023   **Clinical Psychology Pre-Doctoral Intern; Primary Care Mental Health Integration**

Tennessee Valley VA HealthCare System, Murfreesboro, TN

Rotation Description: The PCMHI rotation takes place in an outpatient primary care clinic, with both in-person and telehealth experiences.

Duties: Will work as a member of an interdisciplinary PCMHI team consisting of psychologists, clinical social workers, psychiatric nurse practitioners, and an RN care manager. Will consult with Patient Aligned Care Teams (PACT), which includes a physician, registered nurse, a licensed practitioner nurse, and a medical support assistant regarding patient care. Will collaborate with other consultants within primary care including pharmacy and all other medical specialties. Will provide brief, time-limited psychological interventions treating Veterans with comorbid physical and mental health difficulties. Interventions will include predominantly cognitive-behavioral and mindfulness-based interventions, including CBT, CBT-I, motivational interviewing, and ACT. Will address a variety of clinical presentations, including sleep disturbances, weight concerns, chronic pain, and management of chronic illnesses. Will co-facilitate groups including Stress Management, Cognitive Behavioral Therapy for Insomnia, Walking to Wellness, Coping with Chronic Illness, and Coping with Chronic Pain.

(Supervisor: Brandon Baker, Ph.D.)

Internal Practicum Experience

August 2020-June 2022   **Clinical Graduate Teaching Assistant (CGTA)**
Noble H. Kelley Psychological Services Center, University of Louisville, Louisville, KY.

The Noble H. Kelley Psychological Service Center is a departmental community mental health training clinic The clinic serves diverse community members (urban/rural) by providing outpatient therapy and assessment services. CGTAs serve in leadership roles to help maintain the day-to-day administrative functions.

Selected by faculty to provide peer supervision to graduate students, including assistance with intake assessments, therapy sessions, psychological testing, and clinic procedures. Assisted in planning and instruction of an 8-week Clinical Interviewing course for first-year students. Served as the first line of contact for individuals calling the clinic in crisis and facilitating treatment services, assessment services, or providing necessary referrals. Taught intervention and intellectual assessment to first-

and second-year graduate students in semester-long courses. Collaborated with external agencies to provide referrals, outreach and client case management. Managed clinical operations, including scheduling, payment records, and chart audits; entrusted with clinic key and file room access. Attended weekly staff meetings with clinic directors to discuss incoming clients and other clinic concerns. Participated in training of administrative procedures necessary to maintain a community mental health clinic. Provided crisis management and risk assessment support and supervision to fellow graduate student therapists. Collaborated, organized, and scheduled monthly colloquia for the clinical psychology department with members of the psychological community in Louisville.
(Clinic Director: Bernadette Walter, Ph.D.; Director of Clinical Training: Barbara Stetson, Ph.D.)

August 2020-May 2022 Team

Graduate-Level Therapist – Integrative Approach Clinical

Noble H. Kelley Psychological Services Center, University of Louisville, Louisville, KY.

Implemented an integrated therapeutic approach drawing from several evidence-based treatment strategies to create an individualized treatment plan for clients with complex and severe presentations. Participated in weekly group and individual supervision for discussion and direction on implementation of treatment, client needs, and relevant empirical literature. Conducted multicultural formulation interviews for each client and integrate findings into client case conceptualizations. Conducted video telehealth and telephone sessions.
(Supervisor: Rich Lewine, Ph.D.)

March 2019-May 2022

Graduate-Level Assessor
Noble H. Kelley Psychological Services Center, University of Louisville, Louisville, KY.

Conducted assessments for personality, ADHD, learning disabilities, developmental disabilities, and educational placement in children and adults. Includes administration, scoring, and interpretation in the form of integrative reports. Provided feedback to clients directly with recommendations when appropriate. Assessments frequently used include the WAIS-IV, WISC-V, WIAT-III, WRAT-4, MCMI-III, MPMI-II, CPT-III, and various self-report measures.
(Supervisors: David Winsch, Ph.D.; Bernadette Walter, Ph.D.)

August 2018-May 2022	**Graduate Level Therapist – General Supervised Clinical Experience**
	Noble H. Kelley Psychological Services Center, University of Louisville, Louisville, KY
	Conducted comprehensive intake assessments and semi-structured interviews for adults and present findings to clinical supervisor for potential treatment options. Conducted treatment of adolescents experiencing psychological disorders and distress using cognitive-behavioral techniques. Conducted joint parent-child sessions. Attend bi-weekly individual supervision. Developed integrative case conceptualizations to assist with treatment planning. Conduct video telehealth and telephone sessions. Consulted with other medical providers and professionals when necessary for client conceptualization and treatment.
	(Supervisor: Bernadette Walter, Ph.D.)
August 2018- July 2020	**Graduate-Level Therapist – Mindfulness Clinical Team**
	Noble H. Kelley Psychological Services Center, University of Louisville, Louisville, KY
	Conducted treatment of adults experiencing psychological disorders and distress, using mindfulness and acceptance- based techniques. Learned and implemented mindfulness-based interventions including Acceptance and Commitment Therapy, Self-Compassion training, and Mindfulness-Based Stress Reduction. Attended weekly team, peer, and individual supervision. Conducted intake interviews for potential clinic clients, developed integrative case conceptualizations and reports, presented case conceptualization of new clients to clinical team. Conducted video telehealth and telephone sessions. Conducted weekly progress and symptom assessments using self-report measures including the BDI, BAI, BHS, BSI, and OQ-45.
	(Supervisor: Paul Salmon, Ph.D.)

External Practicum Experience

October 2021-May 2022	**Graduate Psychological Practicum Student**
	Frazier Rehabilitation Outpatient- NeuroRehab Program, Louisville, KY.
	Site Description: A comprehensive outpatient program providing neurological rehabilitation services to patients with neurological injuries or illnesses, including traumatic brain injury,

strokes/aneurysms, brain tumors and other neurological disorders. Accepts patients across the lifespan and of diverse backgrounds. Offers customized treatment for each patient through individual and group therapies within an interdisciplinary team approach.

Duties: Conducted psychological evaluations to determine adjustment needs and recovery goals in patients who have experienced traumatic brain injury, tumors, and infections that have led to cognitive and physical disability. Developed appropriate treatment plans. Conducted individual and group therapy sessions. Shared feedback on interdisciplinary team when participating in weekly rounds.
(Supervisor: Amy Gonshak, Ph.D.)

May 2021-August 2021   **Adult Assessment Practicum Student**
Private Practice, Louisville, KY.

Conducted a standardized battery of psychological assessments for outpatient clients, including measures of cognition, memory, executive function, personality, parenting, and psychosocial and emotional functioning.
(Supervisor: David Winsch, Ph.D.)

August 2020-April 2021   **Pain Clinic Behavioral Health Practicum Student Therapist**
University of Louisville Pain Management Center, UofL Health, Louisville, KY.

Site Description: UofL Health Pain Management Center uses a non-pharmacological approach to treating chronic pain. In addition to epidural infusions and peripheral nerve injections to treat pain, this center offers behavioral management services to address psychological components to pain and strategies for its management. Patients include diverse community-based (urban/rural) individuals referred by physicians. Common populations include individuals with chronic pain, trauma and stress-related illnesses, conversion disorder, anxiety disorders, depressive disorders and severe mental illness.

Duties: Implemented an integrative treatment approach including mindfulness-based therapies such as Mindfulness-based Stress Reduction and Acceptance and Commitment Therapy for Chronic Pain, Cognitive-Behavioral Therapy, interpersonal skills training, and behavioral activation in the treatment of chronic pain and comorbid mental health problems. Implemented skills training in coping with chronic pain and facilitate adjustment. Conducted psychological assessments via telehealth to assess

mental status and level of functioning in patients experiencing chronic pain to conceptualize treatment plan and outcome goals. Collaborated with a multidisciplinary medical staff comprised of nurses and a physician regarding patient care.
(Supervisor: Brian Monsma, Ph.D.)

August 2019-March 2020   **Graduate Psychological Trainee**
Frazier Rehabilitation Institute, UofL Health, Louisville, KY

Site Description: An acute rehabilitation hospital providing world-class care committed to the development of programs that combine traditional rehabilitation with innovative therapeutic techniques. The inpatient hospital has 135 beds and treats individuals across the lifespan and of diverse backgrounds. An interdisciplinary setting consisting of physicians, nurses, occupational therapists, speech therapists, physical therapists, social workers, and chaplains.

Duties: Conducted psychological evaluations of children and adults with spinal cord injury, traumatic brain injury, stroke, cerebral palsy, amputations, and other neurological deficits and disorders. Conducted extensive patient chart review and form psychosocial conceptualizations of medical or physical illnesses and premorbid mental health disorders. Used therapeutic techniques focused on improving adjustment and coping using cognitive-behavioral and mindfulness-based techniques. Conducted behavioral, psychological, and risk assessments. Co-led spinal cord psychoeducational group. Attended multidisciplinary rounds, team meetings, and family conferences. Supervised one hour per week.
(Supervisors: Greg Nordloh, Ph.D.; Megan Jablonski, Ph.D.; Whitney Rebholtz, Ph.D.)

May 2018-July 2018   **Graduate Psychological Practicum Student**
NeuroRestorative, Lexington, KY

Worked 40 hours/week at an adult day center for people with traumatic brain injury. Co-led and individually conducted group therapy sessions on emotion regulation, nonverbal communication, and coping mechanisms. Assessed individual maladaptive behaviors with functional behavioral analyses. Shadowed several licensed psychologists in individual therapy sessions, community outreach, and weekly clinical coordination meetings. Collaborated with patients and licensed psychologists in goal-setting sessions.
(Supervisor: Timothy Thornberry, Jr., Ph.D.; On-Site Supervisor: Julia Dahmane, M.S., L.P.A.)

January 2018-May 2018	**Graduate Psychological and Behavioral Practicum Student** Rowan County Preschool, Morehead, KY

Worked 13 hours/week at a local preschool with children three- to five- years old. Conducted functional behavioral analyses and behavioral observations. Individually treated a four-year-old child with externalizing behavioral problems with social skills training and an emotion regulation intervention. Led in-class group activities on social skills, emotional regulation, and other skills necessary for normal development. Provided modeling and role play to help at-risk children learn prosocial behaviors. Consulted with teachers about psychological and/or behavioral concerns of children within the classroom.
(Supervisor: Timothy Thornberry, Jr., Ph.D.; On-Site Supervisor: Shirley Anderson, Principal).

May 2017-August 2017	**Graduate Psychological Practicum Student** NeuroRestorative, Lexington, KY

Worked 40 hours per week at an adult day center for people with traumatic brain injury. Shadowed several licensed psychologists in individual therapy sessions, group therapy sessions, intake assessments, community outreach, and weekly clinical coordination meetings. Group therapy sessions included cognitive-behavioral and mindfulness techniques. Co-led psychoeducational group sessions on positivity, cognitive-restructuring, and other aspects of cognitive-behavioral therapy as they relate to brain injury. Individually led group therapy sessions on sleep hygiene and traumatic brain injury. Provided weekly supervised individual counseling sessions to a patient with traumatic brain injury and comorbid psychological disorders.
(Supervisor: Shari Kidwell, L.P., Ph.D.; On-site Supervisor: Emmaly Wilzbacher, M.S., L.P.A.)

PUBLISHED OPINION EDITORIALS

Bodziony, V. (2022) "Coping with Grief and Bereavement: The Role of Positive Health Behaviors". *Healthy Living,* Society of Behavioral Medicine.

Bodziony, V. (2022) "Professional Uncertainty during the COVID-19 Pandemic: How Gratitude is Helping Graduate Students to Cope". *Student SIG Outlook.* Society of Behavioral Medicine.

COMMUNITY PRESENTATIONS

Salmon, P., and **Bodziony, V.** (2022) "*Mindful Movement in Psychotherapy: A Destination and a Bridge to Healthy Physical Activity.*" Colloquium presented at the Psychological Services Center, Department of Psychological and Brain Sciences, University of Louisville, Louisville Kentucky, April 6, 2022.

Bodziony, V. (September 2020). "*Using Mindfulness to Cope with Stress Related to COVID-19.*" Presented virtually at Lexington Catholic High School's Active Minds chapter monthly meeting, Lexington Catholic High School, Lexington, KY.

Bodziony, V. (January 2020). *"Provider Perceptions of Pediatric Obesity in Appalachian Kentucky."* Radio show presentation on U of L Today with Mark Herbert, University of Louisville, Louisville, KY.

Bodziony, V., Ma, J. (June 2019). *"Stress and Coping."* Presentation to participants in Summer Health Professions Education Program (SHPEP), University of Louisville, KY.

Cox, C., **Bodziony, V.,** McKeehan, A., Roark, C., Saylor, J. (October 2016) *"Learn Healthy, Live Healthy: Breaking the Cycle of Obesity in Appalachia."* Presentation at Shaping Our Appalachian Region MIT Health Hack-a-thon, Somerset, KY.

Bodziony, V., Hunter, T., Stidhem, P. (March 2016) *"Effective Intervention Strategies to Increase the Use of Booster Seats."* Presentation at SafeKids Greater Dayton Coalition bi-monthly meeting, Dayton, OH.

COMMUNITY ENGAGEMENT AND CLINICAL ACTIVITIES

Clinical Volunteer Experiences

September 2018-Jan. 2022	**Gilda's Club Mindfulness and Meditation Group Co-Leader** Department of Psychological and Brain Sciences University of Louisville, Louisville, KY (*Supervisor: Paul Salmon, Ph.D.*)
	Conducted bi-monthly meditative and mindfulness practices based on Mindfulness-based Stress Reduction (MBSR) in a group for those impacted by cancer and cancer survivors.
October 2018	**Depression Screening Day Intake Volunteer** Department of Psychological and Brain Sciences University of Louisville, Louisville, KY (*Supervisor: Bernadette Walter, Ph.D.*)
	Conducted on-site intake interview screenings at the Psychological Services Center.

Community Volunteer Activities

January 2021-August 2021   **Big Brother Big Sister (BBBS) Volunteer Mentor**
Big Brothers Big Sisters of America: Kentucky Chapter
Louisville, KY

Served as a community mentor for a 9-year-old male identifying as from a disadvantaged familial and socioeconomic background. Met with mentee once per month to go on outings in the community. Provided child with a safe space to talk, grow, and learn.

August 2018-May 2019   **Make-A-Wish Foundation Walk for Wishes Committee**
Member

The Make A Wish Foundation: Ohio, Kentucky, Indiana (OKI)
OKI Chapter, Louisville, KY

Worked with community members to plan, organize, and implement the annual Walk for Wishes 5k Event. Planned and attended fundraisers, reached out to businesses within the community for donations, and invited Wish Families to participate in the walk. Participated in marketing and recruitment efforts for walk participants.

April 2019   **Military Child Appreciation Day Volunteer**
Department of Psychological and Brain Sciences
University of Louisville, Louisville, KY

Organized games and engaged with children at an event for military families. Provided psychoeducation on common mental disorders and referrals for services.

August 2014-May 2016   **Dayton Children's Hospital Child Life and Research Volunteer**
Dayton Children's Hospital, University of Dayton, Dayton, OH

Organized activities and crafts for children in the hospital. Assisted with data collection and chart review for developing a standard of care treatment protocol for children with asthma. Volunteered over 100 hours.

August 2012-May 2015   **Grandview Medical Hospital Volunteer**
Grandview Medical Hospital, Dayton, OH

Greeted and visited with patients during their hospital stay. Provided comfort and ensured high quality of care.

PROFESSIONAL SERVICE ACTIVITIES

National Organizations

August 2020-May 2022	**American Psychological Association Division 38: Society of Health Psychology Campus Representative**
	Served as the campus liaison for Society of Health Psychology (SfHP) activities and information. Organized a SfHP sponsored event once per year to educate students about health psychology and SfHP. Disseminated information from the Student Advisory Council to the graduate students in the Clinical Psychology program at the University of Louisville.
May 2020-May 2021	**Society of Behavioral Medicine Student Special Interest Group - Membership and Communications Director**
	Managed Student SIG communication outlets including the student listserv. Editor of the *Student SIG Outlook* Newsletter. Assisted in writing and organizing newsletter content. Coordinated with Student Liaisons to collect information about opportunities shared through various SIGS throughout SBM. Co-organized Student SIG sponsored events at SBM's national conference.

University and Local Organizations

January 2021-May 2022	**Kentucky Psychological Association Peer Mentor**
	Kentucky Psychological Association
	Provided mentorship to an undergraduate student interested in pursuing graduate training or research in clinical health psychology. Met with student twice per month to discuss graduate school application process and clinical and research interests. Assisted peer mentee with clinical health psychology training- and career-related questions and editing application materials.
August 2018-May 2022	**Clinical Psychology Peer Mentor**
	Department of Psychological and Brain Sciences
	University of Louisville, Louisville, KY
	Provided mentorship to first- and second-year graduate students in the clinical psychology program. Met with students three times per semester. Assisted peer mentee with program related questions and provide guidance through yearly milestones.
August 2019-June 2021	**Clinical Psychology Graduate Student Representative**
	Department of Psychological and Brain Sciences
	University of Louisville, Louisville, KY

Served as a representative and liaison to student peers. Attended monthly faculty meetings, communicated to faculty the needs to students, and write a program update to send to students. Organized and planned applicant interview week, planned student committee meetings.

October 2019-February 2021 **Applicant Interview Committee Co-Chair**
Department of Psychological and Brain Sciences
University of Louisville, Louisville, KY

Conducted collaborative student brainstorming meetings for the planning and execution of applicant interviews. Delegated tasks and responsibilities to committee members. Contacted applicants and coordinate interview day transportation. Provided training and assistance for incoming chairs.

August 2017-May 2018 **Graduate Curriculum Committee Member**
College of Arts and Sciences
Morehead State University, Morehead, KY

Served on a committee with department directors and reviewed curriculum proposals and changes to graduate level courses.

MULTICULTURAL AND SPECIALIZED TRAININGS

July 2022 **Cognitive Behavioral Therapy for Chronic Pain**
Online Training through Veteran's Affairs TMS Training

Completed an 8-hour training course in providing cognitive-behavioral therapy for chronic pain. Completed an additional course in overlap between trauma and chronic pain.

August 2021 **Mindfulness-Based Stress Reduction**
Online Training – Dr. Saki Santorelli and Florence Meleo-Meyer

Completed an 8-week training course in Mindfulness-Based Stress Reduction. Sessions included learning foundations of mindfulness and MBSR techniques.

June 2021 **Columbia Suicide Severity Rating Scale Risk Assessment**
Online Training – Columbia Psychiatry

Completed a 2-hour online training sponsored by the Columbia Lighthouse Project on suicide risk identification and triage using the Columbia Suicide Severity Rating Scale.

May 2021 **Literacy-Adapted CBT for Chronic Pain**
Online Training – VA Pittsburgh Healthcare System

Completed 8 hours of online training for CBT for chronic pain designed to help individuals who may have literacy difficulties. Modules included learning about pain and stress, the role of the brain in pain and pain management, how physical activity and healthy habits can improve pain, associations between pain and emotions, how to communicate feelings of pain, recognizing and managing thoughts and core beliefs that hinder successful pain management, and coping skills such as relaxation, activity pacing, and deep breathing.

March 2020	**Cognitive-Behavioral Therapy for Insomnia (CBT-I)** Online Training – Medical University of South Carolina Completed 6.5 hours of online training designed to help providers become minimally proficient in CBT-I, the first line treatment for chronic insomnia. Modules included learning the basics of sleep, assessment of insomnia, behavioral models of insomnia, sleep restriction/stimulus control, relaxation training, cognitive restructuring, sleep hygiene, problem-solving, relapse prevention, and efficacy of CBT-I.
March 2020	**LGBTQ+ Healthcare Affirming Series** University of Louisville, Louisville, KY Completed 4 one-hour modules and an interactive training that aims to provide affirming education, applicable skills, and best practices needed to advocate and improve health outcomes for LGBTQ+ patients. The series is specifically designed for healthcare students, professionals and anyone else interested in LGBTQ+ advocacy to address the significant health disparities faced by the LGBTQ+ community. Participated in an interactive patient simulation session, in which I had the opportunity to interact with LGBTQ+ community members in real time and practice skills related to health screenings and interviews.
March 2020	**Motivational Interviewing in Rehabilitation** Online Training - Johns Hopkins University Completed 8 training videos and three assessments on motivational interviewing in a rehabilitation setting. Training modules included learning motivational interviewing principles and skills, and how to specifically use skills within a rehabilitation setting. Rehabilitation-specific skills included how to overcome client resistance and increase collaboration, how to decrease social avoidance, maintaining hope for future recovery, understanding of the client perspective, promoting client

independence, and how to promote MI within the multidisciplinary rehabilitation team.

September 2019

LGBTQ+ SafeZone Training
University of Louisville, Louisville, KY

Safe Zone trainings are designed to give university community members the tools and resources they need to understand LGBTQ+ students and colleagues, and create a welcoming, affirming campus environment for all. Completed a two-hour training consisting of a presentation and Q&A panel discussion comprised of students belonging to the LGBTQ+ community.

May 2018

Trauma-Focused Cognitive Behavioral Therapy (TF-CBT)
Online Training – Medical University of South Carolina

Completed an 11-hour online course for mental health professionals of 11 learning modules that cover the foundations of TF-CBT and each of the treatment components. Each module has a concise explanation of the treatment component, video demonstrations of treatment procedures and techniques, and clinical materials and resources.