Perceptions of executive functions and self-care actions in major depressive disorder.

Melanie G. Walters

University of Louisville

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PERCEPTIONS OF EXECUTIVE FUNCTIONS AND SELF-CARE ACTIONS IN
MAJOR DEPRESSIVE DISORDER

By

Melanie G. Walters

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PERCEPTIONS OF EXECUTIVE FUNCTIONS AND SELF-CARE ACTIONS IN
MAJOR DEPRESSIVE DISORDER

By
Melanie G. Walters

A Dissertation Approved on

December 2, 2020

by the following Dissertation Committee:

________________________________________
Dr. Vicki Hines- Martin, Dissertation Chair

________________________________________
Dr. Lynne Hall, Committee member

________________________________________
Dr. Cathy Batscha, Committee member

________________________________________
Dr. Lora Beebe, Committee member (external)
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ABSTRACT

PERCEPTIONS OF EXECUTIVE FUNCTIONS AND SELF-CARE ACTIONS
IN MAJOR DEPRESSIVE DISORDER

Melanie G. Walters

December 2, 2020

This dissertation encompasses a study of the effect of impaired executive functions on decision-making and self-care of depressive illness. The first chapter provides an introduction and summarizes the body of literature on the executive functions and its association with depressive symptoms. The second chapter contains the second of two systematic reviews which examines conceptualizations of executive functions, classical and current measures used to assess the executive functions, and challenges and limitations related to current methods of assessment. The third chapter describes the development of a vignette technique and its use in a study to examine the association of depressive symptoms with self-care and other functional outcomes. The fourth chapter describes the details of the study and findings, Perceptions of Executive Functions and Self-care Actions among Individuals with Major Depressive Disorder. The final chapter provides a brief discussion of lessons learned and potential future directions for nursing research and practice.
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ROLE OF EXECUTIVE FUNCTIONS IN DECISION-MAKING AND SELF-CARE

Introduction

The proliferation of research on Major Depressive Disorder over the past two decades has expanded our knowledge of the disease and best treatment practices, yet attempts to abate severe functional outcomes associated with this devastating illness have not been realized. Globally, Major Depressive Disorder (MDD) ranks second among the 20 most disabling conditions (Committee on National Statistics, National Academies Press, 2016). Depressive disorders represent the third most common cause of hospitalization in the U.S. for adults aged 18-44 years (National Alliance on Mental Illness [NAMI], 2013). There have been reports that younger age, including individuals aged 20 to 49 years of age, was associated with psychiatric readmission for significant impairment (Machado, Leonidas, Santos, and Souza, 2012). The primary purpose of this paper is to summarize and highlight the significance of the executive functions in self-care of illness among individuals living with Major Depressive Disorder based on the current literature.

Executive functions (EF) have been identified as “central to the ability of a person to synthesize information from several areas of the brain and to generate, implement, and correct strategies necessary to accomplish novel tasks in everyday life” (Wolf, 2010, p. 460). Impairments in the executive functions may be evidenced by a number of dysfunctional behaviors related to decision-making, judgment, and organization (Strauss,
Sherman, & Spreen, 2006). Based on this information, the EF serves a primary function in the capacity for managing self-care in MDD. Indeed, there is a vast literature on EF, including attempts to confirm EF impairment among currently depressed and remitted depressed individuals. However, due in part to a large amount of heterogeneity in definitions of EF as well as the measures used to assess specific domains of EF, findings have been inconsistent (Walters & Hines-Martin, 2018). Therefore, current gaps in the literature will also be identified and a relevant theoretical framework will be presented, one that could be used to guide an examination of the impact that impairments of specific EF domains have on self-care of MDD.

**Overview of Executive Functions**

Researchers and scholars have proposed that the executive functions comprise several cognitive faculties that have a reciprocal working relationship (Baddeley, 1998; Stuss & Alexander, 2000; Trivedi & Greer, 2014). The EF appears to collaborate with or mediate attention and verbal fluency (Arnemann et al., 2015; Lin, Roiland, Chen, & Qiu, 2015). Researchers have most often operationalized EF as cognitive flexibility (Gregorio et al., 2015), inhibition (Brenner et al., 2015), ability to shift the mental set (Boeker et al., 2012; Sheline et al., 2006), and working memory (Kamradt, Ullsperger, & Nikolas, 2014; O’Conor et al., 2015).

Cognitive flexibility refers to the shifting of attention (set shifting) from one relevant topic or activity to another in a fluid manner (Lezak, 1995). Inhibition refers to the individual’s ability to cease activity or thoughts that are no longer useful or beneficial for the present moment (Roth, Isquith, & Gioia, 2005). Working memory “supports the short-term storage and processing or manipulation of information” (Lum, Conti-
Ramsden, Page, & Ullman, 2012). Working memory aids the individual to use information from the past to accomplish tasks in the present. The individual must be able to maintain content in memory that are relevant to the moment. Relevant content must be constantly updated in memory to enable the person to persevere in goal pursuit (Roth et al., 2005). Working memory contains information from sensations as well as those retrieved from long-term memory (Strauss et al., 2006).

Classical methods for assessing EF requires the participant complete one or more structured tasks in a controlled laboratory setting. Performance on a laboratory measure of EF, however, may not reflect an accurate picture of his or her physical or mental functioning in daily life. Because of this discrepancy, additional measures may be needed to complement EF tests, in order to gauge the individual’s ability to function in a complex, ever-changing environment (Ziemnik & Suchy, 2019; Wilson, 1993).

Self-report measures for EF exist, though those studies are fewer in number. Researchers have used EF ratings to supplement EF tests. For example, the Dysexecutive Questionnaire (DEX) is a 20-item, 3-factor questionnaire that assesses everyday changes to cognition, emotion, and behavior after neuropathological events (Barker, Morton, Morrison, & McGuire, 2011). One advantage of the DEX is the survey may be completed by both the patient and an informant. Higher “discrepancy” scores are associated with lower insight into behavioral problems for the patient. Kamradt, Ullsperger, and Nikolas (2014) collected self-report and informant-reports of EF using the Barkley Deficits in Executive Functioning Scale (BDEFS) to assess problems in the domains of time management, organization, self-restraint, self-motivation, and emotion-regulation in adults diagnosed with ADHD. In summary, classical EF tests may offer a
less accurate reflection of performance in real-time. Thus, implementing an additional self-report measure for triangulation of data may be helpful.

**Executive Functions among Adults with Unipolar Depressive Disorders**

Studies of adult patients with unipolar MDD have demonstrated impairments on the EF domains of focused and divided attention, and working memory, when compared to healthy controls (Cotrena, Branco, Kochhann, Shansis, & Fonseca, 2016). In addition, depressed participants demonstrated impairments inhibiting information, due to slowed processing or reduced ability to screen or block out irrelevant information (Gohier et al., 2009; Hammar et al., 2010). Both inpatients and outpatients with depression have performed worse on tests of cognitive flexibility and attentional switching tasks (Rose & Ebmeier, 2006).

Factors may mediate the relationship between depressive symptoms and EF. There is mounting evidence that the emotional salience of material has an effect on decision-making, which may manifest as biases and preoccupations. For example, depressed participants take more time to shift the focus of their attention and response on emotional tasks (Murphy, Michael, & Sahakian, 2012). De Lissnyder, Koster, and De Raedt (2012) acknowledged increased severity of depressive symptoms positively correlates with rumination, and higher rumination had a negative association with cognitive control of internal representations, material held in memory, when participants were confronted with emotional material.

Perseveration among those with acute- and moderately-severe depressive symptoms affects decision-making. For example, individuals with MDD may fear negative appraisals by others (Tops, Riese, Oldehinkel, Rijsdijk, & Ormel, 2008).
Therefore, the depressed individual may be “stifled” from using rational, spontaneous and goal-directed decision-making. Lastly, individuals with acute depressive symptoms may have difficulties making decisions under the conditions of ambiguity or uncertain risks within the situation or available options (Deisenhammer, Schmid, Kemmler, Moser, & Delazer, 2018). This difficulty is thought to be an effect of ruminating or other irrational preoccupations.

Remitted MDD clients have also demonstrated slowed inhibition (Aker, Bo, Harmer, Stiles, & Landro, 2016). There are reports that MDD-remitted clients demonstrate lower performance on tasks of response inhibition (filtering out irrelevant material) irrespective of age (Nakano et al., 2008; Paelecke-Habermann, Pohl, & Leplow, 2005). There are also reports of impaired set-shifting in remitted outpatients (Bhardwaj, Wilkinson, Srivastava, & Sharma, 2010).

One of the greatest challenges to synthesizing the literature on executive functions with depressed and remitted-depressed individuals is that most studies have failed to measure specific functional outcomes, have not measured functional outcomes in a uniform manner, or have done so using strictly survey data. There are reports that impaired EF may translate to deficient skills for positive coping, decision-making, and follow through of healthy behaviors and self-care of chronic illness such as hypertension, HIV, and post brain injury (Giesbrecht et al., 2014; Gregorio et al., 2015; Insel, Morrow, Brewer, & Figueredo, 2006). At present, however, there seems to be no suitable measure in which both of these constructs - executive functions and self-care of chronic illness - have been examined. Thus, we have limited knowledge of how EF translates to specific observable real-time functional outcomes that are relevant to self-care of MDD.
Significance: Self-care in the Context of Major Depressive Disorder

Self-care requires that the individual make decisions and engage in appropriate activities to manage episodes of chronic illness (Richard & Shea, 2011). Orem (1985) described self-care as a process by which individuals master facets of the internal and external environment to regulate their functioning. Upon close examination in the health and social sciences literature, there are few to no studies of self-care and associations with EF among those managing MDD.

There were studies of decision-making among individuals with mild- to moderate-depression. Studies often used classical EF testing conditions. However, in some cases researchers did not measure EF exclusively, or did not measure the primary domains of EF cited previously in much of the literature - shifting, inhibition, and working memory. One study showed that depressed clients had difficulties with flexible decision-making measured by the Iowa Gambling Task (Cella, Dymond, & Cooper, 2010). Participants with MDD also exhibited impairment in affective decision-making measured by tasks of working memory, focused and divided attention (Cotrena, Branco, Shansis, & Fonseca, 2016).

Executive functions may have more of an impact on thought process and functioning than we realize. Reviewing the studies of EF and decision-making, it appears that some level of EF is integrated within, and thus manifested in, each thought, decision, and action a person takes. For the individual who struggles with MDD, the scope of EF impairment may be severe and far-reaching. There is some evidence that EF mediates positive coping styles among individuals with depressive symptoms (Gregorio et al., 2015). For example, with a sample of 93 brain-injured patients, Gregorio et al. used tests
for mediation and found that EF “influenced coping...in turn, influencing outcomes” (p. 298). Coping style was measured using the self-report Utrecht Coping List which assesses for presence of problem-focused or passive-reactive coping styles. This finding is significant because coping style is related to the individual’s ability to form and maintain healthy relationships with others.

Rumination and attention to negative cues among some depressed individuals likely contributes to problems with decision-making in social situations (Alexander, Oliver, Burdine, Tang, & Dunlop, 2017; Destoop, Schrijvers, De Grave, Sabbe, & De Bruijn, 2012; Jensen, Kind, Morrison, & Heimberg, 2014), thereby compounding the depression. Impairments in EF may contribute to problems of impulsivity, a concern that traverses the spectrum of psychiatric disorders, including suicidal behavior (Caceda et al., 2014). Furthermore, some researchers suspect that impairments in EF may be trait-related (Bhardwaj, Wilkinson, Srivastava, & Sharma, 2010; Jollant et al., 2010; Preiss, Kucerova, Lukavsky, Stepankova, Sos, & Kawaciukova, 2009). For example, in the study by Bhardwaj, remitted-depressed performed worse even after controlling for depressive symptoms. The researcher indicated that this was likely a true trait effect (rather than confounding by residual depressive symptoms). Because the success of self-care efforts seems to be so intimately tied to executive functions, it may be beneficial to include self-care outcome variables in studies that explore the executive functions among individuals living with MDD.

The Theory of Self-Care

Orem (1995) described self-care as both, a process and a product – requiring the person who partakes in self-care to be engaged in deliberate action aimed at achieving
some desired end. As such, this individual is deemed a self-care agent. In recognizing the individual’s agency to perform actions to meet self-care needs, three important assumptions should be identified. The first assumption is that the individual has the knowledge necessary to participate in the various phases of self-care. Furthermore, continual learning and practice or experience applying the actions of self-care is an important component of self-care. As Orem stated, “They develop behavioral repertoires for taking action when various combinations of conditions and circumstances prevail in themselves or in their environments” (Orem, 1995, p. 225). The second assumption is that individuals possess what Orem termed the “power” or capability to endeavor in self-care. Within her discussion of the power components for self-care, Orem acknowledged the executive functions. For example, Orem identified shifting set and updating working memory - the ability to “order discrete self-care actions…into relationships with prior and subsequent actions” (Orem, 2001, p. 265). The recognition of individual power leads to the third assumption, that the individual is able to produce self-care by controlling factors within the internal and external environment. There are 10 basic conditioning factors that are hypothesized to influence an individual’s ability to implement self-care actions, and includes age, gender, health state, pattern of living, and environmental factors (Orem, 1995).

**Components of self-care.** Orem used the term, *Self-Care Requisite*, to describe the knowledge that all individuals have relative to daily functioning and survival (Orem, 1980). The self-care requisite refers to the particular ends that one hopes to achieve, the meeting of goals, through the performance of self-care (Orem, 1985). There are three types of self-care requisites – *Universal, Developmental, and Health-Deviation* (Orem,
A health-deviation self-care requisite applies to individuals who are ill, are injured, have disabilities, or are receiving care for a health condition. Therefore, the health-deviation self-care requisite would be most applicable to the individual living with MDD. Orem (1985) listed six categories of health deviation self-care requisites: 1) Seeking and securing appropriate medical assistance; 2) Awareness and attending to the effects of pathological conditions and states; 3) Effectively carrying out medically prescribed measures; 4) Awareness and attending to the deleterious effects of medical care measures; 5) Modifying the self-concept in accepting oneself in a particular state of health; and 6) Learning to live with the effects of pathological conditions and the effects of medical treatment measures.

Integral to performing self-care, the individual progresses through a set of sequential actions, or Self-Care Operations, aimed at meeting the identified goal. This set of action sequences, Orem identified as the Therapeutic Self-Care Demand. The therapeutic self-care demand involves an estimation of the types of action or skills needed to meet identified self-care requisites. When estimating the therapeutic self-care demand, the patient relies heavily on past experience with self-care actions that were successful in meeting needs that are similar to the current situation.

Process of self-care. The individual partakes in deliberate action having known what it is he/she hopes to achieve; “it is result-seeking activity” (Orem, 2001, p. 271). Deliberate action involves the ability to pay attention to things of relevance, and filter out other less relevant things while being able to formulate a course of action for purposes of performing timely and necessary self-care actions in the moment. Orem expanded on the
concept of self-care by introducing the terms, planning, doing, and checking as aspects of mastering one’s environment.

The active process of caring for oneself (termed self-care operations) includes three specific operations – Estimative, Transitional (reflection), and Productive. The mental processes that take place during these phases, assists the individual in recognizing and being able to meet the identified self-care goal (Orem, 1995; 2001). Goals can be met through the performance of a sequence of actions in which one self-care action leads to the next action.

In managing chronic illness, individuals must be able to interpret symptoms. Then, the individual must be able to identify and execute actions in response to those symptoms. These calculated actions are referred to as “estimative” operations (Orem, 1995). An example of an estimative sub-operation is, “Investigation of the meaning of characterized conditions and factors and their regulation” (Orem, 1995, p. 218). Over time, through this process of recognition and interpretation, the individual gains an, “experiential knowing of the meaning of the existent conditions and factors for life, health, and well-being” (p. 218). In summary, the individual must be able to act on knowledge of self-care demands, initiate and persevere to achieve the desired ends (Orem, 1971). Individuals perform self-care operations which advance the self toward a desired self-care goal. Self-care is the culmination of these actions and efforts.

Within the estimative type operations, the individual uses knowledge of self and the environment to investigate the meaning behind conditions and factors. The individual also investigates methods which may be used to control or change the conditions and factors (Orem, 2001). During the transitional type operations, the individual uses the
knowledge from the first phase as a basis for reflecting on self-care options. The individual chooses from among several potential courses of action. During the productive type operations, the individual prepares to carry out the selected self-care operations determined in the transitional phase. Throughout this productive phase, the individual is actively engaged, performing self-care actions, and self-monitoring to identify evidence of successful performance of self-care actions as well as any untoward effects. The individual continually re-evaluates progress and adjusts the plan of action as needed. Orem’s detailed discussion of the phases of self-care adds credence to the idea that self-care consists of a number of “step-by-step” cognitive processes, which involves decision-making.

**Implications for Nursing Practice and Research**

As proponents of the Recovery Model, mental health providers are charged with encouraging and assisting their clients to assume a more active role in self-care in all spheres of life, including managing their illness (Substance Abuse and Mental Health Services Administration [SAMHSA], 2012). This knowledge should prompt mental health providers to include specific measures of functioning and MDD self-care at each visit. Different outcome trajectories have been identified for individuals diagnosed with MDD (Verhoeven, Wardenaar, Ruhé, Conradi, & de Jonge, 2018), confirming the need for individualized assessment of factors beyond the presence of symptoms that meet the DSM-5 diagnostic criteria.

Given the variability of findings in previous research on EF and functional outcomes, more suitable measures are needed to assess impairments in EF and specific self-care outcomes associated with it. Orem’s Theory of Self-Care offers an appropriate
guiding framework for research in this area, as many of Orem’s ideas and concepts related to self-care align with the literature that highlights the role of the executive functions in decision-making and other functional outcomes. Thus, Orem’s Theory of Self-Care is relevant to the study of decision-making in self-care of Major Depressive Disorder.
LITERATURE REVIEW

Background

Depressive disorders affect more than 264 million individuals around the globe (World Health Organization [WHO], 2020). These numbers may be a conservative estimate, as depressive disorders tend to be under-reported (Ho et al., 2018). In the United States alone, the prevalence in 2017 for major depressive episodes among adults aged 18 to 49 years was 20.8 million. Noteworthy, is that the prevalence of a major depressive episode in the same year was highest among the subset of adults aged 18 to 25 years, at 13.1 million (National Institute of Mental Health, 2019). Depressive disorders were the third leading cause for years lived with a disability (YLD) among all ages as of 2007 (James et al., 2018). According to O’Dea et al. (2016), the primary cause for disability in young adults is depression. Lastly, recurrence of major depressive episodes may be higher for younger adults compared to adults 60 years of age and older (American Psychiatric Association, APA, 2013). The disability statistics for younger adults are significant, as disability may represent global impairment in functioning during the peak years of one’s life.

Significance of Symptoms Associated with Major Depressive Illness

Functional impairment is linked to several of the diagnostic criteria for Major Depressive Disorder (MDD; APA, 2013), illuminating the burden of illness during the acute state. For example, anhedonia may contribute to social withdrawal and limited participation in pro-social behaviors (Kupferberg, Bicks, & Hasler, 2016). In addition,
the DSM-5 (APA, 2013) recognizes feelings of worthlessness as a diagnostic criterion for MDD, which may be reported as low self-esteem. Researchers have found that low self-esteem may contribute to further recurrence of major depressive episodes (Sowislo & Orth, 2013; van Tuijl et al., 2016). Researchers have also identified a positive association between depressive symptoms, poor self-care behaviors and lower adherence to medication and diet regimens among individuals diagnosed with diabetes (for example, Schmitt et al., 2017; Gharajeb, Gajewski, Al-smadi, & Boyle, 2016). Through the use of Structural Equation Modeling, researchers have identified depressive symptoms as a mediator of self-care behaviors among individuals with diabetes (McKellar, Humphreys, & Piette, 2004). Depression is also negatively associated with self-care maintenance and self-care confidence among patients managing heart failure (Chuang, Kao, Lin, & Chang, 2019). Researchers have also provided quite a bit of data that demonstrates cognitive impairment is associated with acute depressive illness.

For example, attention and memory problems are common deficits among acutely depressed clients (Cohen, Lohr, Paul, & Boland, 2001; Millan et al., 2012) and may impact the individual’s ability to participate in a wide range of activities. Furthermore, biases in memory, especially for negative events and material, has been positively associated with suicidal risk (Caceda et al., 2014). A clinical review of 251 studies which examined cognitive dysfunction in MDD revealed that the most frequently cited cognitive impairments occurred in the domains of attention, working memory, learning, processing speed, and executive function (Bortolato, Carvalho, & McIntyre, 2014). Quinn, Harris, Felmingham, Boyce, and Kemp (2012) found poorer performance on neuropsychological measures of visual memory and new learning, and short-term
working memory among a sample of 124 adult MDD participants who were currently moderately-depressed. The average age was 41.54 and 37.77, respectively. Albert, Potter, McQuoid, and Taylor (2018) found that currently depressed, anti-depressant free participants demonstrated worse processing speed (measured with neuropsychological testing) compared to never depressed participants among adults aged 20 to 50 years. In that study, the depressed group had an average Montgomery-Asberg Depression Rating Scale (MADRS) score of 24, representing the low end of moderate-depression, and had experienced more than one episode of MDD. These studies did not measure any functional outcomes. Sumiyoshi et al. (2019), however, found worse severity of depression was positively correlated with higher level of self-reported psychosocial impairment, defined as severe impairment in work, social life, or family life/home responsibilities, among a sample of 518 clients, mean age of 37 years, with a current diagnosis of Major Depressive Disorder. In that study, 78.5% of the sample (n=407) were moderately- to severely-depressed based on the MADRS. Cognition was measured using the Digit Symbol Substitution Test, an objective measure of specific cognitive faculties – processing speed, visual perception, and attention. Notwithstanding these studies which have highlighted cognitive impairment during the acute stage of depressive illness, there is growing recognition that cognitive impairment persists during clinical remission (Bhardwaj, Wilkinson, Srivastava, & Sharma, 2010; Boeker et al., 2012; Hasselbalch, Knorr, Hasselbalch, Gade, & Kessing, 2013).

Doubtless, one’s ability to live independently across the lifespan is based on the ability to provide care for oneself during periods of health and periods of illness. Despite improvements in available treatments for Major Depressive Disorder, which includes
antidepressants and psychotherapy, there seems to be an enduring pattern of relapse and chronicity of illness associated with depressive disorders. Euthymia seems a necessary yet insufficient precursor for stable functioning in daily life. Although research has improved our understanding of MDD and has led to very effective treatments, mechanisms underlying chronicity of illness and disability within this population are not well understood. Individuals living with MDD must fulfill the same requirements as any other healthy individual in order to meet basic and self-care needs. Perhaps it would be worthwhile to understand more about the relationship between cognitive function and daily self-care skills that individuals with MDD must perform. Assessment of cognitive function could provide important clinical information to aid our understanding of the high disability numbers in the adult MDD population. This paper attempts to examine the role of cognitive impairment in daily living skills, specifically, the role of executive functions in self-care, among individuals living with a depressive disorder.

**The Executive Functions are a Unique Cognitive Entity**

Cognitive impairment in the aforementioned studies covers a fairly broad range of cognitive faculties. Defined broadly, the executive functions denote intentional, goal-directed behavior. There seems to be a lack of agreement as to any one specific neural structure to “house” the executive functions. Researchers have identified a collaboration among several cognitive entities such as attention and verbal fluency (Arnemann et al., 2015; Baddeley, 1998; Lin, Roiland, Chen, & Qiu, 2015; Stuss & Alexander, 2000; Trivedi & Greer, 2014). However, a recent study of decision-making among depressed and non-depressed individuals identified a link between the dorsal prefrontal cortex and decision-making and cognitive control, or set-shifting (Jollant et al., 2016). In addition,
other brain regions linked to cognitive control include the anterior cingulate cortex and
cerebellum (Caceda, Nemeroff, & Harvey, 2014).

Executive functions (EF) are “central to the ability of a person to synthesize
information from several areas of the brain and to generate, implement, and correct
strategies necessary to accomplish novel tasks in everyday life” (Wolf, 2010, p. 460).
Classical studies of EF have consistently included inhibition, shifting (mental set), and
updating the contents of working memory as core features of EF (Walters & Hines-
Martin, 2018). Inhibition refers to the individual’s ability to cease activity or thoughts
that are no longer useful or beneficial for the present moment (Roth, Isquith, & Gioia,
2005). Shifting involves fluid alternation between tasks, thoughts, or actions, and is also
termed “cognitive flexibility” (Lezak, 1995). The ability to shift mental set appears to be
positively associated with planning and decision-making, as measured using objective
neuropsychological tasks (Cella, Dymond, & Cooper, 2010; Rubinsztein, Michael,
Underwood, Tempest, & Sahakian, 2006). Working memory enables the individual to
complete tasks as it “supports the short-term storage and processing or manipulation of
information” (Lum, Conti-Ramsden, Page, & Ullman, 2012). Relevant content must be
constantly updated in memory to enable the person to persevere in goal pursuit (Roth et
al., 2005). Working memory contains information from sensations as well as those
retrieved from long-term memory (Strauss, Sherman, & Spreen, 2006).

Based on this description, the executive functions may be the key to
understanding the process depressed clients use when engaging in various types of self-
care. Applied to the context of self-care scenarios, impairments in executive functions
may have some effect on a client’s decision-making process. For example, Case et al.
(2019) identified the executive functions as a necessary prerequisite for a client with chronic illness to engage in their health care decisions and self-management. Executive functioning includes problem-solving, verbal reasoning, inhibition, mental flexibility and the ability to multi-task, initiation, and monitoring of actions (Rustad et al., 2013). As of yet, there are few to no studies that have focused on specific processes of decision-making and executive functions in self-care among individuals living with MDD.

**What is the Relationship between the Executive Functions and Self-care of Chronic Illness?**

Over the last several decades, as mental health care has shifted from clinician-led care to collaboration between client and clinician, there is more focus on promoting client autonomy and increased client responsibility for their health and managing chronic conditions (Coates & Boore, 1994). Self-care is the “practice of activities that individuals initiate and perform on their own behalf in maintaining life, health, and well-being” (Orem, 1980, p. 35). Self-care agency denotes one’s power to direct his or her behavior toward accomplishing self-care goals. Self-care is crucial to managing chronic mental illness, yet, there are no clear guidelines on the self-care skills or actions necessary for individuals with MDD to manage their illness. Researchers in other disciplines outside of psychiatry provided some examples of current self-care guidelines.

Clients managing heart failure must be able to follow a prescribed regimen pertaining to medications and diet (Hjelm, Brostrom, Riegel, Arestedt, & Stromberg, 2015). Clients must be able to recognize and respond to symptoms of worsening heart failure, as well as evaluate and update the action plan. Diabetes management involves exercising and self-monitoring blood glucose levels (Li et al., 2017). Case et al. (2019)
studied the association of executive functions – working memory and semantic memory – on patient activation and health related quality of life among a mixed clinical sample of 440 adults aged 21 to 55 years with a diagnosis of serious mental illness (MDD, Bipolar Disorder, and Schizophrenia). The researchers found a direct effect of EF on mental Health Related Quality of Life as measured with the Short Form -12. Many studies examining self-care have used quantitative surveys. However, one disadvantage of using surveys or questionnaires in studies of self-care is related to their static nature. Surveys may fail to capture the fluidity of self-care in real time.

Qualitative studies have elucidated client perspectives pertaining to self-management. Using focus groups, 20 patients in remission from depressive disorder provided strategies they use to promote recovery. Strategies that patients used to promote recovery included seeking an alternate therapist, finding information about depression, using a “to-do list” to overcome problems with concentration, and setting realistic short-term goals (van Grieken, Kirkenier, Koeter, Nabitz, & Schene, 2015). In addition, Ebert et al. (2017) used ethnography to study cognitive symptoms in depression and their impact on everyday life among a group of 34 MDD participants aged 18 to 60 years (mean age 40 years). Measures included observations of activities and situation card exercises. Participants reported that behaviors which negatively affected their activities of daily living included leaving the water running, losing track of what they were doing during activities of daily living, and inability to prioritize tasks. The limitation of that study was the failure to exclude cognitive impairment or dementia subtypes. In a sample of 1,559 participants, median age of 70 years with hypertension, dyslipidemia and diabetes, no associations were found between cognitive impairment, as measured using
the Mini-Mental State Examination (MMSE), and medication adherence (Hennein et al., 2018). A potential explanation for this finding lies in the fact that the MMSE does not measure executive functions (McDowell, 2006). Lastly, in a sample of 96 participants with a heart failure diagnosis, (mean age of 75 years) the researchers found a significant positive correlation between executive dysfunction as measured with the Clock Drawing Test and lower scores of self-care confidence as measured with the Self-Care of Heart Failure Index (CHFI) v. 6.2 (Viveiros, Sethares, & Westlake, 2020).

In summary, the executive functions encompass cognitive processing units, skills, and activities which appear to work reciprocally with other cognitive faculties to advance the individual toward an identified end goal. Self-care of chronic illness may be thought of as an end goal, as one strives to manage the illness on a daily basis. But what are the processes involved and how does the individual navigate through the various cognitive processing activities to arrive at an end goal in self-care? As of yet, this question has remained largely unanswered. Researchers have sought to conclude whether executive functions are impaired among samples of currently depressed and remitted-depressed individuals. Most often, those studies involve measuring performance on tests of multiple cognitive faculties, including the executive functions. Occasionally, researchers included broad measures of psychosocial functioning as an outcome variable (not specifically self-care). Overall, methodological issues such as heterogeneity in measures of EF and inconsistent measures of psychosocial outcomes in those studies have made it difficult to fully assimilate that literature. In addition, findings in those studies have been mixed (Walters & Hines-Martin, 2018).
This paper describes a critical review which was undertaken with the intention to identify and describe studies of specific self-care behaviors or practices within the context of major depressive illness or symptoms, and the specific mechanisms by which impaired executive functions may impose a negative effect on those self-care behaviors.

Methods

The present critical review is an expansion of an earlier published systematic review which focused on the relationship between depressive- and mood disorders and the executive functions. The databases CINAHL and PubMed were used (Appendix A). As a preliminary step, the term ‘Self Care’ was entered as a ‘Exact Major Subject Heading’ in CINAHL to identify alternate terms from the keyword lists of published studies. This step was later combined with the identification of theoretical/conceptual terms for EF that had been found within previous studies. When developing the search string for this review, construct terms were separated by ‘Or’. Then, the terms for major constructs – Major Depressive Disorder, Executive Function, and Self-care were combined by the word ‘And’ (Table 1). Eligible studies for the present review included an examination of the association between executive functions and self-care outcomes, and included primary or concurrent depressive disorder or screening for depressive symptoms. Filters used were academic journals, publication year 2000-2020, all adults 19 years and older, and English language. Studies were screened and excluded first by title, then by abstract. Studies were excluded based on criteria: (a) Interventional/RCT; (b) Neurological comorbidity; (c) Substance or Alcohol use disorder; (d) Personality Disorder or trauma-related disorder; and (e) Eating disorder. The full text for remaining studies were examined for methodological integrity. Studies were subsequently excluded.
due to: (a) study protocol; (b) pilot study; (c) Insufficient description of the self-care or EF measure; (d) Results not clearly presented; and € Intervention/RCT. After duplicates were removed, 12 studies were available for further evaluation and analysis. Twelve studies were selected for inclusion in this review. All selected studies included a measure of depressive symptoms.

**Results**

Seven of twelve studies focused on adult samples with a mean age of 60 years or older. Ten studies examined treatment/medication adherence as the self-care measure. Nine studies included measures of cognitive faculties above that of the executive functions. Only three studies had a sample of participants with a primary psychiatric diagnosis, major depressive disorder. Indeed, in eight studies participants were either not clinically depressed or had only minimal to mild symptoms. The two studies of Instrumental Activities of Daily Living (IADL) included medication management and driving.

**Patients with Existing Medical Comorbidity**

There is some support for the notion that executive functions influence self-care actions. Brewster, Peterson, Roker, Ellis, and Edwards (2017) found that older age and less education were associated with worse cognitive performance and, on hierarchical regression, accounted for 18% of the variance in timed IADL performance. These findings are not surprising. The measure used for IADL performance consisted of observation of tasks such as reading directions on a medication bottle and reading food labels. The participant is scored on accuracy and time taken to complete the task. Type and magnitude of errors are also recorded. Depressive symptoms contributed
significantly to timed IADL performance controlling for the other variables, however, it is worthwhile to note that these participants were not clinically depressed. The researchers found that cognitive performance mediated the relationship between depressive symptoms and timed IADL. Likewise, EF mediated the relationship between memory and timed IADL and speed of processing and timed IADL.

There have been several studies of EF in heart failure patients. Self-care of heart failure is a complex process. The individual must be able to identify and respond to symptoms which may indicate worsening heart failure. Dolansky et al. (2016) found that EF, as well as attention and memory, were significantly associated with greater medication adherence in a sample of Class II and Class III heart failure patients. However, after adding age, minority status and other demographic variables, only reduced memory was significantly associated with poorer medication adherence, defined as less than 80% of days compliant with prescribed medication regimen.

Memory is important for processing and storing information so that it may easily be retrieved for future manipulations. Memory is subdivided into different forms, which may be understood as categories identifying how information in memory is stored, processed and manipulated (Strauss et al., 2006). Two of the EF measures used in the Dolansky et al. (2016) study were gold-standard neuropsychological tasks. The Stroop Color Word test measures inhibition and cognitive flexibility or control, and the Trail Making Test (TMT) generally measures switching (shifting) between topics, objects, or tasks, and motor speed (Strauss et al.). A major strength of the Dolansky et al. study was the use of an objective method for measuring medication adherence – an electronic pill box with Bluetooth capability.
In another sample of heart failure patients, using a mixed methods study, the odds of a 30-day rehospitalization was 2.3 times higher for those with more severe depressive symptoms. Depressive symptoms were significantly associated with delays in decision making regarding whether to go to the hospital. In addition, those participants reported not knowing how to respond to symptom exacerbations and did not reach out to a healthcare provider before making decisions (Xu et al., 2018). Patients who had high self-care scores tended to be more proactive, reaching out to their healthcare providers with whom they had established relationships. Conversely, those with lower self-care scores had been rehospitalized within 30 days and were more likely to delay professional care, relying instead on personal strategies and seeking advice from family and friends. Of note, none of the study participants demonstrated depressive symptoms.

Another study of heart failure patients found that only processing speed predicted adherence to heart failure self-care behavior guidelines (Hjelm et al., 2015). In this case the EF domain included processing speed and was measured with the Trail Making Test-B. Depression did not moderate the relationship between EF or other cognitive variables and self-care behaviors. This study highlights the importance of efficiency of information processing to provide effective illness self-care.

Similarly, among a sample of heart failure patients, Kim, Hwang, Heo, Shin, and Kim (2019) reported that less than 20% of the sample demonstrated adequate self-care, measured using a combined score for self-care maintenance and self-care confidence on the Self-Care of Heart Failure Index. Approximately thirty-nine participants demonstrated cognitive impairment in most domains (global cognition, memory and executive function). These researchers found that only cognitive function, specifically
EF as measured with the Trail-making Test A (primarily assessing motor speed), was significantly associated with major life events such as visits to the emergency room or hospitalization, even after controlling for demographic and clinical factors. Participants with slower performance times on the test were more likely to have experienced a major life event. Surprisingly, neither depressive symptoms nor self-care adequacy contributed to major life events. The authors noted the finding may have been due to the two groups (those who had no major events and those who had major events) being equal in performance level for cognitive function. The authors acknowledged relatively younger age and mild heart failure symptoms among the sample.

In a study of cancer patients, working memory, digit memory, and short-term memory were positively correlated with adherence, measured subjectively as participant responses to questions about how often they had forgotten to take medications over the previous month and number of times medications were missed (Dos Santos et al., 2019). In this study, digit memory was measured using the Digit Span subtest which requires participants to memorize and recall by repeating back to the examiner, both forward and backward, progressively longer strings of digits. Adherence was measured at 1 month and 3 months after initiating treatment for oral cancer. Researchers noted that higher number of prescriptions (more than eight) was also associated with greater non-adherence.

In a sample of diabetes patients, the EF domains of planning and problem solving were significantly related to diabetes self-management. Multivariate regression revealed that planning and problem solving were strong predictors of better diabetes self-management. However, other strong predictors were lower BMI, absence of major
depression, and female sex (Primozic, Tavcar, Avbelj, Dernovsek, and Oblak (2012). The researchers reported that the EF domains of planning and problem solving were highly correlated with other cognitive domains of immediate and delayed memory, attention, language, and visuospatial/constructional abilities. Thus, when substituting the latter into their regression model, they found the score on the attention subtest was a significant predictor of diabetes self-management. Notwithstanding these studies of self-care behavior, other researchers have shed some light on the influence of the EF in one’s appraisal of self-sufficiency and level of insight in performing self-care.

Using structural equation modeling, researchers found self-efficacy mediated the relationship between neurocognitive abilities and medication adherence among a sample of renal transplant patients (Paterson, O’Rourke, Shapiro, & Thornton, 2018). Perhaps more importantly, neurocognitive abilities also positively predicted self-efficacy. However, neurocognitive abilities were examined as a whole, not separated out by cognitive domain. In this study, everyday problem-solving was measured in addition to objective neuropsychological measures for the EF domains of set shifting and inhibition. Everyday problem solving was measured by having participants respond to a vignette with a list of potential solutions to identified problems. Adherence was measured subjectively through a questionnaire asking the participant how well he or she was adhering to prescribed medications, and objectively through serum lab testing. Perhaps one limitation of the Paterson et al. study was the lack of correlations testing between the subjective problem-solving and EF measure. Having that data would strengthen our hypothesis that EF is involved in problem-solving processes.
Among a sample of HIV+ patients, neuropsychological functioning was significantly associated with number of errors on a driving simulator task and performance on the medication management task, the objective measure of medication adherence. This objective measure requires the participant to determine when a medication refill is needed and how many pills are required to obtain the correct dosage (Thames et al., 2011). There was no correlation between subjective and objective medication management difficulties. However, participants who over-reported cognitive difficulties and medication management difficulties were found to be more depressed compared to those who reported no problems. Importantly, those who reported difficulties with medication management did not have deficits on the medication management task. Conversely, participants who reported no decline in driving ability had more errors on the driving simulator compared to those who reported a decline. Tasks on the simulated driving test included passing other cars, stopping at traffic lights, and avoiding pedestrians in the road. Lastly, those who under-reported deficits in driving and medication management demonstrated impairments across all domains of cognitive function including EF. Neurocognitive functioning was strongly correlated with performance on driving and medication management. These findings demonstrate that testing multiple cognitive faculties may strengthen a study by allowing the researcher to identify variance contributed by each cognitive domain (including the EF). Age-related changes likely have some effect on EF. In addition, EF may affect one’s attitude and insight regarding disease management. One potential explanation for the findings in these studies in which EF was not found to be significantly associated with self-care lies
in the hypothesis that the executive functions work reciprocally with other cognitive faculties in higher level, complex cognitive operations.

**Patients with a Primary Diagnosis of Major Depressive Disorder**

The EF domain of semantic fluency was an independent predictor of treatment completion for participants with a primary diagnosis of MDD who had been started on a trial of an antidepressant (Cristancho et al., 2018). The researchers found that increased semantic fluency scores were positively correlated with treatment completion. Semantic fluency in this study referred to the ability to initiate and maintain set (e.g., inhibit irrelevant material). However, that study included only baseline measures of the EF and other cognitive variables.

Cha et al. (2017) found statistically significant differences between participants with MDD and healthy controls on the disability measure. Interestingly, only subjective cognitive impairment was significantly associated with higher disability scores when controlling for depressive symptoms. Possibly, providing a game version of the neuropsychological tests may have encouraged more active engagement by participants. Participants with MDD also reported more economic days lost and underproductive days. Contrary to other studies reported previously in this paper, cognitive impairment was not a significant predictor over and above depressive symptoms. One potential explanation for that is the fact that this sample of participants had a primary diagnosis of MDD and were moderately depressed. Based on our knowledge of the EF, acute MDD symptoms could have obscured the influence of other cognitive faculties.

**Discussion**
As in previous studies of EF, the studies in the present review demonstrated heterogeneity in the measures used to assess EF. Ninety-one percent of the studies included here \((n=11)\) measured the executive functions using a classical neuropsychological test or battery of tests. While these traditional measures of EF have been the gold standard, however, researchers have noted the difficulties of generalizing performance on tests of EF using a lab-controlled setting to everyday self-care scenarios, where environmental distractions and other stressors could influence self-care activities (Wilson, 1993; Ziemnik & Suchy, 2019).

The domains of EF measured in this sample of studies varied as well, researchers having focused on only a few domains. Consistent with previous EF research, inhibition and/or set-shifting (cognitive flexibility) were often part of the core cognitive faculties that researchers focused on \((n=10)\). However, based on the discussion presented in this paper which points to the reciprocal nature of EF, there seems to be ample evidence in support of testing multiple domains of EF. This method of assessing multiple domains of EF seems to offer the most comprehensive data for examining impairments in EF, associated functional outcomes, and the contribution of the specific EF domain. Despite the heterogeneity in measures, however, the role of the executive functions in self-care seems to be largely substantiated.

Impaired EF may impact decision-making processes which are crucial for effective self-care of illness. Decision-making has been described as a process composing several stages (Carroll & Johnson, 1990). These stages of decision-making include recognition, formulation, alternative generation, and judgment or choice. In addition, subsequent action, and feedback help inform further decision-making.
Cristancho et al. (2018) provided an exemplar, expanding on the concept of decision-making to entail several of the executive functions in treatment completion for individuals diagnosed with MDD. These authors proposed that the depressed individual relies heavily on EF to execute successive steps during decision-making. These steps include initiation – as patients seek out and engage in treatment, and planning and sequencing – as patients determine the steps needed to achieve their treatment goal. In addition, patients must exhibit the ability to flexibly shift the mental set in order to meet changes in the treatment plan. Lastly, “if unexpected stressors occur, they must continue to attend to their treatment and inhibit impulses to focus solely on the stressor” (p. 2).

Thus, it may be necessary for healthcare providers and researchers to understand the step-by-step process that individuals use in managing their care in order to identify any areas of “break down”.

The studies presented here did not acknowledge self-care or decision-making as a step-by-step process. Measures of self-care in these studies typically consisted of questionnaires. For samples with a primary MDD diagnosis, self-care outcomes and associated measures varied. For example, Cha et al. (2017) used the Sheehan Disability Scale, a brief self-report tool using a visual analog scale to assess symptom-related impairment. The measure assesses impairment in work and school, social life and leisure, and family life and home responsibility (Arbuckle et al., 2009). The range of scores are ‘0’ – no impairment, to ‘10’ – extreme disability. When assessing medication adherence, Cristancho et al. (2018) collected a quantitative value of missed doses of medication using participants’ self-reports. Miyata et al. (2018) examined driving performance using specialized software.
Traditional self-report questionnaires are by nature static, and thus have limited usefulness because they fail to adequately capture the moment-by-moment processing of information and resultant actions that are characteristic of self-care. Studying a sample of HIV+ patients with depressive symptoms, Thames et al. (2011) implemented a combined self-report and performance-based measure of medication management. For the subjective portion, participants were asked if they had noticed a decline in their ability to manage medications. For the performance portion, participants enacted various tasks related to medication adherence, such as determining when to refill the medication and which medications should be taken with food. Ideally, the self-report and performance-based data complement each other. However, in the Thames et al. study, the subjective report item did not seem to be perfectly aligned with the performance-based measure. Thus, there was no significant correlation between self-reported difficulties managing medications and participant performance on the tasks. Successful performance within any given domain of EF may be most easily measured and evidenced by specified functional outcomes.

Recent research may shed some light on EF and links to autonomy in self-care. For example, social support has been noted to be particularly effective in late life depression because the support person is in constant contact with the family member, encouraging and, in some cases, physically assisting them to seek help or to remember to take medications (Polacsek, Boardman, & McCann, 2020). Likewise, there are several studies of successful interventions implemented for individuals with chronic conditions, including depressive disorders. These interventions include providing education on self-management and improving self-management skills among adults of all ages (Hagerty &
Bathish, 2018; Lorig, Ritter, Pifer, & Werner, 2014; Ory et al., 2014), and problem-solving therapy (Arean, Hegel, Vannoy, Fan, & Unutzer, 2008; Choi, Marti, & Conwell, 2016). These studies, however, have not included measures of EF. It may be worthwhile to include such measures in these interventional studies.

**Conclusions**

There are some limitations that should be noted here. The first limitation is related to the small number of studies that were available for analysis. Indeed, there were a limited number of well-designed studies that communicated clearly all aspects of the study design and results. Moreover, the majority of studies here involved samples of individuals with medical comorbidities above that of depressive symptoms. Thus, when evaluating the present findings, one must take into consideration the potential confounding effects of medical comorbidities on the cognitive domains explored.

Though highlighting an important link between cognition and self-care, EF alone may be insufficient to improve our understanding of the self-care construct. For example, motivation was not clearly examined in these studies. Low motivation is a central feature of major depressive disorder (APA, 2013). Researchers have found an association between impaired motivation and deficient reward processing in depressive disorders. This alteration may negatively influence goal-directed behavior and contribute to avoidance behaviors among depressed individuals (Grahek, Shenhav, Musslick, Krebs, & Koster, 2019; Subramaniapillai et al., 2019; Weinberg, Liu, Hajcak, & Shankman, 2015). This characteristic potentially leads to both, fear in decision-making and undesirable outcomes.
Knowledge level is an important component of self-care performance, yet was not clearly assessed in most of these studies. For example, Chuang et al. (2019) acknowledged that heart failure patients must possess adequate knowledge to inform their decisions about worsening symptoms and self-care, including decisions about when to go to the emergency room. Individuals with depressive disorders have also identified the importance of seeking information about depression as well as finding effective strategies to manage recovery (van Grieken, Kirkenier, Koeter, Nabitz, & Schene, 2015).

In summary, the executive functions appear to have some influence on decision-making and self-care actions. According to Ziemnik and Suchy (2019), compared to other cognitive faculties, the EF have been found to be most strongly correlated with IADL, including medication management. However, thus far we have limited data regarding if and how the specific domains of EF, hypothesized to be involved in decision-making, affect self-care actions within the context of MDD. Therefore, it may be prudent to focus our efforts on the process our patients use to manage self-care. Widening our understanding of this self-care construct could strengthen the treatment plan for our patients with MDD, including the development of targeted person-centered interventions and inter-professional collaboration. More research is needed with samples of younger- to middle-aged MDD individuals currently in remission. Lastly, measures with high content validity to assess EF and self-care are needed.
**Table 1 Summary of Search Terms**

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<thead>
<tr>
<th>Major Construct</th>
<th>Terms</th>
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<tr>
<td><strong>Major Depressive Disorder</strong></td>
<td>Major Depressive Disorder</td>
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<td>Cognitive Function</td>
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<td>‘Medication’ or ‘Treatment’ compliance</td>
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THE VIGNETTE TECHNIQUE TO STUDY SELF-CARE

Background and Significance

More than 260 million individuals are living with a depressive disorder (World Health Organization, 2020). The prevalence of major depressive episodes among younger adults in the U.S. is 20.8 million (National Institute of Mental Health, 2019). Issues pertinent to patient care in this population are more prominent than ever due to the long-term consequences of untreated, or inadequately treated, depressive disorders.

Research is needed in a variety of areas to inform nursing practice and provide a basis for mental health advocacy efforts. Although we understand the importance of research to advance our knowledge and understanding of caring for individuals with psychiatric disorders, carrying out research with individuals living with psychiatric illness can be challenging.

The purpose of this paper is to present the vignette as a viable alternative to traditional survey and semi-structured interviews for conducting nursing research with a psychiatric population such as individuals living with Major Depressive Disorder. A focus of this paper is self-care of MDD. A review of the use of the vignette in research will be presented, specifically how it has been applied in various disciplines. Also discussed is the potential benefit of using the vignette as a data collection technique in nursing research with individuals managing a Major Depressive Disorder (MDD). Current recommendations for designing studies using vignettes and limitations when
using vignettes are discussed. The author will offer an example of the vignette technique in data collection from a completed mixed methods study with a sample of individuals diagnosed with major depressive disorder.

**Major Depressive Disorder and Self-Care**

Despite the abundance of studies that have investigated individuals diagnosed with major depressive disorder, few studies have explored these individuals’ daily experiences managing aspects of self-care step-by-step. Successful self-management of a major depressive illness include decision-making and priority setting such as scheduling and keeping appointments with the mental health provider and identifying exacerbation of and seeking help for worsening depression. Managing a chronic mental illness may be viewed by many as a complicated process.

According to the American Psychiatric Association (APA, 2013) individuals with major depressive disorder experience clusters of symptoms that may contribute to reduced functioning in various spheres of life. Cognitive symptoms may be experienced broadly as impaired concentration and difficulty making decisions. However, research conducted over the past decade has identified that cognitive impairment encompasses the brain’s executive functions, responsible for orchestrated expression of higher level thought and behavior. Impairments in a variety of executive function domains have been found in acute and remitted stages of the illness (Aker, Bo, Harmer, Stiles, & Landro, 2016; Behnken et al., 2010; Boeker et al., 2012; Dillon et al., 2015). Moreover, impairments in executive functions may be manifested in a number of deficits which impact daily functioning to a significant degree (Snyder, 2013). Given this information, individuals living with MDD may experience difficulties managing their illness.
Self-care involves a high level of cognitive effort, which includes decision-making. A sequential activity, the self-care process requires the individual to have the knowledge and ability to evaluate information quickly and efficiently, and to formulate a hypothesis about how best to respond to the information presented (Orem, 1995). The individual must choose from among several options the best course of action to achieve their goal (Orem, 1995). In the case of managing MDD, a client must have some knowledge of fundamental aspects of the illness, such as signs and symptoms of the illness, how to take their medications and what to do about adverse effects, and how to navigate the healthcare system to receive consistent mental healthcare. Orem recognized the executive functions as having an important place in one’s cognitive flexibility and other cognitive processing skills in self-care (Orem, 2001).

Self-care is proposed as a continuous, individualized process in which the person acknowledges, evaluates, and responds intentionally to stimuli within the internal and external environment, the result being regulation of functioning. Orem (2001) named the desired ends for self-care, the Self-Care Requisites. Orem specified distinguishing characteristics for three broad types of self-care requisites, essentially delineating ‘sets’ of self-care actions to those whom are without illness, those in need of adaptive coping skills for managing various developmental crises, and those who live with chronic medical and mental conditions or disabilities. This last set of self-care actions is termed the Health Deviation Self-Care Requisites and was the focus of the present study. Few nursing studies have included current theory-based examination of self-care in the context of mental health disorders and impaired executive functions.
Orem (2001) theorized that individuals use different types of cognitive *operations* that will advance him or her toward the identified goal. Though the individual is the active agent of self-care, this process of abiding through to the achievement of a self-care goal occurs largely on a subconscious level. The cognitive operations are termed *Estimative, Transitional* (reflecting), and *Productive* operations. These operations and actions allow the individual to filter out “noise” and to stay focused on the most important information all the while calculating next steps. Orem acknowledged the actions of planning, doing, and checking in regulating one’s functioning. At the culmination of the actions and skills the individual performs, self-care is produced. In summary, individuals with MDD may be at particularly high risk for impairment in the executive functions, thereby leading to difficulties in cognitive processing and decision-making skills which are crucial to managing their illness.

The literature that examines the executive functions historically has been conducted by the psychology discipline. There is a vast body of literature on neuropsychological tests, which have attempted to identify deficits of EF among individuals diagnosed with MDD (Boeker et al., 2012; Brenner et al., 2015; Gregorio et al., 2015; Kamradt, Ullsperger, & Nikolas, 2014). Classical tests for assessing EF, however, have entailed task-oriented activities performed in a lab setting. In addition, EF researchers use different measures and conceptualizations of EF, with no agreement or uniformity of measures across their studies. This issue has often led to inability to generalize EF deficits to real world functional outcomes (Ziemnik & Suchy, 2019). Because there is a high likelihood that individuals living with MDD have impairments in EF across their course trajectory, it may be prudent to explore alternative research
methods by which EF impairments may be correlated to deficits in self-care. The vignette may be the answer. The next section provides an examination of how vignettes have been used in research.

**Brief History of Vignettes in Quantitative and Qualitative Research**

Phenomena that are of interest to psychiatric-mental healthcare professionals may be difficult to elucidate using strictly quantitative measures. The vignette, another form of self-report, has demonstrated utility in answering a variety of research questions. The vignette has the potential to add significant depth and breadth to our understanding of how individuals with major depressive disorder confront and manage real-life situations they encounter every day.

A vignette is “a short, carefully constructed description of a person, object, or situation representing a systematic combination of characteristics” (Atzmuller & Steiner, 2010, p. 128). Vignettes are usually read aloud to study participants, and the story is followed by a set of related questions. Response options may be fixed-choice or open-ended (Rahman, 1996). Vignettes are most often used to garner information from participants about their beliefs, attitudes, perceptions, and values (Flaskerud, 1979). Lastly, the researcher is able to craft the vignette by manipulating variables of interest. When paired with corresponding questions and response options, the vignette technique functions similarly to a survey (Gould, 1996). This feature helps ensure the measure is “standardized” (p. 209).

Vignette designs have been implemented in the disciplines of anthropology, business management and leadership, economics, and education. Vignettes have been described as containing elements of both qualitative and quantitative research orientations
(Barter & Renold, 1999; Holley & Gillard, 2018) and there is a considerable amount of variation across studies in the amount of detail and the configuration of response options. Case studies have often been used to formulate the substantive content for vignettes (Freyer et al., 2018; Kathiresan & Patro, 2013; Krolak-Schwerdt, Horstermann, Glock, & Bohmer, 2018).

There is evidence of vignette techniques early in historically qualitative traditions, such as ethnography. For example, Herskovits (1950) chronicled his use of vignettes as part of his fieldwork with indigenous peoples, labeling the short stories, hypothetical situations. In this method of data collection, the researcher used extant knowledge of the population to create a detailed event that served as a frame of reference by which subsequent informants could share their stories. Rivers (1910) claims to have used a rudimentary form of vignette for aiding native peoples in recalling an extensive lineage as well as details, such as the form and strength of those relationships. Vignettes are well suited for the study of contemporary societal issues as well.

Bohrnstedt, Freeman, and Smith (1981) studied adults’ perspectives on children’s rights to autonomy. In the Bohrnstedt et al. study, vignette incidents portraying a variety of potential conflict areas such as privacy, education and sexual conduct were included. Introductory statements were designed to elicit from participants which positions they would take in each of the scenarios: for/against the child and for/against the parent.

Coleman and Gilliam (1983) explored whether students’ problem behaviors influenced teachers’ attitudes toward them in the classroom. The researchers created vignettes to depict a student exhibiting an emotional disturbance. Researchers controlled (held constant) student attributes that were identified as having some influence over
teachers’ attitudes. For example, the child’s sex was kept male, intelligence level was kept average, achievement was kept below grade level, and socioeconomic status was kept middle class.

Mansell, Poses, Kazis, and Duefield (2000) sought to determine whether the type of illness and nature of decision predict patients’ preferences for involvement in making decisions. Among a sample of 255 adults, mean age 63 years, who were part of the Veteran’s Affairs medical clinic, these researchers used a vignette for colon cancer, acute myocardial infarction (AMI), and diabetes. Participants were asked corresponding questions about who should make the decision regarding aspects of their care – ranging from physician only, patient and physician, to patient only. Responses were recorded on a 5-point Likert scale.

Based on this sampling of studies, vignette techniques hold great potential for the examination of complex topics, such as human thought process, specifically, where the stakes are high, where human thought process results in behaviors that lead to or may impact important outcomes. Because vignettes may be crafted to depict real life situations, the technique may be particularly useful for the study of thought process and behavior related to self-care.

The Vignette Technique in the Study of Decision-Making

Published studies of decision-making in business may be the closest example we have outside of nursing for assistance with tackling a study of decision-making in self-care. Classic research in business and organizational leadership has focused on maintaining a competitive edge in the marketplace, and the strength of any organization lie within the capacity of its leaders to employ sound reasoning and judgments when
acting on behalf of the company. The following discussion presents findings from research conducted in the business-management and leadership sector.

The term, *Strategic Decision-making*, is used to define high-level thought and judgment that leads to a particular managerial behavior intended to advance the organization in some area such as new product development (Bronn & Olson, 1999). Early studies of judgment and decision-making of top managers and executives were accomplished primarily through quantitative methods; identifying indicators of performance and performance appraisals. The manager was presented with a vignette which was a brief written description of a criterion identified as a significant personal attribute of managerial employees that predicted success within the role. The high-level manager was invited to rate the candidate on those criteria (Cleveland & Landy, 1981). Data could then be analyzed via linear regression methods. However, instruments measuring content and process of strategic decision-making did not adequately reflect the interaction of the two variables on organizational performance outcomes (Robinson & Pearce, 1988).

Hitt and Tyler (1991) asserted that managers’ decision-making processes entails the concurrent identification and discrimination between salient features of all the relevant choices available. Managers make strategic decisions by weighing several external (or environmental) and internal (organizational) factors. Based on the appraisal of the interaction between the two factors, the manager formulates a strategy for making a decision, which gives consideration to potential threats, risks, strengths, and opportunities. Hitt and Tyler’s description reinforces the idea that decision-making involves a cognitive process by which information is identified and evaluated, and an end
goal with appropriate action steps articulated. The next several paragraphs provides a 
discussion of studies and disciplines that have used vignettes to examine some aspect of 
decision-making.

Sauer (2011) examined team members’ perceptions of characteristics and 
leadership styles using vignettes in which participants responded to survey items that 
assessed their perceptions of the leader’s effectiveness. The researcher used a 2 x 2 
factorial design in which leader status and leadership style were manipulated. Using this 
approach, Sauer was able to use analysis of variance to compare group means based on 
leader status and leadership style and examine main effects. One strength of Sauer’s 
study was the use of video to bring the scenario to life. According to Aguinis and 
Bradley (2014), increasing participants’ involvement enables them to have a sense they 
are a part of an experience that is similar to a real-world encounter. This feature 
increases internal validity.

The number of independent variables in vignette studies can be quite high. For 
example Buers, Karpinska, and Schippers (2018) created random sample packets of 12 
vignettes that contained several manipulations of employee-related attributes. Managers 
were asked to review the 12 vignettes and based on the employee attributes, make a 
decision about which employees they would consider retaining in the company. The 
limitation to both of these studies, however, lies in the static format. Even while the 
scenarios in these studies depicted realistic events, the vignettes were created to portray 
just a snapshot in time. Likewise the corresponding questions and response options were 
constructed in such a way as to constrain the participant’s response. These elements of 
the studies prevented the researcher from examining the process of decision-making.

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Studies in nursing and health and social sciences have improved upon the vignette design somewhat. Finch (1987) referred to her use of vignettes as “surveys” (p. 106). The Finch study examined normative beliefs about obligations between relatives, and Finch used evolving vignettes to demonstrate changes that occur in a situation over time. Finch focused on the participant’s thought process. For example, in a vignette about a married couple faced with a decision about whether to provide care for a family member, the researcher would ask participants what they thought should happen next and why. Participants were provided four or five closed-ended response options. Finch suggested that vignettes and response options be concrete and that characters have names. She identified some of the strengths and limitations of using vignettes - the scenario has the effect of separating the participant from the life of the vignette character, allowing participants to be candid or explore taboo topics uninhibited without fear of judgment by the researcher. In the same way, the participant’s responses are “their own”, having created each response for a specific time and situation, free from the researcher’s preconceived notions.

A psychiatric-mental health perspective was offered by Klineberg, Bittle, Donovan, and Gunnell (2011). These researchers examined the link between knowledge of help-seeking behavior and intentions of help-seeking in a sample of 1,125 young adults aged 16 to 24 years with no reported psychiatric history. Evolving vignettes depicted two individuals, one with mild and one with severe depressive symptoms. The authors identified one of the study strengths as the data analysis stage. The researchers described their coding scheme as emergent from the text responses. The researchers chose a sub-sample of responses to develop an initial coding scheme, which was tested
on responses from 50 participants. The refined codes were collapsed and data transformed for quantitative analysis. Limitations to the study included the sampling procedure – surveys sent through the postal service and no exclusion criteria. There was no description of other measures used, such as the GHQ. Lastly, there may be incongruence between the participants’ suggested actions for the character, and their own actions in a similar situation. Perhaps additional items to assess for personal experiences would have strengthened the design. However, that was not possible due to the recruitment procedure.

In her study of risk behavior among incarcerated drug injecting individuals, Hughes (1998) used a vignette combined with an in-depth interview guide to explore the participants’ personal experiences of risk and safer behavior. A noted strength of that study was the use of conversations with drug injecting individuals and literature review to guide vignette development. In addition, pilot studies led to the development of a ‘storybook’ format to present the storyline. Each stage of the vignette was built upon previous events. Hughes noted this evolving feature held the participant’s interest and also saved time during the data collection process. Hughes asked probing questions during interviews, paid attention to the participant’s affect and behavior as they responded to the vignettes, and surveyed each participant at the conclusion of her study to solicit their opinions of the vignette technique. Hughes asked participants if they had experienced a similar situation to that of the characters. Hughes noted that social desirability was less of a problem compared to other designs – “participants offered responses based on what they thought characters…should do but then went on to describe
what they thought would realistically happen” (Hughes, 1998, p. 390). These researcher activities enhance methodological rigor.

Lastly, citing a recent example, Xu, Arruda, et al. (2018) used a vignette to understand how patients interpret symptoms and to assess self-care decisions among individuals living with heart failure. The study had been conducted in two parts, the primary study having been an explanatory sequential mixed methods design. Using purposive sampling, 20 participants were chosen from the larger sample of 127 based on their self-care ability and readmission status. The Situation-Specific Theory of Heart Failure Self-Care guided the larger study. Three vignettes were created to depict the most common symptom clusters that individuals experience and participants were asked how they would respond if in the same situation. Importantly, researchers asked participants to identify their first action. No coding scheme was pre-determined. Rather, content analysis was used to examine blocks of text which were representative of self-care decisions. A noted strength of the Xu et al. (2018) study was the ability to “examine heart failure patients’ ability to interpret symptom changes and their plan of action” (p. 3558). Another strength was the rigor with which the scenarios were created, in collaboration with heart failure clients and clinicians, and researchers. Vignette responses indicated patients had difficulty making decisions related to symptom worsening and formulating appropriate actions.

Reviewing this sample of studies, the business and managerial publications presented here do not allow in-depth understanding of the leader’s thought process outside of the pre-determined variables that are manipulated within each scenario. Another limitation to those studies is the large number of vignettes each manager reads.
Such a large number of vignettes would not be feasible for a study of decision-making among clients living with MDD. The latter studies, while they also have limitations, allow more open narrative from participants. The evolving vignettes with corresponding questions and probes showed promise in studying decision-making in self-care of MDD.

The vignette technique was identified as the most appropriate for the present study compared to other types of measures such as performance-based and other questionnaires. Performance-based measures, such as the Performance Assessment of Self-care Skills (PASS; Holm & Rogers, 2014) are task based, yet tasks are rated in isolation from other tasks. While the rater is able to observe first-hand the participant’s performance on a skill, there is no consideration of the underlying cognitive mechanism when interpreting the behavior, which could assist with understanding why a participant performed poorly. Likewise, the researcher examined other self-report measures, including those developed to be used to measure Self-care Agency. However, no other self-report measures from the current literature on EF or self-care were found suitable.

**Recommendations for Using Vignettes in Nursing Research**

There are some potential methodological issues with vignette techniques. In qualitative research, *trustworthiness* of a study demonstrates that the work is a useful and valid contribution to the field (Lincoln & Guba, 1985). Other areas that should be addressed are *triangulation* to establish credibility, and examining *fittingness*, findings that could realistically be seen outside the study situation (Sandelowski, 1986).

A controversial issue that has surfaced is related to how the participant perceives and responds to the character in the vignette scenario, and subsequent interpretation of those results. Researchers have cautioned against substituting participants’ verbalization
of how a vignette character should behave for a prediction of their actual behavior (Finch, 1987; Schoenberg & Ravdal, 2000). The psychology of participants’ responses is not within the scope of this paper; however, these next few paragraphs present some of the information found in the literature about this phenomenon.

When participants engage in vignette research, it is likely that they proceed based on a “position” relative to the character. It is difficult to know what that position is without asking and, even then, participants may not be able to verbalize it. Projection has been hypothesized as the process by which individuals identify with an external object (in this case, the character), no matter how short-lived (Cramer, 2020). Thus, in order to respond in a genuine and accurate manner to a vignette scenario, the participant would need to transfer an already present thought or drive. In other words, to the extent the participant can relate or has had similar experience to that of the vignette situation and the character, we could assume the participant’s responses are “real”. Jenkins, Bloor, Fischer, Berney, and Neale (2010) asserted that participants take on a “Thou” orientation to vignette characters. Thus, in trying to determine how and why a character should act a certain way, the participant recalls how he or she has behaved in a similar situation. While that information does not help us solve the dilemma of predicting behavior, we can be more confident that a highly structured scenario that participants are familiar with will yield examples of personal experiences they have had.

Aguinis and Bradley (2014) suggested researchers use rigorous procedures for determining sample size and eligibility criteria. Researchers must also select the most appropriate statistical testing and data analysis plan. Conjoint analysis is a form of statistical analysis that estimates the importance of various predictors that affect one’s
decisions, and is most frequently found in research related to consumerism and organizational leadership. Conjoint analysis is most appropriate for analyzing vignettes when the researchers have ample data, evidence, and theory from the literature to effectively place boundaries on the behaviors or attributes that are the focus of the study. In summary, vignettes should be carefully crafted to yield the most accurate, reliable data. The remainder of this paper focuses on the creation of a vignette study and outcomes. The researcher’s methods for maintaining methodological rigor are presented throughout.

Development of a Vignette to Examine Self-care

The present research study focused on perceptions of executive functions and self-care actions among clients diagnosed with major depressive disorder, using a convergent mixed methods design QUAN + QUAL. Orem’s Theory of Self-Care (Orem, 2001) guided the study. The specific aims were to: (1) determine whether there is an association between severity of depressive symptoms, number of previous hospitalizations for worsening depression and self-reported executive functions; (2) describe participants’ perspectives and knowledge base pertaining to self-care actions they perceive as necessary for carrying out prescribed medical treatments to manage depressive illness; and (3) interpret the impact of self-reported EF on decision-making processes (estimative, transitional, and productive self-care operations) related to self-care actions necessary to manage depressive illness.

Planning and Design Stage

The quantitative strand of the study included a survey, the Behavior Rating Inventory of Executive Function - Adult Version (BRIEF-A; Appendix C), which
measures self-reported executive functions along nine domains. Given the methodological problems associated with traditional EF tests, the self-report measure of EF was identified as a better measure of EF. Knouse, Murphy, and Barkley (2013) noted that EF ratings may generalize to real-life situations better than EF tests.

The qualitative strand consisted of one evolving vignette and corresponding semi-structured interview guide. Three “scenes” were developed to align with three of Orem’s Health Deviation Self-Care Requisites (Orem, 2001). The storyline followed a gender-matched individual (James/Janice) with a diagnosed major depressive disorder, who navigates different self-care scenarios. Each of the three scenes was subdivided into smaller segments, and each segment built on the scene preceding it. Each segment was developed to capture a specific domain of executive function and was linked to the BRIEF-A survey. Likewise, the corresponding questions for each segment were aligned with the domains of the BRIEF-A. The hope was that this “stepped” approach to collecting data would allow the researcher to both observe first-hand the participant’s thought process and performance in each EF domain, while simultaneously capturing details about self-care decisions and actions. Both strands of data were intended to provide depth about the participant’s thought process and performance on measures of EF.

The initial plan was for consecutive convenience sampling to acquire a representative sample of 142 participants. Purposive sampling was implemented to select a subset of 15 participants with extreme T scores on the BRIEF-A, indicating no/yes self-reported EF impairment. This procedure would have allowed a comparison of self-care and decision-making between those who did and did not have impaired self-reported EF.
The relative paucity of studies that had examined associations between impaired executive functions and instrumental activities of daily living, as well as the inadequate description of experiences among depressed individuals in the realm of self-care, signified the need for a study design that could garner this type of information from participants.

To address content validity, the vignette scenes were developed by incorporating the current relevant literature and the author’s (clinician) experience with the target population. In addition, consultation regarding the vignette segments was sought with a panel of four doctorally prepared nurses and researchers. The vignettes and interview guide were reviewed by two psychology associates with expertise in assessment of executive functions in the clinical setting. This procedure enhances the project’s trustworthiness (Spalding & Phillips, 2007). The vignettes were piloted with a randomly chosen group of five young-to middle-aged adults with no known history of psychiatric illness, in order to gather information on clarity and comprehension of the measure. Those responses were used (as an “unofficial” and preliminary marker) for gauging potential responses that might be offered by the full study sample. The responses of the five individuals were not different from commonly accepted views of caring for an illness.

**Data Collection and Data Analysis Stage**

Participants were recruited from a local Day Treatment Program. Based on the literature, there were some conditions which were identified as potential confounders. For example, self-care performance may be impaired due to psychosis among individuals affected by Schizophrenia. Participants were excluded if any of the following was
present: (a) comorbidity of PTSD or panic attacks/panic disorder; (b) diagnosis of Substance use or Alcohol use disorder; (c) diagnosed personality disorder or intellectual disability; (d) neurological disorder, such as multiple sclerosis, traumatic brain injury, dementia, or seizures; (e) acute psychosis; (f) Electroconvulsive Therapy (ECT) within the past two weeks; (g) PHQ-9 score > 19 (Appendix B); (h) Failure to demonstrate an adequate level of decisional capacity to participate in the research study; and (i) visual or hearing impairments. They completed the study during break times or after their program concluded for the day. Participants had a median PHQ-9 score of 12 indicating moderate depressive symptoms. Participants completed the BRIEF-A survey, followed by the vignette within one week of each other. The researcher read aloud each scenario while participants followed along. After reading each scene, the participant was asked to respond to the corresponding questions. The interviews proceeded the same for all participants - scenes were read in order followed by the corresponding questions prior to moving to the next segment. This feature enables a standardized vignette and procedure (Hughes & Huby, 2002). Clarifying probe questions were built into the vignette to add sufficient depth to the participant’s reasoning and other thought processes. For example, in scene #1 the character had been diagnosed with depression for a year and needed to reschedule an appointment. Participants were asked to state the reason the character should seek care and also to identify and order the actions that would be necessary to bring about the desired goal (e.g., attaining an appointment with a psychiatric clinician). After each HDSCR was discussed, each participant was asked if he or she had experienced a similar situation. Responses were audio-recorded for accuracy, then transcribed verbatim. Due to loss of one of the recruitment sites, the original sampling
plan of 142 participants was abandoned. Fifteen individuals were eligible and agreed to take part in the study. Two participants were unable to complete the interviews due to persistent illness. Thus, thirteen participants completed both parts of the study.

Orem’s Theory of Self-Care guided the content analysis. Each line of text was examined, word for word, for language and statements that were consistent with EF domains and evidence of self-care operations and actions, known as recording units (Krippendorff, 2019). The theoretically driven, structured questions of the interview guide left little room for broad interpretations. Typically, responses within each vignette segment were one to two sentences, termed context units (Krippendorff, 2019). Recording units were placed into categories, accompanied by the participant’s quotes, and labeled in proximity with self-care operations and actions (Mayring, 2000). This process improves reliability of the responses obtained (Krippendorff, 2019). Recording units or categories were presented in a matrix to provide a quantitative description of categories (frequencies) and how those categories varied by self-reported EF status (Krippendorff, 2019). The categories and quotes were reviewed by a second person who is an experienced nurse researcher. Finally, the categorized data were merged with the same participant’s self-reported EF status. Some participants shared their personal experiences, such as how they managed a self-care situation. Their responses were left in raw (quoted) form, and subsumed under the appropriate vignette segment when reporting results.

**Discussion**

Overall, the vignette and interview guide performed well for the study of self-care in MDD. The vignette and interview guide functioned as both a quantitative and
qualitative measure. The researcher adopted sound strategies found in the previous studies when developing the vignette. For example, vignettes were crafted to portray realistic self-care situations that continued in time and space, and incorporated changes in stimuli. Individuals living with MDD (and any cognitive impairments) contend with all of these factors. The different segments of the vignette captured the cognitive operations (EF domains) required to navigate those changes in stimuli. The realistic scenarios also served as a frame of reference for participants, who may have difficulty spontaneously producing examples of self-care actions from the past. This feature of the vignette also helps to minimize a weakness of traditional self-report measures, such as potential for recall bias. The scenarios enabled participants to pick up on cues and make connections with the character based on their personal experiences (Jenkins et al., 2010). There was direct evidence of this phenomenon in their responses.

There were some limitations as well. A major limitation to the present study was the small sample size, which precluded any statistical significance testing. Thus, the specific aim 1 was not evaluated. Logistic regression would have provided valuable information about the relationship between severity of depressive symptoms, number of previous hospitalizations for worsening depression and self-reported EF.

For purposes of evaluating the methodological rigor of this study, the researcher adopted several of the criteria for evaluating the quality of mixed-methods studies. This procedure seems more appropriate than evaluating each method separately (Eckhardt & DeVon, 2016; O’Cathain, 2010). In summary, several considerations (outlined above) influenced design decisions, and several measures were taken to ensure the methodological integrity of the study. For example, the vignette scenarios combined with
the thoughtfully constructed interview guide improves internal validity and reliability of
the measure itself.

The standards of credibility, fittingness, auditability, and confirmability are used
to evaluate the quality of qualitative studies (Sandelowski, 1986). The vignette is a
unique form of qualitative research. Thus, some of the traditional concepts associated
with evaluating qualitative research may not always hold for the vignette approach.
Nevertheless, the next few paragraphs focus on how the researcher attempted to meet
standards for credibility and fittingness.

The vignette and interview guide were structured. However, space was given to
participants to share their experiences as they saw the necessity relative to the self-care
scenarios. This element prevented the researcher from controlling or injecting bias into
the interview or its findings. This particular study did not require any active participation
on the part of the researcher, and enabled clear boundaries between the researcher and
participant. These actions enhance credibility (Sandelowski, 1986). Field notes included
some descriptors of participants as they worked through the vignettes. Some of those
descriptors were “slowed” speech and “a little disorganized”, for example. As a
psychiatric clinician, the researcher understood that this participant’s behavior should not
necessarily be classified as “abnormal”. However, when reporting the study results,
those observations were presented along with its potential impact on decision-making.

The fact that the interviews did not occur in a participant’s natural setting (e.g.,
home) leads to the possibility that the data may not be an accurate representation of one’s
decision-making and self-care actions had they been in their natural environment (termed
fittingness). This limitation was addressed when reporting study results. In conclusion,
this vignette study was a good starting point for further development of the vignette technique for use in future studies of self-care with individuals living with MDD.
THE RESEARCH STUDY

Introduction

According to the World Health Organization (2020), more than 260 million individuals are living with a depressive disorder. Most recently in the United States, the prevalence of major depressive episodes among younger adults, up to age 49 years, was 20.8 million (National Institute of Mental Health, 2019). Because individuals often delay seeking care for depression, the exact number of individuals living with a depressive disorder may be higher (Ho et al., 2018). It appears that the group of individuals aged 18 to 25 years are at highest risk for a major depressive episode, with a prevalence of 13.1 million (National Institute of Mental Health, 2019). Depressive disorders are among the five leading causes for years lived with a disability (James et al., 2018), and is the leading cause for disability among young adults (O’Dea et al., 2016). In light of these statistics, it is plausible that individuals with depressive disorders have difficulties managing the illness.

Readmissions among Individuals with Psychiatric Problems

According to Heslin and Weiss (Agency for Healthcare Research and Quality [AHRQ], 2015) in 2012, 9% of clients were readmitted with a principle diagnosis of mood disorder within 30 days of an index stay. It is conceivable that impaired ability to engage in self-care could result in early hospital readmission among clients living with Major Depressive Disorder (MDD). There appears to be some indirect evidence for an association between EF impairment and self-care.
For example, in a mixed sample of individuals with acute psychiatric illness which included depression, lack of patient adherence to the treatment plan was associated with length of hospital stay beyond 10 days (Zhang, Harvey, & Andrew, 2011). Depression was one of the five psychiatric diagnoses that comprised 90% of patient readmissions within 90 days of an index hospital (Downey & Zun, 2015). Furthermore, these are the patient groups most likely to have longer lengths of stay and higher associated costs (Downey & Zun, 2015). Lastly, in a systematic review of interventions geared toward curbing early readmission for mentally ill clients who were recently hospitalized, Vigod et al. (2013) found that pre-discharge and post-discharge psycho-educational interventions such as follow up phone calls and home visits may be particularly effective for risk factors such as medication management difficulties and impairments in self-care.

Self-care requires active participation, relying heavily on one’s physical, mental, and emotional faculties to direct and appoint his or her energy toward meeting specific daily goals (Richard and Shea, 2011). Undoubtedly, self-care for depressive illness is more difficult when symptoms are severe. The underlying pathology contributes to attention and memory problems, reduced motivation, and fatigue (American Psychiatric Association, APA, 2013).

Cognitive impairment during acute episodes is a contributing factor to declines in both social and vocational functioning in major depressive disorder (Preiss et al., 2009). More specifically, impaired executive functions have been reported even in studies of remitted depressed individuals (Aker, Bo, Harmer, Stiles, & Landro, 2016; Bhardwaj, Wilkinson, Srivastava, & Sharma, 2010). Executive Functions (EF) refers to complex,
higher order thought processes which are necessary to appropriately plan, execute, and re-evaluate problem-solving strategies for situations humans encounter in daily living (Sbordone, 2000). Within the psychology literature, the domains of EF that have been most frequently studied are shifting, inhibition, and updating of working memory. Executive functions appear to have an important role in activities of daily living, recruiting other cognitive faculties, such as attention and memory, enabling goal attainment through sustained focus on tasks and actions (Snyder, 2013).

Recent studies provide some evidence that individuals with MDD across acuity levels have impairments in a range of EF when measured using neuropsychological tests (Aker et al., 2016; Dillon et al., 2015). Researchers have found a positive association between impaired EF and functional outcomes in MDD such as social problem solving (Thoma et al., 2015) and work performance (Sierra-Aparicio, a Magaña-Quijano, Vargas-Quiñones, Martínez-García, & Toledo-Fernández, 2019). The study of EF may be significant to our understanding of self-care of chronic MDD illness.

Patients with depressive disorders may have more difficulty than healthy individuals holding back certain actions and/or responses and filtering out information that is not necessary for current tasks, termed inhibition. This is true for individuals in remission irrespective of age (Paelecke-Habermann, Pohl, and Leplow, 2005). This finding is significant because impaired inhibitory control could lead to problems of impulsivity and poor problem solving. In terms of working memory, some studies have shown working memory deficits to be either mild or no different from healthy controls in samples of remitted depressed and currently depressed outpatients (Bhardwaj, Wilkinson, Srivastava, & Sharma, 2010; Haddad, Harmer, and Williams, 2014; Halvorsen et al.,
2012; Wekking, Bockting, Koeter, & Schene, 2012). However, Boeker et al. (2012) found that deficits in working memory and EF persisted even after clinical recovery from acute depressive illness.

**Decision Making and Self-care in Major Depressive Disorder**

Self-care requires the individual to make decisions regarding the most appropriate course of action to manage health and illness episodes in Major Depressive Disorder (MDD). However, impaired shifting appears to be negatively correlated with sound decision-making skills. For example, community-dwelling patients with MDD have demonstrated poor flexibility in decision-making when compared to healthy controls (Cella, Dymond, & Cooper, 2010). There is a reported positive association between depressive symptoms and self-reported maladaptive styles of decision-making (Alexander, Oliver, Burdine, Tang, & Dunlop, 2017). Furthermore, there is a positive correlation between severe depressive symptoms and rumination (De Lissnyder, Koster, and De Raedt, 2012). These researchers found that rumination had a negative association with the individual’s ability to exhibit cognitive control over material held in memory when perceived by the individual as highly emotional. Moreover, it is important to remember that individual “triggers” may be quite subjective, and their response to emotional material, unforeseen. Lastly, individuals with acute depressive symptoms may have difficulties making decisions under the conditions of ambiguity within a given situation or the uncertainty of risks inherent in available options (Deisenhammer, Schmid, Kemmler, Moser, & Delazer, 2018).

While neuropsychological tests were used in all of these decision-making studies, some studies did not explicitly test the executive functions of shifting, inhibition, an
working memory. Researchers have found that patients in both acute and remitted states of MDD have slower processing speed and reaction times (Aker et al., 2016; Dillon et al., 2015; Hammar et al., 2010; Schmid, Strand, Ardal, Hammar & Lund, 2011). The latter results illuminate the potential for deficits in judgment and decision-making capacity.

In summary, the studies of EF have not demonstrated a clear link to specific activities of daily living or self-care. Rather, most EF studies appear to be a “proof of principle”. To the extent that EF is involved in thoughtful and deliberate action, there is some indirect evidence that EF deficits translate to impaired functioning in daily life, including self-care actions related to managing MDD. The heterogeneity in the EF testing scenarios and tasks that were used as measures seems to have some effect on the discrepancy in findings seen across studies. Thus, EF tests may be limited because they may not generalize to real-world scenarios. Lastly, few investigators have examined the effect of EF impairment on specific functional outcomes, such as activities of daily living (ADL) with remitted MDD individuals (Walters & Hines-Martin, 2018).

Psychiatric nurses at all levels of practice could benefit from a greater awareness of the mechanisms by which EF affects their patients. This new knowledge could lead to the development of effective nursing interventions and targeted client teaching, and to collaborative work with other disciplines in the provision of evidence-based care. There is a need for new and supplementary measures to assess EF so that those results may generalize to everyday life and self-care activities for clients managing MDD.

**Theoretical Framework: Orem’s Theory of Self-Care**
Orem’s Theory of Self-care (2001) was identified as an appropriate structural scheme to study self-care, as there is a focus on the cognitive faculties and the process individuals use to proceed through the various phases of self-care (Figure 1). According to Orem, self-care is “The practice of activities that…mature persons initiate and perform, within time frames, on their own behalf in the interests of maintaining life….” (p. 521). Orem described self-care as a process which engages the person in deliberate action aimed at achieving some desired end. During an episode of self-care, the individual progresses through phases of investigating, estimating, reflecting upon, and appraising internal and external factors which affects his or her performance. The person then progresses through judgment and decision making to arrive at an acceptable course of action which may be carried out.

Self-care activities, known as self-care requisites, regulate functioning within a specific context, time and place (Orem, 2001, p. 258). Executive functions combined with one’s knowledge enables deliberate action intended to meet a goal in self-care. Conditioning factors such as age, developmental state, and health state also influence the self-care process. The health state, Major Depressive Disorder, was the focus for the present study. Orem described ‘sets’ of self-care actions for three broad types of self-care requisites - individuals without illness, those in need of adaptive coping skills for managing various developmental crises, and those who live with chronic medical and mental conditions or disabilities. Self-care requisites associated with illness are termed The Health Deviation Self-care Requisites (HDSCR), and were the focus of the present study.
The purpose of this cross-sectional mixed-methods study was to examine the relationship between self-reported executive functions and the mental processes that are involved with decision-making related to self-care among individuals diagnosed with MDD. Specific aims were to: (1) determine whether there is an association between severity of depressive symptoms, number of previous hospitalizations for worsening depression and self-reported executive functions; (2) describe participants’ perspectives and knowledge base pertaining to self-care actions they perceive as necessary for carrying out prescribed medical treatments to manage depressive illness; and (3) interpret the impact of self-reported EF on decision-making processes related to self-care actions necessary to manage depressive illness. A core feature of this study was a vignette and corresponding interview guide with open-ended questions.

**Method**

This study used a mixed-methods, cross-sectional design using quantitative and qualitative self-report data to examine executive functions (EF), decision-making, and self-care actions among individuals diagnosed with major depressive disorder (Creswell & Plano Clark, 2011).

**Recruitment, Inclusion Criteria, and Study Participants**

IRB approval for this study was obtained from the University of Louisville and the recruitment site. A sample size of 142 participants was calculated as sufficient to detect a significance level of .05 for statistical tests. A consecutive convenience sampling plan was used. Participants for this study were recruited from the psychiatric Day Treatment Program (DTP) of a community hospital. The recruiting site is located within an ethnically diverse geographic location in the U.S. The Day Treatment Program
admits individuals on a rolling basis and clients can complete the program in 2 weeks with daily attendance in structured group and individual therapeutic activities.

Participants had a past or current diagnosis of MDD, single episode or recurrent episode, in partial to full remission, and were receiving maintenance treatment for MDD. The criteria for selection included: (a) 18 years of age or older; (b) English speaking; and (c) willing to consent to participate in the quantitative and qualitative data collection process. Based on the literature, there were some conditions which were identified as potential confounders. For example, self-care performance may be impaired due to psychosis among individuals affected by Schizophrenia. Participants were excluded if any of the following was present: (a) comorbidity of PTSD or panic attacks/panic disorder; (b) diagnosis of Substance use or Alcohol use disorder; (c) diagnosed personality disorder or intellectual disability; (d) neurological disorder, such as multiple sclerosis, traumatic brain injury, dementia, or seizures; (e) acute psychosis; (f) Electroconvulsive Therapy (ECT) within the past two weeks; (g) PHQ-9 score > 19; (h) Failure to demonstrate an adequate level of decisional capacity to participate in the research study; and (i) visual or hearing impairments.

The Principal Investigator (PI) collaborated with the Director of the DTP, who posted pre-printed flyers and monitored for potential candidates to recruit for the study. Based on the inclusion criteria, the DTP staff notified the PI of potential candidates. The PI was present at the recruitment site multiple times weekly using a designated office space within the DTP. During those times, the PI met with potential candidates that had been identified by the DTP staff, to provide a broad overview of the study purpose, to
answer questions, and garner interest from potential participants. Interested participants were screened for depressive symptoms using the PHQ-9 survey.

Prior to enrollment, all participants were given a thorough description of the study, which included a question and answer session. All potential study participants were evaluated on decisional capacity to provide informed consent using the MacArthur Competence Assessment Tool for Clinical Research (MacCAT-CR; Appelbaum & Grisso, 2001). This assessment and measure were integrated into the consenting process, while the study was explained in detail to participants. The placement of this procedure and the measure during the consent process seemed most appropriate and has been endorsed by other researchers (Eyler, Mirzakhanian, & Jeste, 2005). All subsequent meetings with enrolled study participants occurred on the premises.

**Data Collection**

The PI arranged to meet with eligible participants to complete the study at a time that was convenient for them. Disruption to programming was kept to a minimum by arranging to meet with participants over two consecutive days to complete the data collection. Thus, data were collected while participants were on-site during their lunch breaks, before the DTP began in the morning, or after the DTP ended for the day. After informed consent was obtained on the first day, participants also completed a sociodemographic questionnaire and the BRIEF-A survey. Interviews were completed during the second meeting, within 7 days of the first session. Total time for participants to complete the informed consent process, the questionnaires, and the interview was approximately one hour. Participants were compensated $10 in the form of a cash gift card after they completed each section of the study, for a total of $20.
Measures

**decisional capacity.** The MacArthur Competence Assessment Tool for Clinical Research (MacCAT-CR; Appelbaum & Grisso, 2001) guided the assessment for decisional capacity through the use of a structured interview which incorporates the informed consent procedure. The instrument is intended for the researcher to record the participant’s ability to understand, appreciate, reason, and make a rational choice related to the specific research study. The researcher gives a rating of 0 to 2 on items in each of the four competency assessment sections, with a score of 2 representing higher ability. For example, for the ‘Understanding’ section, a score of 2 would be given if the participant is able to restate or paraphrase clearly the content explained to him or her by the researcher. In their review of 23 instruments designed to measure capacity for sound decision-making related to clinical research, Dunn, Nowrang, Palmer, Jeste, and Saks (2006) concluded that the MacCAT – CR was the most comprehensive and had been used in many studies, with an adequate record of reliability and construct validity. The measure has inter-rater reliability value (ICC) of 0.78 to 0.98 (Gilbert, Bosquet, Thomas-Anterion, Bonnefoy, & Le Saux, 2017).

There is no consensus nor cut-off score for determining decisional capacity (competence) to make an informed decision regarding research participation (Appelbaum & Grisso, 2001). Because it has been established that potential participants for the proposed study may have some level of cognitive impairment, stringent guidelines were most appropriate. Potential participants achieved the following scores for each of the
four domains: (a) Understanding – 26; (b) Appreciation – 6; (c) Reasoning – 8; and (d) Expressing a Choice – 2 (Appelbaum & Grisso).

**severity of depressive symptoms.** The Patient Health Questionnaire – 9 Item (PHQ-9; Kroenke, Spitzer, & Williams, 2001) was used to measure depressive symptoms. The measure consists of nine criterion-referenced items derived from the full PHQ. Participants are asked to rate how often during the past two weeks they have been bothered by depressive symptoms. The depressive symptoms correspond with the diagnostic criteria for Major Depressive Disorder based on the DSM-IV (APA, 2000). Response options are “Not at all”, “Several Days”, “More than Half the Days”, and “Nearly Every Day”. A tenth item assesses the level of difficulty symptoms have caused at work, home, and in their relationships. The items are scored from 0 (not at all) to 3 (nearly every day). The maximum possible score on the PHQ-9 is 27. According to the instrument developers, a score of 0-4 represents minimal symptoms, a score of 5-9 represents mild symptoms, a score of 10-14 represents moderate symptoms, a score of 15-19 represents moderately-severe symptoms, and a score of > 20 represents severe major depression (Kroenke et al., 2001). The PHQ-9 has demonstrated adequate construct validity and concurrent criterion validity (Kroenke et al., 2001). Convergent validity is reported as $r = .73$ (Kroenke et al., 2001) and $r = .72-.73$ (Titov et al., 2011).

**socio-demographic questionnaire.** Participants completed a brief demographic questionnaire that did not include identifying information. Questions included information regarding past clinical history, number of past psychiatric hospitalizations related to major depressive disorder, current treatment status, age, gender, race, income category, education, and employment status (Appendix D).
**self-reported Executive Functions.** Perceptions of executive functions were elicited using the Behavior Rating Inventory of Executive Function – Adult Version, BRIEF-A (Roth, Isquith, & Gioia, 2005). The BRIEF-A is a 75-item norm-referenced, ordinal-level self-report measure of behaviors which comprises nine subscales representing the nine distinct aspects of EF: (a) Inhibit; (b) Shift; (c) Emotional Control; (d) Self-Monitor; (e) Initiate; (f) Working Memory; (g) Plan/Organize; (h) Task Monitor; and (i) Organization of Materials. Participants are asked to rate how often they had experienced each behavior during the past month. Response options are ‘Never’ (N), ‘Sometimes’ (S) and ‘Often’ (O). Raw scores are calculated for each subscale by summing all the responses in that column. Raw scores are converted to T scores and a BRIEF-A T score of 65 or higher is indicative of a clinically meaningful deficit in the EF domain (Roth et al., 2005). An example of an item from the Shifting subscale is, “I have trouble changing from one activity or task to another.” When scoring, the ratings are converted to values of 1 (never) to 3 (often). Three validity scales are completed by the administrator in order to test for response bias.

Madhoo et al. (2014) used the BRIEF-A with a sample of 117 individuals diagnosed with MDD and executive dysfunction to measure efficacy in a randomized clinical trial of lisdexamfetamine dimesylate (LDX) augmentation of antidepressant therapy. The age of the sample was 18 to 55 years. The investigators reported that previous studies had yielded a Cronbach’s alpha of 0.73 to 0.90 for the instrument scales, and test-retest reliabilities of 0.82 to 0.93. The investigators evaluated BRIEF-A total T scores at baseline and 9 weeks after treatment. The changes in scores of depression
severity as measured by the Montgomery-Asberg Depression Rating Scale (MADRS) and the BRIEF-A from baseline to week 9 were correlated ($r^2 = .30$).

**Case Vignette and Interview Guide**

Development of the interview guide was based on Orem’s Theory of Self-care (TSC) and was aligned with the nine domains of Executive Functions on the BRIEF-A: (a) Inhibit; (b) Shift; (c) Emotional Control; (d) Self-Monitor; (e) Initiate; (f) Working Memory; (g) Plan/Organize; (h) Task Monitor; and (i) Organization of Materials (Roth, Isquith, & Gioia, 2005).

Figure 2 displays the vignette with interview guide that were developed for the study. The first part of the interview guide consisted of one vignette which portrayed a person diagnosed with major depressive disorder navigating through three health care scenarios. One of these scenarios, 2.1 through 2.3, was an evolving scenario. The scenarios reflected Orem’s Health Deviation Self-care Requisites: HDSCR #1 - seeking and securing appropriate medical assistance; HDSCR #2 - awareness and attending to the effects of pathological conditions and states; and HDSCR #3 - effectively carry out medically prescribed measures. In each scenario the character was confronted with new information and prompted to exercise a conscious decision to perform a self-care action. The character in each scenario was matched to the participant’s gender (Janice/James). No information about the character’s age was provided. Each scenario was read aloud to participants and the order of each scene was fixed.

The interview guide incorporated open-ended questions with probes. The same questions were asked of each participant. After each scene was read to participants, they were asked to assume the character’s position and share how they thought the character
should respond. After each scenario was discussed, participants were asked if they had experienced a similar situation while caring for their depressive disorder. This process aligned with the research aim to describe the participant’s perspectives and knowledge base pertaining to self-care actions. Participants were given the option to forego this part of the interview, if desired. The vignette and interview guide were piloted with a group of randomly chosen middle-aged adults with no known psychiatric illness. The primary purpose for piloting the measure was to ensure clarity of the measure. There was no formal pilot study and these individuals were not included in the full study.

**Data Analysis**

Due to loss of one of the recruitment sites, the original sampling plan of 142 participants was abandoned. Fifteen individuals were eligible and agreed to take part in the study. Two participants were unable to complete the interviews due to persistent illness. Thus, thirteen participants completed both parts of the study. Quantitative data was analyzed using SPSS Statistics version 26 for Windows (IBM Corp). Qualitative data were analyzed both manually and using NVivo 12 for Windows (NVivo 12, QSR International).

Descriptive statistics were performed for demographic and clinical characteristics of the sample. Hospital admission and depressive symptom severity scores were compared by level of impairment in Executive Functions using cross-tabulation. To describe participants’ perspectives and knowledge base pertaining to self-care actions the vignette data was analyzed using directed content analysis (Hsieh & Shannon, 2005). Each audio-taped interview was transcribed verbatim by the PI. Initially, participants’
words were coded line by line using an open coding process (Wuest, 2012). Topical coding (Richards & Morse, 2007) was used to identify categories. Throughout the coding process participant’s words were evaluated for alignment with EF domains and Orem’s Theory of Self-care. Because a specific theoretical framework guided this study, during the coding and categorizing process, the recording and context units were named in proximity with self-care actions, known as deductive category application (Mayring, 2000). Lastly, categories of the text for participant responses to 1.1 through 1.6 and 3.1 through 3.3 were presented in a table to provide a quantitative analysis of categories by way of frequencies (Krippendorff, 2019).

Content/semantic validity was addressed through use of the Theory of Self-care to guide coding and category development, thereby keeping the textual data as close to the theory as possible. Convergent validity was addressed using triangulation of data between the quantitative measure BRIEF-A and the careful construction of the vignette and related interview questions (Krippendorff, 2019). Efforts to achieve reliability occurred using a second person to interpret the text, coding and categories, or inter-coder reliability.

Results

Quantitative Data

Table 2 displays demographic and clinical characteristics of the sample. Median age of participants was 41 years. Forty-six percent were female (n=8), and 93% were Non-Hispanic white (n=14). The median PHQ-9 score was 12.0, denoting moderate depressive symptoms. Fifty-three percent (n=8) had depression-related admission to
hospital in the previous 12 months. Conversely, 46% of participants (n=7) had no hospitalizations in the previous 12 months.

The next two paragraphs address specific aim 1 - determine whether there is an association between severity of depressive symptoms, number of previous hospitalizations for worsening depression and self-reported EF. Participants with only mild depressive symptoms had no self-reported impairment in the domains of Inhibit and Emotional Control (Table 3). Forty percent of participants (n=6) who had a PHQ-9 score of 10-14 (moderate symptoms) had self-reported impairment in the Initiate domain. Comparing number of hospitalizations in the previous 12 months among those who had self-reported impairment in the EF domain Initiate, 40% of participants (n=6) had at least one hospitalization. Based on these data, the Initiate domain of EF may be most problematic for individuals with MDD.

All participants were receiving medications and psychotherapy for their MDD diagnosis, three of which also received case management services. Of note, all 3 participants had been hospitalized within the previous 12 months. The direction of the association is not clear. It is possible that these participants were referred to case management services because of the relatively high number of hospitalizations.

**Qualitative Data**

This section addresses the research specific aims 2 and 3: describe participants’ perspectives and knowledge base pertaining to self-care actions and interpret the impact of self-reported EF on decision-making processes (estimative, transitional, and productive self-care operations) related to self-care actions. Table 4 displays participant responses for HDSCR 1, HDSCR 3 and HDSCR 2.
investigate reasons (HDSCR 1.1) - Consider simultaneously various internal and external factors which affect health and self-care. When asked for some reasons why the vignette character should see a doctor about the depression, participant responses included – “So he can manage his healthcare”. Another participant asserted, “if it’s not taken care of it can get worse (the depressive symptoms).”

identify order (HDSCR 1.2) - Formulate appropriate steps to carry out an action related to health and self-care. When asked to identify the first action the character should take to secure the appointment with the psychiatrist, all participants agreed that the character should eventually place a phone call to the clinician. However, the order and procedure varied across groups. One participant summed up the three most relevant sequential actions to secure a psychiatrist, “Needs to figure out what’s in his insurance network…find the right doctor…and give him a call…schedule the appointment as soon as possible.”

weighing options (HDSCR 1.3). Balancing emotional responses to facilitate cognitive evaluation of current health and self-care needs. When asked what is the best thing the character can do to properly care for the depression, participants often identified the need to be flexible, and this entailed executing conscious control over emotions. For example, one participant with impaired EF noted the character should attempt to cope, “Needs to manage feelings in the moment so he doesn’t make a poor choice and make things worse…needs to follow through with the appointment.”

determine behavior (HDSCR 1.4). Selection of appropriate course of action among several viable options related to health and self-care. When asked what should
the character say to the receptionist that would help get the care (the vignette service user) needed, participants placed some emphasis on maintaining an assertive stance with the receptionist, in effect to be self-advocates, while remaining cognizant of the effects of his or her behavior on others. For example, one participant with EF impairment suggested, “Needs to open up…explain the situation. See if there’s any other time or wait another day.”

**avoiding barriers (HDSCR 1.5).** Selection of appropriate course of action among several viable options while managing factors which affect decision-making and outcomes related to health and self-care. When asked to identify the vignette character’s goal during the phone call with the receptionist, most participants verbalized reaching some agreement with the receptionist and the care agency in order to secure an appointment with the clinician and enable the character to move forward with receiving the needed care - “Get an appointment time that he can keep and feel okay about it.” Another participant with EF impairment stated, “Not get worked up…to make sure there is an appointment by the time that you hang up the phone.”

**settle (HDSCR 1.6).** Determines the effectiveness of one or more courses of action in reaching a desired outcome related to health and self-care. When asked what is the best thing that can happen for the character in this situation of trying to secure an appointment with the psychiatric clinician for follow up, participants seem to have identified some resolution, the ability to schedule a firm appointment time that is suitable based on the character’s needs. For example, one participant with EF impairment identified, “Come to an agreement on the best time possible that will work.”
HDSCR 3. Participants were able to formulate appropriate actions regarding obtaining necessary bloodwork. For example, one participant with EF impairment thought it best to “Wait for the results to determine if the medication needs to be adjusted…but to keep taking what she was given in the interim.”

HDSCR 2. This was an evolving scenario, requiring the participant to identify depressive symptoms and then choose appropriate actions ordered in a logical fashion along with rationale for having chosen that course of action. When asked to identify the symptoms that could indicate impending psychiatric decompensation, many participants identified symptoms consistent with DSM-5 criteria. For example, one participant with EF impairment reported “Hard to get out of bed…hard to concentrate…forgetfulness.”

Overall, participants seem to have investigated the situation, identifying symptoms and signs that may lead to a decompensated state, and ultimately formulated appropriate actions, with corresponding rationale. Although some participants chose first to rely on “self-help” methods, they recognized that reaching out to the mental health provider was necessary if those methods were not helpful. While there was some variability in participants’ responses, decisions and actions they would take in the scenarios did not deviate significantly from that of the normal healthy sample. Some participants shared their personal experiences. At least one participant identified the approach used by the staff within the healthcare system has a significant impact on clients’ motivation to pursue help.

Lastly, field notes revealed that at some times participants demonstrated “slowed” speech and processing of information and a pattern of thinking and speech that were “a
little disorganized”. First, it is important to realize that many factors could have contributed to participants’ behaviors in these instances and may not be an aberration in and of itself. However, as a clinician evaluating clients’ functioning and self-care, it would be important to consider the potential effect that those cognitive aspects may have on the individual’s ability to perform complex cognitive operations.

Conclusions and Implications for Nursing Practice and Research

According to Orem (2001), knowledge is a primary driver of self-care. Participants’ knowledge of depressive symptoms was evident in the responses to HDSCR 2.1. What’s more, participants had acquired this knowledge from personal experience. In addition, participants were able to “work” their way through ideas and potential courses of action and, ultimately, determine the next appropriate step in the self-care scenario. Orem’s TSC, with its focus on phases of self-care, provided a concrete method for examining participant’s cognitive process and response to the scenarios. The role that the EF has on self-care was clear, as participants demonstrated deliberate action - identifying outcomes, talking through and providing their reasoning for decisions and actions in each scenario.

Discussion

The small sample size precludes generalizing quantitative results to the MDD population. Yet the results may offer clinically useful information. Most participants, irrespective of the EF status, had some idea of how depressive symptoms manifest, and their reports frequently were based on personal experience. Perspectives about which actions should be taken to manage the symptoms varied among participants, however, and this was not necessarily associated with self-reported EF.
The ability to plan and organize actions appeared to be similar between the group with self-reported EF impairment and those without EF impairment. For example, two participants in both groups thought the first step to securing an alternate psychiatrist (1.2) should be to determine which providers would be covered by insurance. Based on some of the participants’ responses, however, following through with identified steps may be more challenging.

Individuals reported at times having difficulty initiating contact, reaching out to their mental health provider, even though they felt they needed help. This is consistent with other findings, that increased depressive symptoms (Chuang, Kao, Lin, and Chang, 2019; Schmitt et al., 2017) and impaired executive functions (Case et al., 2019) correlates positively with difficulties maintaining self-care. The quantitative data also supported this qualitative finding, difficulty with initiating, indicating individuals with MDD may have particular difficulty with taking those critical first steps in contacting mental health professionals.

Level of experience managing one’s MDD illness did not appear to affect level of knowledge regarding self-care actions. Two participants in the present study are younger than 20 years of age and described having supportive parents to help them. These participants had less to share when asked about their personal experiences, yet their responses to the vignettes were similar to other participants.

Many participants seem to recognize the potential for their emotions to influence outcomes when interacting with the healthcare system. However, participants without EF
impairment seem to be more likely than those with EF impairment to incorporate into their responses the need to perform a specific self-regulating activity.

**Limitations**

This study has several limitations, some of which will be detailed in the next paragraphs. First, the initial plan was to recruit a sample of remitted MDD participants. However, among those who were eligible, only three participants reported depressive symptoms in the mild range. In addition, small sample size precluded statistical tests and an examination of psychometric properties for the BRIEF-A measure. For example, multiple logistic regression could have been useful to determine the effects of depression severity and number of previous hospitalizations on each of the self-reported executive function domains. Internal consistency is needed to determine if the BRIEF-A measure is appropriate for use with the MDD population going forward.

Another limitation is the overlap among various EF domains, which is evident when viewing the scenarios. For example, it is likely that working memory is involved with other cognitive faculties and during various phases in the decision-making process. Yet when attempting to create a fluid scenario such as the one in this study, it can be a challenge to isolate working memory precisely from the other EF domains. In addition, researchers have acknowledged the difficulty of reaching agreement between traditional EF tests and measures of daily functioning (Burgess, Alderman, Evans, Emslie, & Wilson, 1998; Strauss, Sherman, & Spreen, 2006). The present study attempted to alleviate some of this incongruence by using both a self-report measure of EF and a vignette designed to reflect the same EF domains.
Thirdly, when reviewing these findings one should consider the effects of any psychotropic medications on participants’ processing and responses. However, in reality it is expected that most of our clients are making daily decisions while under the influence of psychotropics. Thus, this feature may add to the study’s external validity. Lastly, there was careful attention to keep the environment calm and predictable to reduce anxiety or excess burden for participants. This control could have affected participants in a significant way so that, if the participant was confronted by the same scenario in real-life, their self-care decisions and actions may be quite different.

While the risk for response bias is likely lessened with the validity scales contained in the BRIEF-A, this phenomenon cannot be completely ruled out from the vignette and interview guide. Still, the type of questions and rate with which the interview proceeded may have required more effort for the participants to “falsify” answers.

In conclusion, the present study yielded useful information that can increase healthcare providers’ confidence in our clients’ knowledge level of both symptom recognition and practical steps to manage their illness. Yet some important clinical questions have emerged from this study and other questions remain to be answered. What is the association between specific EF domains and self-care actions among remitted MDD clients? Should we encourage our clients to use their own personal resources at the first sign of worsening MDD illness, such as self-help techniques? If so, what should we teach clients about contacting the mental health provider? Are advanced-practice nurses assessing EF, self-care for MDD, and daily functioning at each client visit? Which measures or techniques are most appropriate for the advanced-practice
psychiatric mental health nurse practitioner to assess EF in Inpatient and Outpatient settings? Future studies of self-care and executive functions among individuals with MDD should include a larger sample, and include adequate numbers of clients in remission. Nursing researchers should select measures of EF which will generalize to everyday life and self-care actions for clients managing MDD.
**Figure 1. Theory of Self-care: Study Variables**

**Self-care Agency**
- Deliberate Action/Self-Care Operations
  1. Estimative
  2. Transitional
  3. Productive

**Self-care Requisite**
- Self-care actions performed to regulate functioning
  - Universal
  - Developmental
  - Health Deviation

**Self-care**
- End result of one’s engaging in actions to care for oneself

**Power Components**
- 1. Knowledge
- **2. Executive Functions**
- 3. Motivation
- 4. Physical control of one’s body

**Conditioning Factors**
- Age/Gender
- External environmental factors
- **Health State (MDD)**
  - Developmental state
  - Pattern of living
  - Health care system factors
  - Family system factors
  - Sociocultural factors
  - Resource availability

End result of one’s engaging in actions to care for oneself
Figure 2. Health-Deviation Self-care Requisites: Vignettes

Instructions: The PI reads over one vignette at a time, in order (HDSCR #1 - #3). After reading the vignette the participant is asked to respond to each question using probes as needed. Responses must be audiorecorded.

HDSCR #1: Seeking and securing appropriate medical assistance
Part 1 - Janice (James) was diagnosed with depression last year. She is overdue for a check up with the psychiatrist. But, her doctor who diagnosed her and started her on the antidepressant went to work at a new community mental health center.

A. What are some reasons Janice should see a doctor about her depression? (1.1)
B. What is the first action she needs to take to get her doctor’s appointment? What is the second? What is the third? Etc. (1.2)

Part 2 - The receptionist at the new doctor’s office called Janice/James to tell her the doctor had an emergency and needs to change the appointment time. Because of the sudden change to her appointment, Janice will have to be late for work if she wants to keep the new appointment time. Janice feels a lot of anxiety due to this sudden change and feels like yelling at the receptionist

A. What is the best thing Janice can do in order to properly care for the depression in this situation? (1.3)
B. What should Janice say to the receptionist at this time that will help Janice get the care she needs for her depression? (1.4)
C. What is Janice’s goal during the telephone call with the receptionist? (1.5)
D. What is the best thing, or things, that can happen for Janice in this situation with the receptionist? (1.6)

HDSCR #2: Awareness and attending to the effects of pathological conditions and states
After a period of about 6 months without bad depression symptoms, Janice/James woke up one morning and felt she might be getting more depressed

A. What kinds of things might Janice notice that made her think she is getting depressed again? (2.1)
B. What is the first thing Janice should do about this? (2.2)
C. What are some reasons Janice should do this first? (2.3)

HDSCR #3: Effectively carry out medically prescribed measures
Janice/James needs to have her blood work drawn so that her psychiatrist knows that she has the correct amount of medication in her system before making changes to her dosage.

A. What should Janice’s first step be to take care of having her blood drawn? (3.1)
B. Who should she call for the appointment to have her blood drawn? (3.2)
C. What should be the next step? (3.3)
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<td>6.0</td>
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<tr>
<td>Age first diagnosis MDD</td>
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<td></td>
</tr>
<tr>
<td><em>Median = 31.0, Range = 53</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14-19</td>
<td>5</td>
<td>34.0</td>
</tr>
<tr>
<td>20-25</td>
<td>2</td>
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</tr>
<tr>
<td>26-31</td>
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<td>13.0</td>
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<td>32-40</td>
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<tr>
<td>41-59</td>
<td>1</td>
<td>6.0</td>
</tr>
<tr>
<td>≥60</td>
<td>2</td>
<td>13.0</td>
</tr>
</tbody>
</table>
# Table 3

*Crosstabulation: Executive Functions*  
N=15

<table>
<thead>
<tr>
<th>Executive Functions Domain</th>
<th>Depressive Symptom Severity</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mild (5-9)</td>
<td>Moderate (10-14)</td>
<td>Moderately Severe (15-19)</td>
<td>Total n</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inhibit</td>
<td>Unimpaired</td>
<td>3 (20.0%)</td>
<td>3 (20.0%)</td>
<td>2 (13.3%)</td>
<td>8</td>
<td>53.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Impaired</td>
<td>0</td>
<td>4 (26.7%)</td>
<td>3 (20.0%)</td>
<td>7</td>
<td>46.7</td>
<td></td>
</tr>
<tr>
<td>Shift</td>
<td>Unimpaired</td>
<td>2 (13.3%)</td>
<td>4 (26.7%)</td>
<td>3 (20.0%)</td>
<td>9</td>
<td>60.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Impaired</td>
<td>1 (6.7%)</td>
<td>3 (20.0%)</td>
<td>2 (13.3%)</td>
<td>6</td>
<td>40.0</td>
<td></td>
</tr>
<tr>
<td>Emotional Control</td>
<td>Unimpaired</td>
<td>3 (20.0%)</td>
<td>3 (20.0%)</td>
<td>3 (20.0%)</td>
<td>9</td>
<td>60.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Impaired</td>
<td>0</td>
<td>4 (26.7%)</td>
<td>2 (13.3%)</td>
<td>6</td>
<td>40.0</td>
<td></td>
</tr>
<tr>
<td>Self-Monitor</td>
<td>Unimpaired</td>
<td>2 (13.3%)</td>
<td>5 (33.3%)</td>
<td>4 (26.7%)</td>
<td>11</td>
<td>73.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Impaired</td>
<td>1 (6.7%)</td>
<td>2 (13.3%)</td>
<td>1 (6.7%)</td>
<td>4</td>
<td>26.7</td>
<td></td>
</tr>
<tr>
<td>Initiate</td>
<td>Unimpaired</td>
<td>1 (6.7%)</td>
<td>1 (6.7%)</td>
<td>2 (13.3%)</td>
<td>4</td>
<td>26.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Impaired</td>
<td>2 (13.3%)</td>
<td>6 (40.0%)</td>
<td>3 (20.0%)</td>
<td>11</td>
<td>73.3</td>
<td></td>
</tr>
<tr>
<td>Working Memory</td>
<td>Unimpaired</td>
<td>1 (6.7%)</td>
<td>4 (26.7%)</td>
<td>3 (20.0%)</td>
<td>8</td>
<td>53.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Impaired</td>
<td>2 (13.3%)</td>
<td>3 (20.0%)</td>
<td>2 (13.3%)</td>
<td>7</td>
<td>46.7</td>
<td></td>
</tr>
<tr>
<td>Plan/Organize</td>
<td>Unimpaired</td>
<td>1 (6.7%)</td>
<td>4 (26.7%)</td>
<td>2 (13.3%)</td>
<td>7</td>
<td>46.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Impaired</td>
<td>2 (13.3%)</td>
<td>3 (20.0%)</td>
<td>3 (20.0%)</td>
<td>8</td>
<td>53.3</td>
<td></td>
</tr>
<tr>
<td>Task Monitor</td>
<td>Unimpaired</td>
<td>2 (13.3%)</td>
<td>5 (33.3%)</td>
<td>3 (20.0%)</td>
<td>10</td>
<td>66.7</td>
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</tr>
<tr>
<td></td>
<td>Impaired</td>
<td>1 (6.7%)</td>
<td>2 (13.3%)</td>
<td>2 (13.3%)</td>
<td>5</td>
<td>33.3</td>
<td></td>
</tr>
<tr>
<td>Organization of Materials</td>
<td>Unimpaired</td>
<td>1 (6.7%)</td>
<td>4 (26.7%)</td>
<td>3 (20.0%)</td>
<td>8</td>
<td>53.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Impaired</td>
<td>2 (13.3%)</td>
<td>3 (20.0%)</td>
<td>2 (13.3%)</td>
<td>7</td>
<td>46.7</td>
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</tbody>
</table>
Table 3 (continued)

<table>
<thead>
<tr>
<th>Executive Functions Domain</th>
<th>Number of Hospitalizations</th>
<th>Total n, %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
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</tr>
<tr>
<td>Inhibit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unimpaired</td>
<td>4 (26.7%)</td>
<td>4 (26.7%)</td>
</tr>
<tr>
<td>Impaired</td>
<td>3 (20.0%)</td>
<td>4 (26.7%)</td>
</tr>
<tr>
<td>Shift</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unimpaired</td>
<td>4 (26.7%)</td>
<td>5 (33.3%)</td>
</tr>
<tr>
<td>Impaired</td>
<td>3 (20.0%)</td>
<td>3 (20.0%)</td>
</tr>
<tr>
<td>Emotional Control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unimpaired</td>
<td>3 (20.0%)</td>
<td>6 (40.0%)</td>
</tr>
<tr>
<td>Impaired</td>
<td>4 (26.7%)</td>
<td>2 (13.3%)</td>
</tr>
<tr>
<td>Self-Monitor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unimpaired</td>
<td>5 (33.3%)</td>
<td>6 (40.0%)</td>
</tr>
<tr>
<td>Impaired</td>
<td>2 (13.3%)</td>
<td>2 (13.3%)</td>
</tr>
<tr>
<td>Initiate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unimpaired</td>
<td>2 (13.3%)</td>
<td>2 (13.3%)</td>
</tr>
<tr>
<td>Impaired</td>
<td>5 (33.3%)</td>
<td>6 (40.0%)</td>
</tr>
<tr>
<td>Working Memory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unimpaired</td>
<td>4 (26.7%)</td>
<td>4 (26.7%)</td>
</tr>
<tr>
<td>Impaired</td>
<td>3 (20.0%)</td>
<td>4 (26.7%)</td>
</tr>
<tr>
<td>Plan/Organize</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unimpaired</td>
<td>3 (20.0%)</td>
<td>4 (26.7%)</td>
</tr>
<tr>
<td>Impaired</td>
<td>4 (26.7%)</td>
<td>4 (26.7%)</td>
</tr>
<tr>
<td>Task Monitor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unimpaired</td>
<td>4 (26.7%)</td>
<td>6 (40.0%)</td>
</tr>
<tr>
<td>Impaired</td>
<td>3 (20.0%)</td>
<td>2 (13.3%)</td>
</tr>
<tr>
<td>Organization of Materials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unimpaired</td>
<td>5 (33.3%)</td>
<td>3 (20.0%)</td>
</tr>
<tr>
<td>Impaired</td>
<td>2 (13.3%)</td>
<td>5 (33.3%)</td>
</tr>
</tbody>
</table>
Table 4 Participant Responses HDSCR 1.1 to 1.6

<table>
<thead>
<tr>
<th>EF Domain</th>
<th>Definition</th>
<th>EF Impaired</th>
<th>EF Not impaired</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shift</td>
<td>Consider simultaneously various internal and external factors which affect health and self-care</td>
<td>So he can manage his health care (working memory)</td>
<td>Overdue for a visit, needs to get help</td>
</tr>
<tr>
<td>Working Memory</td>
<td>Holding information in mind for the purpose of decision-making related to health and self-care</td>
<td>Just to follow up and make sure the medications are working and she is doing better overall</td>
<td>Depression is a serious illness…. They require treatment. Part of that treatment is regular contact with the psychiatrist</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Because she is overdue for a checkup and any medicine adjustments</td>
<td>Her medication check</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Discuss the medications with the new doctor and how things have been going over the last year</td>
</tr>
</tbody>
</table>

*Note. HDSCR 1.1: What are some reasons James/Janice should see a doctor about the depression?*

Table 4 (continued)

<table>
<thead>
<tr>
<th>EF Domain</th>
<th>Definition</th>
<th>EF Impaired</th>
<th>EF Not impaired</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan/Organize</td>
<td>Formulate appropriate steps to carry out an action related to health and self-care</td>
<td>Call-look on the back of her insurance card they can tell her what psychiatrists are available</td>
<td>Call the doctor, schedule it, getting there on time</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If she wants to stay with the same doctor, call the CMHC and see how to get into that doctor</td>
<td>Could probably contact that old Dr. or referral to someone who was taking patients</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Needs to call her GP or old doctor to see who’s available, there needs to make appointments, needs to show up</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>information about that doctor, If agreeable, make the appointment</td>
</tr>
</tbody>
</table>

*Note. HDSCR 1.2: What is the first action s/he needs to take to get to his/her doctor’s appointment?*
<table>
<thead>
<tr>
<th>EF Domain</th>
<th>Definition</th>
<th>EF Impaired</th>
<th>EF Not impaired</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Control</td>
<td>Balancing emotional responses to facilitate cognitive evaluation of current health and self-care needs</td>
<td>Call and ask for a different appointment</td>
<td>Take some deep breaths, take the new appointment (Self-Monitor)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Needs to manage feelings in the moment so he doesn’t make a poor choice &amp; make things worse, needs to follow through with the appointment</td>
<td>Needs to try some coping or mindfulness techniques to settle down-breathing real quick, maybe grounding yourself</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Keep the new appointment time</td>
<td>Ask if there is a more convenient time for her to meet with the doctor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Don’t let the change get to him, calm down. Maybe be late to work and tell them why</td>
<td>Receptionist works with her to get her a better appointment time</td>
</tr>
<tr>
<td>Note. HDSCR 1.3:</td>
<td>What is the best thing James/Janice can do in order to properly care for the depression in this situation?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EF Domain</th>
<th>Definition</th>
<th>EF Impaired</th>
<th>EF Not impaired</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhibit</td>
<td>Selection of appropriate course of action among several viable options related to health and self-care</td>
<td>Explain how she’s feeling in as calm a manner as she can</td>
<td>Don’t yell</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Just ask for a different appointment</td>
<td>You don’t want to be mean</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Needs to open up, explain the situation. See if there’s any other time or wait another day</td>
<td>Make it clear there’s a time conflict and see if there’s any way to be penciled in somewhere else</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ask for other days or times</td>
<td>“That time will not work for me; can we have a time that works better for her?”</td>
</tr>
<tr>
<td>Note. HDSCR 1.4:</td>
<td>What should James/Janice say to the receptionist at this time that will help get the care s/he needs for the depression?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 4 (continued)

<table>
<thead>
<tr>
<th>EF Domain</th>
<th>Definition</th>
<th>EF Impaired</th>
<th>EF Not impaired</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shift</td>
<td>Selection of appropriate course of action among several viable options related to health and self-care</td>
<td>“…just explain to the receptionist ‘I am eager I really want to do this but it really just conflicts with my job right now’”</td>
<td>Get a new appointment that works with her work schedule</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Have the appointment where she is not late for work</td>
<td>Get the satisfaction that he needs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not get worked up, to make sure there is an appointment by the time that you hang up the phone</td>
<td>To set up an appointment</td>
</tr>
<tr>
<td>Inhibit</td>
<td>Identification and management of factors which affect decision-making and outcomes related to health and self-care</td>
<td></td>
<td>Get an appointment time that he can keep and feel OK about it</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Make an appointment so that he can see the new doctor and make sure everything’s okay</td>
<td>Get an appointment that doesn’t make her so anxious</td>
</tr>
</tbody>
</table>

*Note. HDSCR 1.5: What is James/Janice’s goal during the telephone call with the receptionist?*

<table>
<thead>
<tr>
<th>EF Domain</th>
<th>Definition</th>
<th>EF Impaired</th>
<th>EF Not impaired</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task Monitor</td>
<td>Determines the effectiveness of one or more courses of action in reaching a desired outcome related to health and self-care</td>
<td>Getting a new appointment</td>
<td>That’s the appointment schedule that allows him to make it work on time and lets him get the help he needs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Come to an agreement on the best time possible that will work</td>
<td>You wanted to be solved as easily and quickly as possible, to get an appointment for later in the day or later the next day that would be the optimal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The receptionist is very understanding and try to find an appointment after work and she gets off at a certain time</td>
<td>Getting a new appointment</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Get her appointment but not through yelling</td>
</tr>
</tbody>
</table>

*Note. HDSCR 1.6: What is the best thing that can happen for James/Janice in this situation?*
## Table 4 Participant Responses HDSCR 3.1 to 3.3

<table>
<thead>
<tr>
<th>EF Domain</th>
<th>Definition</th>
<th>EF Impaired</th>
<th>EF Not impaired</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan/Organize</td>
<td>Recognizes and orders tasks appropriately to enable efficient achievement of goals related to health and self-care</td>
<td>Find out the best place to get her blood drawn</td>
<td>Drink plenty of fluid before I go, make sure you’re on time</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I think if she had to fast, or…make her appointment (plan/organize)</td>
<td>Make the appointment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Make the appointment (plan/organize)</td>
<td>Contact his Primary Care Physician and scheduling an appointment with them</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Schedule the appointment</td>
<td>Make the appointment, make sure your schedule is clear, you can get there</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Needs to make the appointment</td>
</tr>
</tbody>
</table>

**Note.** HDSCR 3.1: What should James/Janice’s first step be to take care of having blood drawn?

## Table 4 (continued)

<table>
<thead>
<tr>
<th>EF Domain</th>
<th>Definition</th>
<th>EF Impaired</th>
<th>EF Not impaired</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiate</td>
<td>Begin appropriate task or activity intended to advance toward a desired outcome related to health and self-care</td>
<td>She could call the insurance company and they can let her know who is covered</td>
<td>Call the doctor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Family Physician should know how to do that for her (Initiate)</td>
<td>Make sure the doctor has something so when you go in, it’s in the system what needs to be drawn</td>
</tr>
<tr>
<td></td>
<td></td>
<td>They’re gonna give her a number to call… Or if she can look it up online and see where she can go with her insurance. (“I’ve done that”) (Initiate)</td>
<td>Whoever… The lab. Hopefully they put in an order and gave her directions (Organiz of materials)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>What the prescribing doctor said</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Call the doctor’s office first</td>
</tr>
</tbody>
</table>

**Note.** HDSCR 3.2: Who should s/he call for the appointment to have blood drawn
Table 4 (continued)

<table>
<thead>
<tr>
<th>EF Domain</th>
<th>Definition</th>
<th>EF Impaired</th>
<th>EF Not impaired</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task monitor</td>
<td>recognizes forward progression toward goals related to health and self-care by correctly ordering and executing appropriate tasks and activities</td>
<td>Go to the lab</td>
<td>Just wait and let the doctor know that the appointment was made and when they might possibly have the results back</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Getting it done and finding out the results (working memory)</td>
<td>Make sure you have transportation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wait for the results to determine if the medication needs to be adjusted but to keep taking what she was given in the interim</td>
<td>Just commit to the appointment, follow through</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Make sure you have the right address, let the doctor know when he can expect the results The</td>
<td>Goes and gets her blood drawn and then if she doesn’t hear from the doctor’s office in a few days call the doctor’s office to double check if she needs to change the medication</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Call the lab and make sure they got the doctor’s prescription for the test, find out when he can go to the lab</td>
</tr>
</tbody>
</table>

Note. HDSCR 3.3: What should be the next step?
<table>
<thead>
<tr>
<th>EF Domain</th>
<th>Definition</th>
<th>EF Impaired</th>
<th>EF Not impaired</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1a Shift</td>
<td>Recognizes and interprets the effects of symptoms and physiologic responses on personal functioning</td>
<td>Fluidly generates ideas to facilitate a correct identification of symptoms and corresponding actions aimed at maintaining health</td>
<td>Not wanting to leave the bed or current life situation</td>
</tr>
<tr>
<td>Initiate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2b Plan/Organize</td>
<td>Recognizes and orders tasks appropriately to enable efficient achievement of goals related to health and self-care</td>
<td>Try to recognize within his thinking what might be wrong and realize it’s his depression, not actually the truth</td>
<td></td>
</tr>
<tr>
<td>Working memory</td>
<td>Holding information in mind for the purpose of decision-making related to health and self-care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.3c Shift</td>
<td>Selection of appropriate course of action among several viable options related to health and self-care</td>
<td>So he doesn’t feel awful and is able to start the day</td>
<td></td>
</tr>
</tbody>
</table>

*Note. a What kinds of things might James/Janice notice that made him/her think s/he is getting depressed again? b What is the first thing James/Janice should do about this? c What are some reasons James/Janice should do this first?*
<table>
<thead>
<tr>
<th>EF Domain</th>
<th>Definition</th>
<th>EF Impaired</th>
<th>EF Not impaired</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1a Shift</td>
<td>Recognizes and interprets the effects of symptoms and physiologic responses on personal functioning</td>
<td>Hard to get out of bed, hard to concentrate, forgetfulness</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Initiate</td>
<td>Fluidly generates ideas to facilitate a correct identification of symptoms and corresponding actions aimed at maintaining health</td>
<td></td>
</tr>
<tr>
<td>2.2b Plan/Organize</td>
<td>Recognizes and orders tasks appropriately to enable efficient achievement of goals related to health and self-care</td>
<td>To get up the same time every day and make that bed first thing ‘cause that is a way to get your day going</td>
<td></td>
</tr>
<tr>
<td>Working memory</td>
<td>Holding information in mind for the purpose of decision-making related to health and self-care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.3c Shift</td>
<td>Selection of appropriate course of action among several viable options related to health and self-care</td>
<td>Getting up at the same time every day is starting a routine. These things help preventing the need to call the mental health provider</td>
<td></td>
</tr>
</tbody>
</table>

*Note. aWhat kinds of things might James/Janice notice that made him/her think s/he is getting depressed again? bWhat is the first thing James/Janice should do about this? cWhat are some reasons James/Janice should do this first*
<table>
<thead>
<tr>
<th>EF Domain</th>
<th>Definition</th>
<th>EF Impaired</th>
<th>EF Not impaired</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1&lt;sup&gt;a&lt;/sup&gt; Shift</td>
<td>Recognizes and interprets the effects of symptoms and physiologic responses on personal functioning</td>
<td>Generally feeling more sad or sad without an apparent reason. For me I have a hard time getting out of bed in the morning.</td>
<td></td>
</tr>
<tr>
<td>Initiate</td>
<td>Fluidly generates ideas to facilitate a correct identification of symptoms and corresponding actions aimed at maintaining health</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2&lt;sup&gt;b&lt;/sup&gt; Plan/Organize</td>
<td>Recognizes and orders tasks appropriately to enable efficient achievement of goals related to health and self-care</td>
<td></td>
<td>Try to take care of his immediate physical needs like, has he cleaned himself, has he eaten and drank water? Do what you need to do to get yourself functioning for the day then pick up the phone and call your doctor</td>
</tr>
<tr>
<td>Working memory</td>
<td>Holding information in mind for the purpose of decision-making related to health and self-care</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* <sup>a</sup>What kinds of things might James/Janice notice that made him/her think s/he is getting depressed again?  
<sup>b</sup>What is the first thing James/Janice should do about this?  
<sup>c</sup>What are some reasons James/Janice should do this first
SYNTHESIS OF FINDINGS FROM ALL CHAPTERS

The purpose of this paper is to provide some highlights from my dissertation project and to describe lessons learned from, and limitations of my research study, *Perceptions of Executive Functions and Self-Care Actions among Individuals Living with Major Depressive Disorder*. Implications for the field and future research will be discussed. As a PMHNP, I have been on a quest to find answers to explain clinical outcomes that I have observed for years among my clients diagnosed with Major Depressive Disorder (MDD), and other disorders, who struggled to maintain self-care and optimal mental health.

The clinical outcome that has held my focus for so long, but was not always recognizable, is the phenomenon of self-care. I know now that self-care is a process and a product (Orem, 2001). A significant component of self-care involves decision making. Decision-making is also a process. Decision-making is not the final step in self-care. One must take the initiative to implement a course of action that has been decided upon.

Having reviewed quite a bit of the literature on the executive functions (EF), it seems clear now the role that EF has on the individual’s ability to perform the cognitive processing needed to produce self-care. The neuropsychological measures traditionally used to measure EF, however, seems almost futile, as it is very difficult to generalize findings to daily life. Because there is a lack of ecological validity of EF tests, highly
structured EF questionnaires seem to be a better option. I chose to use self-reported EF in my study along with a carefully crafted vignette.

Some of the most significant findings from my study included the level of knowledge that clients had of the actions needed to perform self-care in various situations. In addition, some clients recognized the role of emotions influencing their desire and sense of motivation to pursue needed mental healthcare. I was pleasantly surprised to find that many of the clients with MDD had responses to the vignette that did not significantly deviate from how a non-clinical sample responded.

What’s more, my review on the topic of self-care and my study brought me to the conclusion that there is no “one-size-fits-all” version of self-care for MDD. Indeed, self-care is ever-changing. Orem (2001) also seems to confirm my belief. Orem recognized the agent’s ability to provide self-care may be insufficient, thus requiring nursing care. However, in her Theory of Self-Care, Orem positioned self-care as the product of the actions the self-care agent performs. Orem noted that no two persons having the same self-care requisite (e.g., hydration in a heart failure client) will meet self-care needs the same way. This notion is something that I continued to grapple with as I finished up my study with MDD clients. So this is confirmation of what we as nurses know we should do - continue to individualize client care and treatment plans. Nurses at all levels should strive to get to know individual clients in order to learn what “version” of self-care will work best for their clients who have MDD and other forms of psychiatric illness.

**Limitations**

The biggest limitation to my research study was the small sample size. The hope was that at least 30 participants would have been eligible to participate. However, the majority of participants had greater than mild depressive symptoms, measured by the
PHQ-9. The small sample size prevented me from the following: (a) determining the internal consistency of the self-reported EF measure; (b) running the logistic regression analyses; and (c) learning more about the association between remitted-depressed clients, self-reported EF status and self-care.

Along those lines, as a PMHNP, I am aware of the potential for alexithymia in my population of MDD clients. Alexithymia may have had a negative effect on the participant’s ability to accurately complete the depression screening tool, resulting in a large number of ineligible participants based on the high PHQ-9 scores. Out of more than 30 clients who were approached, only 15 were eligible based on PHQ-9 scores. Often, the report from the DTP staff of the client’s improved mood and my observations during interactions with potential recruits, were misleading.

An important observation during my interviews was evidence of slowed thought processing and some (mostly mild) disorganization when participants were responding to vignette questions. Though a bit circumstantial at times, all participants eventually answered the questions without my having to redirect them back to question. Had I more time, I would have followed up on this observation with some clarifying questions. Because I did not factor in psychotropic medications during exclusion criteria, I have no way of knowing if that behavior was related to recent changes in medications.

Participants’ proposed self-care actions did not always correspond with level of self-reported EF. For example, one participant who scored in the ‘Impaired’ range on executive functions in multiple domains provided rational responses to the evolving vignette, with correctly ordered actions. Likewise, at other times there was incongruence between participants’ responses to vignettes related to self-care actions and their self-
reported EF. This finding is not new. Researchers have proposed a “non-specific” cognitive impairment which may be manifested as a result of dysfunction in various cognitive faculties that converge, or culminate, in a “final common pathway” (Wekking, Bockting, Koeter, & Schene, 2012).

Lastly, the limitations which have plagued traditional EF testing may have been a factor in my study as well. The measures were completed at a time which was relatively convenient for participants. There was careful attention to keep the environment calm and somewhat predictable to reduce any sense of anxiety or excess burden associated with participating in a research study. This control in study setting could have affected participants in a significant way so that, if the same participant was to confront the same vignette scenario in real-life, their self-care decisions and actions may be different.

**Implications for the Field and Future Research**

I think the role of EF in decision-making and self-care has been established. However, I have a hypothesis that other factors are involved either directly or through a relationship that is mediated by the EF that affects self-care processes. Future research in this area should consider measures of factors such as motivation, fatigue, and knowledge level, specifically, the extent to which participants learned relevant self-care behaviors from family or important others during developmental years. This information may be helpful for nurses working with pediatric mental health populations.

In addition, from a clinical standpoint, we can understand that the relationship between impaired EF and depressive symptoms may be fully expressed through self-care actions. For example, EF deficits may be a predisposing factor for onset of subsequent major depressive episodes (Knouse, Barkley & Murphy, 2013). There is compelling
evidence that individuals with MDD exhibit EF impairments during acute and remitted episodes, highlighting the need for assessment of daily functioning and self-care during client visits.

A final issue worthy of mention is the sensitivity and feeling of vulnerability individuals have when interacting with healthcare professionals. For example, one participant verbalized that staff attitudes and communication skills have some effect on the client’s navigating of client-staff encounters. Advanced practice psychiatric nurses should remain cognizant of the dynamics of client-staff interactions. As ancillary staff are often the “front-line” personnel interacting with clients, perhaps education opportunities to help staff learn therapeutic communication skills would be helpful.

In conclusion, I think my study yielded some useful information that can serve as a springboard for further research in this area, yet some important clinical questions have emerged from this study and other questions remain to be answered. What associations exist between EF and self-care actions among remitted MDD clients? Should we encourage our clients to use their own personal resources at the first sign of worsening MDD illness, such as self-help techniques? If so, when should clients contact the mental health provider? Are advanced-practice nurses assessing EF, self-care for MDD, and daily functioning at each client visit? Which measures or techniques are most appropriate for the advanced-practice psychiatric mental health nurse practitioner to assess EF in Inpatient and Outpatient settings? Future studies of self-care and executive functions among individuals with MDD should include a larger sample, and include adequate numbers of clients in remission. In addition, future studies using the Behavior Rating Inventory of Executive Function- Adult Version (BRIEF-A) should include a
confirmatory factor analysis to evaluate the level of congruence between that measure, Orem’s Theory of Self-Care, and the conceptualizations of EF found in the literature. Lastly, nursing researchers should select measures of EF which will generalize to everyday life and self-care actions for clients managing MDD.
REFERENCES


https://doi.org/10.1016/j.psychres.2017.08.004


Medical Care Research and Review : MCRR, 76(4), 444-461.

doi:10.1177/1077558717709419


doi:10.1016/j.jad.2017.06.036


doi:10.1111/sltb.12195


doi:10.1097/JCN.0000000000000575


reduced objectively monitored medication adherence in patients with heart failure.

*Circulation:Heart Failure, 9*(12), 1-18. doi:10.1161/circheartfailure.116.002475


doi:10.1016/j.schres.2004.06.009


doi:10.1177/1744987115621782


10.1371/journal.pone.0089556


doi:10.1016/j.diabres.2017.03.025


doi:10.1038/npp.2013.334


doi:10.1177/1090198114543008

doi:10.1016/j.addbeh.2011.02.007

doi:10.1371/journal.pone.0204219


doi:10.1177/0004867412461383


doi:10.1176/appi.neuropsych.12010016


doi:10.1037/a0022741


on effort based decision making in patients with major depressive disorder treated with Vortioxetine. *Comprehensive Psychiatry, 94,* 2-7.

Substance Abuse and Mental Health Services Administration (2012). *SAMHSAs working definition of recovery.* Retrieved from
https://store.samhsa.gov/sites/default/files/d7/priv/pep12-recdef.pdf


doi:10.1080/13854046.2010.539577


Appendix A.

PRISMA 2009 Flow Diagram

Records identified through PubMed (7,952) and CINAHL (569) databases (n = 8,521)

Additional records identified through other sources (n = 0)

Records after duplicates removed (n = 120)

Records screened (n = 120)

Records excluded (n = 68)

Full-text articles assessed for eligibility (n = 52)

Full-text articles excluded, with reasons

n = 6 Study protocol
n = 4 Pilot study
n = 28 Methodological issues
n = 2 Intervention/RCT

Studies included in qualitative synthesis (n = 12)
### Appendix B.

**Copy of the Patient Health Questionnaire (PHQ-9)**

<table>
<thead>
<tr>
<th>Over the past 2 weeks, how often have you been bothered by any of the following problems?</th>
<th>Not At All</th>
<th>Several Days</th>
<th>More Than Half the Days</th>
<th>Nearly Every Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Little interest or pleasure in doing things</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Feeling down, depressed or hopeless</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Trouble falling asleep, staying asleep, or sleeping too much</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Feeling tired or having little energy</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Poor appetite or overeating</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Feeling bad about yourself – or that you're a failure or have let yourself or a family member down</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Trouble concentrating on things, such as reading the newspaper or watching television</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Moving or speaking so slowly that other people could have noticed. Or, the opposite – being so fidgety or restless that you have been moving around a lot more than usual</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Thoughts that you would be better off dead or of hurting yourself in some way</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Appendix C.

Copy of the Behavior Rating Inventory of Executive Function-Adult (BRIEF-A)

During the past month, how often has each of the following behaviors been a problem?

\[ N = \text{Never} \quad S = \text{Sometimes} \quad O = \text{Often} \]

1. I have angry outbursts
2. I make careless errors when completing tasks
3. I am disorganized
4. I have trouble concentrating on tasks (such as chores, reading, or work)
5. I tap my fingers or bounce my legs
6. I need to be reminded to begin a task even when I am willing
7. I have a messy closet
8. I have trouble changing from one activity or task to another
9. I get overwhelmed by large tasks
10. I forget my name
11. I have trouble with jobs or tasks that have more than one step
12. I overreact emotionally
13. I don’t notice when I cause others to feel bad or get mad until it is too late
14. I have trouble getting ready for the day
15. I have trouble prioritizing activities
16. I have trouble sitting still
17. I forget what I am doing in the middle of things
18. I don’t check my work for mistakes
19. I have emotional outbursts for little reason
20. I lie around the house a lot
21. I start tasks (such as cooking, projects) without the right materials
22. I have trouble accepting different ways to solve problems with work, friends, or tasks
23. I talk at the wrong time
24. I misjudge how difficult or easy tasks will be
25. I have problems getting started on my own
26. I have trouble staying on the same topic when talking
27. I get tired
28. I react more emotionally to situations than my friends
29. I have problems waiting my turn
30. People say that I am disorganized
31. I lose things (such as keys, money, wallet, homework, etc.)
32. I have trouble thinking of a different way to solve a problem when stuck
33. I overreact to small problems
34. I don’t plan ahead for future activities
35. I have a short attention span
36. I make inappropriate sexual comments
37. When people seem upset with me, I don’t understand why
38. I have trouble counting to three
39. I have unrealistic goals
40. I leave the bathroom a mess
41. I make careless mistakes
42. I get emotionally upset easily
43. I make decisions that get me into trouble (legally, financially, socially)
44. I am bothered by having to deal with changes
Appendix C (continued)
45. I have difficulty getting excited about things
46. I forget instructions easily
47. I have good ideas but cannot get them on paper
48. I make mistakes
49. I have trouble getting started on tasks
50. I say things without thinking
51. My anger is intense but ends quickly
52. I have trouble finishing tasks (such as chores, work)
53. I start things at the last minute (such as assignments, chores, tasks)
54. I have difficulty finishing a task of my own
55. People say that I am easily distracted
56. I have trouble remembering things, even for a few minutes (such as directions, phone numbers)
57. People say that I am too emotional
58. I rush through things
59. I get annoyed
60. I leave my room or home a mess
61. I get disturbed by unexpected changes in my daily routine
62. I have trouble coming up with ideas for what to do with my free time
63. I don’t plan ahead for tasks
64. People say that I don’t think before acting
65. I have trouble finding things in my room, closet, or desk
66. I have problems organizing activities
67. After having a problem, I don’t get over it easily
68. I have trouble doing more than one thing at a time
69. My mood changes frequently
70. I don’t think about consequences before doing something
71. I have trouble organizing work
72. I get upset quickly or easily over little things
73. I am impulsive
74. I don’t pick up after myself
75. I have problems completing my work

Note. Actual measure and authority to administer was obtained by purchase and individual licensing.
Appendix D. Socio-Demographic Information

As part of the study, we would like to have some general background information about you.

A. Health Status

1. How old were you or what year were you first diagnosed with depression: Age______ Year:_______

2. Over the past 12 months, how many times have you been hospitalized for more than one night due to worsening depression? (Please write in the number of times) _____ Times

3. What type of services are you currently receiving for help with depression? Check ( √ ) all that apply.
   None ______
   Therapy______
   Medications______
   Case Management______
   Other_____________________________________________________________

B. Demographic Information

1. What is your age? _____ years
2. What is your gender? (Circle)     Male      Female
3. What is your race/ethnicity? (Place a check “ √ ”)
   _____ Non-hispanic white
   _____ Non-hispanic black
   _____ Hispanic
   _____ American Indian/Alaska native
   _____ Asian/Native Hawaiian

4. What is your current employment status? (Place a check “ √ ”)
   _____ Employed Full-time
   _____ Employed Part-time
   _____ Not Employed
   _____ Retired

5. What is the highest level of education you have completed? (Place a check “ √ ”)
   _____ Less than High School
   _____ High School
   _____ Some College or Vocational Training
   _____ College

6. Please place a check ( √ ) next to the number that is closest to your yearly household income:
   _____ < $25,000
   _____ $25,000 to $49,999
   _____ $50,000 to $74,999
   _____ > $75,000

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CURRICULUM VITA

Melanie G. Walters, MSN, APRN, PMHNP-BC

EDUCATION:

GRADUATE

<table>
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<td>2006</td>
</tr>
<tr>
<td>Nashville, TN</td>
<td>Psychiatric Mental Health NP Track</td>
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UNDERGRADUATE

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<th>Date Awarded</th>
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<tr>
<td>Northern KY Univ,</td>
<td>Bachelor of Science in Nursing</td>
<td>2003</td>
</tr>
<tr>
<td>Middletown, OH</td>
<td>AAS in Nursing</td>
<td>1996</td>
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PUBLICATIONS
