The Relationship Between Cognitive Flexibility, Coping, and Symptomatology in Psychotherapy

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THE RELATIONSHIP BETWEEN COGNITIVE FLEXIBILITY, COPING AND SYMPTOMATOLOGY IN PSYCHOTHERAPY

by

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ABSTRACT
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Cognitive flexibility is broadly defined as the ability to shift perspective or approach in order to adapt to changes in the environment. This implies the abilities to generate alternatives and then to implement effective approaches. High cognitive flexibility has been associated with psychological well-being and effective coping, whereas low flexibility, or rigidity, has been linked to several types of psychopathology. The goal of the current study was to provide exploratory evidence of the utility of a brief, self-report measure of cognitive flexibility in identifying relationships to coping strategies, symptomatology, and treatment duration in a clinical setting. A total of 18 individuals seeking treatment at a university-affiliated mental health clinic participated in the study. Participants completed measures of cognitive flexibility and coping styles. Demographic information and data regarding symptomatology and treatment were gathered from client files. Correlational analyses indicated strong positive relationships between aspects of cognitive flexibility and use of problem-focused coping, suggesting that greater ability to generate and implement effective approaches is linked to greater use of pragmatic strategies to improve a situation. Results also indicated a strong positive correlation between the perceived control over challenging situations and duration of previous therapy. However, no relationship was found between flexibility and symptomatology. These exploratory results provide preliminary evidence for the relationship between cognitive flexibility and aspects of mental health in a clinical setting.

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I. INTRODUCTION

Cognitive flexibility is broadly defined as the ability to shift perspective or approach in order to adapt to changes in the environment (Johnco, Wuthrich, & Rapee, 2014a). It is considered a complex construct composed of several aspects of executive functioning, allowing an individual to generate ideas, consider alternative perspectives, and inhibit habitual responses in favor of more adaptive approaches to challenges. As such, individuals high in cognitive flexibility should be expected to effectively manage life stressors due to their greater ability to generate and appropriately shift approaches according to the situation.

A. The Relationship between Cognitive Flexibility and Mental Health

This theoretical conceptualization has led researchers to explore the relationship between cognitive flexibility and psychological health. Hayes, Luoma, Bond, Masuda, and Lillis (2006) conducted a meta-analysis of research concerning the relationship between flexibility and psychological well-being. The meta-analysis of 74 correlations across 32 studies found a moderate relationship between flexibility and various measures of psychological outcomes (Hayes et al., 2006). More specifically, a greater ability to adapt to situational demands by effectively shifting perspectives was associated with better work performance, better pain management, better physical health, and less parental stress (Hayes et al., 2006).

Traditionally, factors such as positive experiences, appraisals, emotions, and satisfaction of psychological needs have been cited as keys to psychological well-being (Kashdan & Rottenberg, 2010). To this end, cognitive flexibility has been shown to be associated both with positive mood and with employment of strategies facilitating the

maintenance of positive mood (Hirt, Devers, & McCrea, 2008). Hirt et al. (2008) found that individuals generating a greater number and more creative responses to various tasks were happier than those with a more restricted response pattern. Furthermore, they found that these flexible individuals were better able to maintain their affective state from pre- to post-task, even when the task was unpleasant (Hirt et al., 2008). Hirt et al. (2008) concluded that cognitive flexibility enabled the ability to generate approaches that would mitigate the impact of negative experiences.

However, in order to satisfy needs achieve goals, an adherence to hedonistic approaches may not always be effective (Kashdan & Rottenberg, 2010). In some situations, experiencing traditionally negative emotions, such as anger, has been shown to enable behaviors that are more likely to achieve the desired outcome (Tamir, 2009; Tamir, Mitchell, & Gross, 2008). Tamir et al. (2008) demonstrated that individuals preferred to engage in anger-generating activities before entering a confrontational situation, despite the expected unpleasantness of the chosen activity, whereas those anticipating non-confrontational situations preferred to engage in neutral or excitement-generating activities. Furthermore, they found that individuals who engaged in anger-generating tasks performed better at achieving desired outcomes of the confrontation than those who engaged in neutral or pleasant activities (Tamir & Ford, 2012; Tamir et al., 2008). These results suggest that taking a flexible, context-appropriate approach enables greater success in achieving desired goals than a strict adherence to pleasurable activities (Tamir, 2009).

B. The Relationship between Cognitive Flexibility and Mental Illness

Just as cognitive flexibility is related to psychological health, inflexibility or rigidity is related to psychological problems. Hayes et al. (2006) noted that greater inflexibility is related to a greater probability of having a psychiatric disorder and to greater endorsement of symptoms of depression and anxiety. Greater rigidity, as manifested in an inability to shift approach in response to changing demands, has also been found in those diagnosed with obsessive-compulsive disorder and anorexia-nervosa when compared to healthy controls (Meiran, Diamond, Toder, & Nemets, 2011; Steinglass, Walsh, & Stern, 2006).

Given that specific symptoms may be found across diagnoses, research has attempted identify those symptoms believed to be related to cognitive rigidity, such as ruminative thinking and a negative attributional style, which are both common to depression and anxiety (Beck, Rush, Shaw, & Emery, 1979; Kashdan & Rottenberg, 2010; Luten, Ralph, & Mineka, 1997). Ruminative thinking refers to perseveration on symptoms of distress and perceived causes and consequences of these symptoms. It is believed that rumination diverts cognitive resources from the generation of approaches that could lead to effective relief of distress, maintaining perseverative thinking (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). Evidence supports this conceptualization, showing that ruminators show an impaired ability to adjust their approach when faced with changing demands, compared to non-ruminators (Davis & Nolen-Hoeksema, 2000).

A negative attributional style is the persistent use of negatively-valenced explanations for understanding life events. Individuals espousing a negative attributional style typically believe that problems are internal, unchangeable, and universal

(Abramson, Metalsky, & Alloy, 1989). Rigidity is not only evidenced in the inflexible negative content of the attributions, but also in the inability to employ alternative attributions in different situations (Fresco, Williams, & Nugent, 2006; Moore & Fresco, 2007). Cognitively flexible individuals have been found to employ a greater variety of explanations for events than more rigid individuals, and this attributional flexibility is likewise associated with endorsement of fewer symptoms of depression and anxiety (Fresco, Williams, & Nugent, 2006).

C. The Relationship between Cognitive Flexibility, Psychotherapy, and Coping

In clinical research and practice, attempts have been made to alleviate psychological distress and improve well-being by targeting cognitive rigidity. For example, Beck's cognitive theory of depression suggests that distress arises from rigid, self-reinforcing patterns of thinking (Beck et al., 1979). Cognitive-behavioral therapy (CBT) was developed to help individuals interrupt maladaptive patterns of thinking and replace them with more adaptive approaches (Beck et al., 1979). To achieve this goal, individuals are encouraged to generate and consider alternative approaches contrary to the unhelpful approach being employed (Beck et al., 1979). CBT been shown to be effective in reducing distress associated with a variety of mental disorders, including mood disorders, anxiety-related disorders, schizophrenia, and eating disorders (American Psychological Association – Society of Clinical Psychology, n.d.).

A key component of CBT is to identify and develop effective coping mechanisms to manage distress, while reducing ineffective coping mechanisms (Folkman & Moskowitz, 2004). Research has focused on two broad coping domains: problem-focused coping and emotion-focused coping. Problem-focused coping is an approach

that attempts to change a situation for the better whereas emotion-focused coping encompasses a variety of emotion-regulation techniques (Folkman & Lazarus, 1985). The particular coping styles employed by an individual can change over time and in relation to the situation, such that a specific coping approach may be adaptive in one situation and unhelpful in another (Cheng, Lau, & Chan, 2014; Kashdan & Rottenberg, 2010; Lazarus, 1993). Nonetheless, some emotion-focused coping strategies, such as avoidance, have been linked to poor mental health (Folkman & Moskowitz, 2004). These coping techniques provide immediate, temporary relief of distress but do little to resolve the underlying problem, resulting in continued distress, repeated engagement in unhelpful coping styles, and enabling of a self-reinforcing cycle of coping rigidity (Folkman & Moskowitz, 2004; Lazarus, 1993). Individuals with greater cognitive flexibility may be better equipped to consider and employ various coping strategies in order to resolve situations and reduce distress. Research has supported this assertion, finding that flexibility in coping strategies is related to better effectiveness in managing stressors, a greater sense of well-being, and fewer symptoms of depression and anxiety than an inflexible approach to coping (Cheng, Lau, & Chan, 2014; Kashdan & Rottenberg, 2010).

D. Measuring Cognitive Flexibility

A variety of measures have been developed to evaluate cognitive flexibility. Given that cognitive flexibility is considered to be an aspect of executive functioning, neuropsychological measures have traditionally been employed to measure this construct. Measures such as the Wisconsin Card Sorting Task (Berg, 1948) and the Stroop Color and Word Task (Golden, 1975; Stroop, 1935) attempt to assess cognitive flexibility by measuring the ability to shift to a new problem-solving approach when the previous one

is no longer applicable. However, the neuropsychological tests commonly used to measure cognitive flexibility are time-consuming, can elicit frustration in test-takers, and may not relate to the type of cognitive flexibility that is considered important in psychotherapy (Dennis & Vander Wal, 2010; Johnco et al., 2014a; Martin & Rubin, 1995).

Several self-report questionnaires have been developed to evaluate cognitive flexibility in an effort to provide less frustrating and more time-efficient measures that may provide more utility in a clinical setting (Dennis & Vander Wal, 2010). These include self-report questionnaires designed to measure cognitive flexibility using communication competence (Cognitive Flexibility Scale [CFS], Martin & Rubin, 1995), attributional style (Attributional Style Questionnaire [ASQ], Peterson et al., 1982), and experiential avoidance (Acceptance and Action Questionnaire [AAQ], Hayes et al., 2004).

More recently, Dennis and Vander Wal (2010) developed the Cognitive Flexibility Inventory (CFI) as an attempt to identify the aspects of cognitive flexibility that are beneficial in psychotherapy. They identified two primary aspects of cognitive flexibility: (a) the ability to perceive alternative solutions to challenging situations; and (b) the ability to perceive difficult situations as controllable. Although these aspects of cognitive flexibility are of particular focus in CBT, other psychotherapies rely on a similar framework of promoting flexibility. For example, emotion-focused therapy (EFT) attempts to replace maladaptive emotional schemes by promoting and modeling alternative, adaptive functions for emotions (Greenberg & Pavio, 1997). Similarly, acceptance and commitment therapy (ACT) encourages experiential openness and

acceptance as an alternative approach to rigid behavioral and attributional styles that may maintain distress (Hayes, Strosahl, & Wilson, 2012).

Evidence for construct validity of the CFI has been shown in that it is significantly correlated with other measures of cognitive flexibility, including the CFS, Stroop Color-Word Test, Trail-Making Test Part B, and the Wisconsin Card Sorting Task (Dennis & Vander Wal, 2010; Gulum & Dag, 2012; Johnco et al., 2014a). Additional evidence for the construct validity of the CFI has been found in terms of a negative relationship between CFI-measured cognitive flexibility and both depression and anxiety, demonstrated by significant correlations with the Beck Depression Inventory, Beck Anxiety Inventory, Geriatric Depression Inventory, and Geriatric Anxiety Inventory (Dennis & Vander Wal, 2010; Gulum & Dag, 2012; Johnco et al., 2014a).

Johnco et al. (2014a) discovered that the correlations between the CFI and traditional neuropsychological tests of cognitive flexibility disappeared in a clinical subgroup consisting of older adults (age 60 and above) with diagnosed mood or anxiety disorders. Similarly, correlations between the CFI and symptoms measures nearly completely disappeared when evaluating this clinical subgroup, with only a weak negative relationship remaining between the CFI Control subscale and the GAI. They concluded that the CFI measures a different aspect of cognitive flexibility than the performance-based, task-switching ability assessed by the neuropsychological tests; specifically, they suggested that self-report measures of cognitive flexibility, such as the CFI and CFS, may instead assess the self-appraisal of one's ability to adapt to challenging situations (Johnco et al., 2014a). Furthermore, they suggested that this self-appraisal may not be as affected by negative mood states in clinical samples compared to

non-clinical samples (Johnco et al., 2014a). Given that Johnco et al. (2014a, 2014b) has been the only team to investigate the CFI using a clinical sample, and that this sample was adults over the age of 60, further research is needed to evaluate the utility of the CFI in identifying relationships between cognitive flexibility and symptomatology.

E. Aims and Hypotheses

The current study explored the relationship between cognitive flexibility, coping, and distress in a clinical population. It should be noted that this was not a homogeneous sample, in that it was not restricted to a specific disorder or to a specific psychotherapeutic approach. All clinicians were students in a doctoral program in clinical psychology and were supervised by licensed clinical psychologists. Student clinicians were trained in several empirically supported therapies, including ACT, EFT, and Interpersonal Therapy, with a particular focus on CBT. Although they utilize methods based on different theoretical perspectives, each of these techniques encourages an individual to identify and consider alternative approaches in order to alleviate their distress. Therefore, the construct of cognitive flexibility assessed in this study was considered to be relevant to the treatments provided, despite their variety.

It was expected that psychotherapy would assist individuals in developing greater understanding of their problems and in developing more adaptive skills for managing distressing thoughts and situations. Cognitive flexibility was expected to play a role in several aspects of the psychotherapeutic process, resulting in the following hypotheses. First, cognitive flexibility was expected to be negatively related to symptom severity at the start of therapy. Individuals with higher levels of cognitive flexibility would be expected to generate a greater repertoire of approaches for dealing with difficult situation,

thereby being better able to call upon a successful approach and less likely to experience distress. Second, it was expected that cognitive flexibility would be negatively related to length of therapy. Given that promoting effective ways to manage distress is a key component of psychotherapy, individuals with a greater ability to perceive and engage in a variety of approaches would be better prepared for this aspect of therapy, reducing the amount of time needed to develop these skills. Third, it was expected that cognitive flexibility would be positively associated to use of adaptive coping styles and negatively associated with use of maladaptive coping styles due to the ability of those with greater flexibility to generate alternative approaches to challenges, making it more likely that they discover and employ an effective approach.

II. METHODS

A. Participants

Participants were recruited from the Marquette University Center for Psychological Services (CPS). Participants were required to be at least 18 years old and currently engaged in psychotherapy at the CPS at the time of participation. Individuals were excluded from participation if they received psychotherapeutic services or case supervision from either the graduate student investigator or his faculty supervisor during the course of the study. An a priori power analysis revealed that 84 participants were required to achieve 80% power for detecting moderate relationships ($r > .30$) between variables. Based on previous attempts to generate participation from this clinical population, a participation goal of 40 participants was expected over a recruitment period of nine months. This increased the necessary relationship strength to $r > .43$ in order to achieve 80% power.

B. Materials

Pre-study notice (Appendix A). The pre-study notice briefly described the study, how individuals might participate, and provide contact information of the investigators. As research materials were included with clinic materials, the pre-study notice was intended to inform CPS clients of the upcoming study and reduce ambiguity between clinic materials and research materials.

Study information sheet (Appendix C). The study information sheet was included with research materials and briefly described the study, research materials, conditions for participation. It was intended to reduce ambiguity between clinic materials and research materials.

Research consent form (Appendix D). The informed consent form described the research purpose, requirements for participation, potential risks, protections in-place to minimize risks, potential benefits, participation procedure, and contact information of the investigators in the event that the participant has questions.

HIPAA consent form for use of protected health information (Appendix E). The HIPAA consent form requested participant authorization for investigators to collect data from HIPAA-protected client files at the CPS.

Intake questionnaire. The Intake Questionnaire was completed prior to an individual's first appointment at the CPS. It included demographic information, information about previous mental health treatment, brief medical information, and family psychological history.

Cognitive Flexibility Inventory. The Cognitive Flexibility Inventory (CFI) is a 20-item self-report questionnaire developed to measure an individual's potential for challenging maladaptive cognitions (Dennis & Vander Wal, 2010). Items are answered on a 7-point Likert-type scale according to the extent that they accurately describe the respondent's approach to challenging situations. The CFI has two subscales: The Control subscale assesses perceived control over situations; the Alternatives subscale assesses the ability to perceive alternatives to difficult situations. Dennis and Vander Wal (2010) reported good to excellent internal consistency using Cronbach's alpha at time points seven weeks apart for the total CFI (time 1 α = .90; time 2 α = .91), Alternatives subscale (time 1 α = .91; time 2 α = .91), and Control subscale (time 1 α = .86; time 2 α = .84). They reported test-retest reliability after 7 weeks was high for the Total CFI score (r =

.81, $p < .001$) and for both the Alternatives ($r = .75$, $p < .001$) and Control ($r = .77$, $p < .001$) subscales.

Ways of Coping Questionnaire. The Ways of Coping Questionnaire (WoC) is a 66-item self-report questionnaire developed to assess how frequently an individual engages in eight different coping styles (Folkman & Lazarus, 1985). Items are answered on a 4-point Likert-type scale according to how frequently respondents use specified methods of coping when facing challenging events. For the current study, the WoC was modified to 19 items assessing three coping styles (Problem-focused Coping, Wishful Thinking, and Keeping to Self) in order to reduce the time necessary to complete the questionnaire. Wishful Thinking and Keeping to Self were selected as examples of maladaptive coping styles based on results of a previous study that had identified positive correlations between depressive symptoms as measured by the Beck Depression Inventory (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) and these coping styles: Wishful Thinking ($r = 0.40$, $p < 0.001$) and Keeping to Self ($r = 0.49$, $p < 0.001$) (Wierzbicki, Johnson, & Adams, 2015). These coping styles were also found to be negatively correlated with cognitive flexibility (Dennis & Vander Wal, 2010). Problem-focused coping was selected as an example of adaptive coping due to the positive relationship of items in this subscale to cognitive flexibility (Dennis & Vander Wal, 2010). Folkman and Lazarus (1985) reported internal consistencies of $\alpha = 0.85$ for Problem-focused coping, $\alpha = 0.84$ for Wishful Thinking, and $\alpha = 0.65$ for Keeping to Self.

Personality Assessment Inventory. The Personality Assessment Inventory (PAI) is a 344-item self-report measure developed to assess various domains of

psychopathology and personality (Morey, 1991). Items are answered on a 4-point Likert-type scale according to how accurately they describe respondent's experiences. The PAI contains four validity scales, 11 clinical symptom scales (with 30 subscales), five treatment consideration scales, and two interpersonal scales. Morey (1991) reported evidence of construct validity between PAI scales and numerous measures of psychopathology, including the Minnesota Multiphasic Personality Inventory, BDI, and State-Trait Anxiety Inventory. Internal consistency ranged between α = .74 and α = .90 on the clinical symptom scales of the PAI, including α = .87 for the Depression scale and α = .90 for the Anxiety scale (Morey, 1991).

Clinical Outcomes in Routine Evaluation – Outcome Measure. The Clinical Outcomes in Routine Evaluation Outcome Measure (CORE) is a 34-item self-report measure developed to assess aspects of current functioning (Evans et al., 2002). This measure was intended to be used by clinicians to evaluate change in symptom-related impairment during the course of therapy, regardless of therapeutic approach (Evans et al., 2000) and is used in the CPS for this purpose. Items are answered on a 5-point Likert-type scale according to how frequently they have been experienced during the previous week. The CORE has four subscales that assess subjective well-being, current symptoms, life functioning, and clinical risk. In a clinical sample, internal reliability for the overall measure was α = 0.94 with individual subscale reliabilities between α = 0.75 and α = 0.88 (Evans et al., 2002). Evans et al. (2002) reported good convergent validity of the CORE scales and a variety of symptom measures including the BDI, BAI, Brief Symptom Inventory, and General Health Questionnaire.

Mini International Neuropsychiatric Interview. The Mini International Neuropsychiatric Interview (MINI) is a structured diagnostic interview used to diagnose a number of DSM-IV psychiatric disorders (Sheehan et al., 1998). The MINI was used in the current study to confirm psychological diagnosis. Sheehan et al. (1997) reported good to very good kappa levels of concordance between diagnostic modules of the MINI and those of the Structured Clinical Interview for the Diagnostic and Statistic Manual (SCID).

C. Procedure

Participants were recruited from individuals receiving psychotherapy at the CPS. All therapy clients at the CPS complete the CORE upon arrival to the CPS for each appointment. The CORE is located at the reception desk in the CPS attached to clipboards so that clients may complete this form immediately upon arrival. The PAI and MINI were routinely completed during initial intake sessions to further diagnostic assessment of symptoms and distress.

Two weeks prior to commencement of recruitment and data collection for the current study, a pre-study notice was attached to the CORE clipboards. This notice informed clients of the upcoming research so that they might have a better understanding of the purposes of the study. In addition, this notice emphasized that participation was voluntary and would not affect their treatment at the CPS.

Upon commencement of recruitment and data collection, the pre-study notice was removed from the CORE clipboards and replaced by the study information sheet, research and HIPAA consent forms, and the CFI and WoC. The study information sheet informed clients that these additional materials were for research purposes, participation

is voluntary, and should they not wish to participate they should still complete the CORE per clinic routine. Individuals who chose to participate were expected to read and sign the research consent form and HIPAA consent form, then complete the CFI and WoC. These materials were submitted to the CPS administrative assistant when the participant completed their CORE. The administrative assistant then left the research materials in a secure location for the investigator. Demographic information, mental and physical health history, and psychological testing data were collected from participant's client files at the CPS. Psychological testing data included results from the PAI, CORE, and MINI. Statistical analyses were performed to investigate relationships between cognitive flexibility, psychological factors, and therapeutic factors.

III. RESULTS

A. Participant Characteristics

Demographics. A total of 21 individuals volunteered to participate. Three individuals had received services from the principal investigator, resulting in their exclusion from the study, resulting in a final total of 18 participants. Participants ranged in age from 18 to 57 years (M = 28.3, SD = 11.7) and were predominantly female (61.1%) and Caucasian (72.2%). Most had attended at least some college (77.8%) at the time of the study. Participants were nearly evenly split between those employed part-time (38.9%), full-time (33.3%), and unemployed (27.8%). Demographic characteristics of participants are summarized in Table 1.

Table 1
Participant Demographics

Characteristic	*M (SD)*	Range	*N (%)*
Age	28.3 (11.7)	18-57	
Sex			
Female			11 (61.1)
Male			7 (38.9)
Ethnicity			
Asian/Pacific Islander			1 (5.6)
Black/African American			1 (5.6)
White/Caucasian/Euro-American			13 (72.2)
Biracial or Multiracial			3 (16.7)
Education			
Some high school or high school graduate			4 (22.2)
Some college			6 (33.3)
College degree			6 (33.3)
Some graduate school or graduate degree			2 (11.2)
Employment			
Part-time			7 (38.9)
Full-time			6 (33.3)
Unemployed			5 (27.8)

Diagnostic and treatment variables. Information about participants' current diagnosis was gathered from clinician assessment reports in the client file and corroborated with results from the MINI. Previous treatment information was gathered from intake questionnaires and examined. Results are summarized in Table 2.

Table 2
Treatment Characteristics

Characteristic	*M (SD)*	Range	*N (%)*
Number of sessions in current treatment	16.7 (15.5)	1-55	
Clinical Diagnosis[a]			
Mood disorder			9 (50.0)
Anxiety disorder			8 (44.4)
Trauma-related disorder			1 (5.6)
Personality disorder			1 (5.6)
No diagnosis			1 (5.6)
How long has the problem existed?			
About a month			2 (11.1)
About a year			1 (5.6)
About two years			4 (22.2)
More than two years			10 (55.6)
Not specified			1 (5.6)
Previous treatment type			
Individual therapy only			5 (27.8)
Medication only			1 (5.6)
Multiple treatments			6 (33.3)
No response			6 (33.3)
Length of previous treatment[b]			
1 session			1 (8.3)
2-10 sessions			5 (41.7)
11-50 sessions			1 (8.3)
More than 50 sessions			3 (25.0)
No response			2 (16.7)
Helpfulness of previous treatment[b]			
Very helpful			3 (25.0)
Somewhat helpful			4 (33.3)
Not at all helpful			3 (25.0)
Harmful			1 (8.3)
No response			1 (8.3)

[a]Three individuals were diagnosed with comorbid mood and anxiety disorders. One individual was diagnosed with comorbid mood, anxiety, and trauma-related disorders.

[b]n = 12 participants reporting previous treatment

Anxiety and depressive disorders were the most frequent diagnoses (44.4% and 50%, respectively) and four individuals had comorbid diagnoses (22.2%). Participant's distress was typically long-lasting, with 14 individuals (77.8%) indicating that their problem had persisted for two years or more. Six participants (33.3%) reported multiple types of previous treatment; five (27.8%) reported previous therapy without medications; and one (5.6%) reported medication use only. Six individuals (33.3%) did not report previous treatment. Of those participants reporting length of previous treatment (n = 12), six (50.0%) reported treatment lasting ten sessions or less and three (25.0%) reported greater than 50 sessions. Treatment was rated as somewhat or very helpful by seven (58.3%) of these individuals and as not helpful or harmful by four (33.3%) participants.

B. Evaluation of Hypotheses

Descriptive statistics for the CFI, WoC, PAI Anxiety and Depression scales, and CORE are presented in Table 3. All 18 participants completed the CFI and WoC, requiring a correlation strength of $r > .61$ to achieve 80% statistical power. Validity scales on the PAI were evaluated and determined to be within acceptable levels. The PAI

Table 3
Descriptive Statistics of CFI, PAI, and Coping Scales

Measure	*M*	*SD*	Minimum	Maximum
CFI Total	93.56	15.76	61	118
CFI Alternatives	67.33	12.65	35	84
CFI Control	26.22	6.04	19	36
PAI Anxiety	72.14	11.09	56	90
PAI Depression	73.07	11.60	51	98
WoC Problem Focused Coping	29.67	8.11	12	44
WoC Wishful Thinking	13.83	3.65	8	20
WoC Keep to Self	8.78	2.24	3	12

Note. CFI = Cognitive Flexibility Inventory; PAI = Personality Assessment Inventory; WoC = Ways of Coping Questionnaire

had not been completed by four individuals, reducing the sample size to 14 for analyses including the PAI and requiring a correlation strength of $r > .67$ to achieve 80% power. One individual terminated services before completing their first CORE, reducing the sample size to 17 for analyses including this measure. Statistical analyses were all evaluated at an alpha level of 0.05.

Relationship between cognitive flexibility and initial symptomatology. It had been predicted that there would be a negative relationship between cognitive flexibility and initial symptomatology. This was tested by examining the Pearson product-moment correlation coefficients between the CFI and measures of initial symptom severity: Depression and Anxiety scales of the PAI and initial CORE scores. These correlations are presented in Table 4. The PAI is typically administered during intake sessions and provides information about symptom severity relating to a broad range of psychological disorders. The Depression and Anxiety scales of the PAI were included due to the relationship of these disorders to cognitive flexibility (Dennis & Vander Wal, 2010; Hayes et al., 2006; Johnco et al., 2014a). The CORE measures aspects of life functioning each week that may be impacted by mental illness. In order to provide a stable

Table 4
Correlations between CFI, PAI, and Initial CORE

Measure	CFI Total	CFI Alternatives	CFI Control
PAI Anxiety	-.06	.08	-.25
PAI Depression	-.22	-.31	.00
CORE Total	.01	-.05	.13
CORE Life Functioning	-.11	-.21	.15
CORE Well Being	.04	.02	.08
CORE Symptoms	.12	.11	.09
CORE Risk/Harm	-.02	-.12	.20

* $p < .05$

Note Higher scores on PAI scales indicate greater endorsement of symptoms associated with the specified domain. Higher scores on CORE scales indicate greater functional impairment in the specified domain. CORE scores were evaluated using mean scores obtained over the first four sessions of treatment. PAI = Personality Assessment Inventory; CORE = Clinical Outcomes in Routine Evaluation

assessment of functioning early in the treatment process, CORE scores from the first four sessions of treatment were averaged to create a single score for each participant. Three participants had completed the CORE fewer than four times and were excluded from this analysis. The prediction was not supported as the correlations between the CFI scales and the measures of initial symptomatology were not significant.

Relationship between cognitive flexibility and length of therapy. It had been predicted that there would be a negative relationship between cognitive flexibility and length of current therapy, considered to be the number of sessions from intake to completion of treatment. At the time of data analysis, only nine of the eighteen participants (50%) had completed treatment. Of these nine, three (33%) attended four or fewer sessions, indicating the likelihood of premature termination given that diagnostic assessment, rather than clinical intervention, is conducted during the first couple sessions. Based on this reduction in sample size, a correlational analysis was not conducted.

An exploratory analysis was conducted to examine the relationship between current levels of cognitive flexibility and length of previous treatment. Length of previous treatment was indicated by self-report according to the following categories: one session, 2-10 sessions, 11-50 sessions, and more than 50 sessions. A Spearman's rank-order correlation revealed a significant positive correlation between CFI Control and length of previous treatment ($r_s(8) = 0.67$, $p = 0.03$) indicating that a greater perception of control over challenging situations was related to longer duration of previous treatment. No significant relationship was found between length of previous treatment and CFI Total ($r_s(8) = 0.19$, $p = 0.60$) or CFI Alternatives ($r_s(8) = -0.16$, $p = 0.66$).

Relationship between cognitive flexibility and coping style. It had been predicted that cognitive flexibility would be positively related to problem-focused coping and negatively related to wishful thinking and keeping to self. Pearson product-moment correlation coefficients were calculated to evaluate these relationships. A significant positive correlation was found between problem-focused coping and CFI Total ($r(16) = 0.63$, $p = 0.01$), CFI Alternatives ($r(16) = 0.53$, $p = 0.02$), and CFI Control ($r(16) = 0.53$, $p = 0.02$). These results indicated that greater use of problem-focused coping was associated with greater ability to consider alternatives, greater perception of control in challenging situations, and greater overall cognitive flexibility. Relationships between wishful thinking and keeping to self coping styles and CFI scales were not significant. Results are summarized in Table 5.

Table 5

Correlations between CFI and Use of Coping Styles

Coping Style	CFI Total	CFI Alternatives	CFI Control
WoC Problem Focused	**.78****	**.65***	**.82****
WoC Wishful Thinking	-.18	-.18	-.14
WoC Keep to Self	-.30	-.40	-.10

Note. WoC = Ways of Coping Questionnaire.

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

IV. DISCUSSION

A. Discussion of Results

The present study examined the relationship between self-reported cognitive flexibility and aspects of symptomatology and treatment outcome. It had been predicted that greater cognitive flexibility would be related to lower initial symptom severity and less time in therapy; however, these hypotheses were unsupported. Cognitive flexibility was unrelated to initial levels of depression, anxiety, or distress related to aspects of life functioning. These results are similar to those reported by Johnco et al. (2014a), who found no relationship between cognitive flexibility and measures of depression and anxiety in a clinical sample of older adults, despite significant negative relationships between these measures in a combined sample. Combining the results of the current study with those of Johnco et al. (2014a) suggests that the CFI may not be sensitive to the relationship between cognitive flexibility and psychopathology in clinical populations.

Post hoc analysis indicated that greater self-efficacy in one's ability to control situations was related to greater duration of previous treatment. This finding was contrary to the hypothesis that greater cognitive flexibility would facilitate treatment response and result in fewer sessions. Therefore, the following explanations were considered. First, the ability to generate and implement different approaches for overcoming challenges is an aspect of cognitive flexibility that is developed through CBT (Beck et al., 1979; Dennis & Vander Wal, 2010); therefore, it would be expected more time spent in therapy developing these skills would result in a greater sense of control over challenges and explain this relationship. Previous research by Johnco, Wuthrich, & Rapee (2014b) assessed cognitive flexibility before and after 12 weeks of manualized

group CBT and found statistically significant increases in cognitive flexibility at post-treatment, providing evidence that therapy can improve cognitive flexibility. Alternatively, the relationship between control and length of treatment may indicate that a feeling of control over challenging situations may manifest as cognitive rigidity in clinical samples, reducing response to therapy and prolonging treatment. Research has found that individuals with a greater sense of control are more likely to rigidly employ problem-solving strategies, even when a situation cannot be controlled or solved, and subsequently report greater psychological stress (Watanabe, Iwanaga, & Ozeki, 2002). Further research is necessary to clarify this relationship.

Cognitive flexibility was found to be positively correlated to the use of problem-focused coping, whereas non-significant negative relationships were found with wishful thinking or keeping to oneself. The relationship with problem-focused coping confirms findings from previous research (Dennis & Vander Wal, 2010) as well as a primary hypothesis of the present study, suggesting that the ability to consider a variety of approaches and view situations as controllable enables the use of direct, pragmatic strategies to overcome challenges. The negative relationships with wishful thinking and keeping to oneself were expected, yet the lack of statistical significance precludes direct interpretation of these results. The Ways of Coping Questionnaire had been shortened for the purpose of this study, including only those coping scales that had previously been found to be related to cognitive flexibility. In doing so, several coping styles were excluded that may be expected to display stronger relationships to cognitive flexibility in a clinical population. Two of these excluded coping scales were self-blame and tension-reduction, the latter of which includes behavioral methods of distress management such

as eating, drinking, substance-use, and exercise. According to the cognitive triad of depression proposed by Beck et al. (1979), individuals experiencing clinical levels of depression are likely to view themselves negatively and would therefore have a propensity to engage in self-blame. Similarly, cognitive rigidity may be related to increased self-blame, particularly when an individual feels control over a situation but is unable to generate effective approaches, as previously described. The distress and frustration resulting from the inability to employ effective approaches may also be associated with an increase in behaviors to avoid or mitigate the resulting distress, such as substance use or exercise. Evaluation of a more inclusive range of coping methods would be useful in future research.

B. Limitations

Several limitations likely impacted the findings of this study. First, the small sample size limited the ability to detect statistically significant results. Hypothesized directions of relationships between variables were found throughout results but were of insufficient strength to be considered significant due to the limited sample. Furthermore, the relationship between cognitive flexibility and duration of current treatment was not evaluated due to half of the sample continuing treatment at the time of data analysis. A more robust sample size would not only allow for greater ability to detect effects but would also allow for more complex methods of analysis.

The heterogeneity of the clinical attributes of the sample also complicated analyses. Cognitive flexibility may be differently involved depending on an individual's diagnosis. For example, negative attributions about the world and future may render an individual with depression unable to perceive options for change. In contrast, ruminative

worry experienced by an individual with anxiety may be fueled by an ability to generate a multitude of possible distressing outcomes. Evaluation of a more homogenous clinical sample or recruitment of a sufficiently large sample size would allow for further investigation into the relationship between cognitive flexibility and psychopathology.

C. Future Directions

The present study provided pilot data regarding the role of cognitive flexibility in psychotherapy. Results suggested relationships between cognitive flexibility, time in treatment, and coping. Further exploration of these variables within the context of therapy while addressing the limitations of the current study will continue to clarify the role of cognitive flexibility in therapeutic processes.

Additional research is needed to evaluate the utility of the CFI in a clinical setting. As a brief self-report measure, it is ideal for use as a screening measure of cognitive flexibility in a broad range of clinical settings. Information gathered from this measure may inform a clinician about effective approaches to therapy. For example, individuals with extremely low levels of flexibility may be more resistant to treatment, necessitating greater attention to developing a therapeutic alliance early in therapy. Interactions between the Alternatives and Control subscales may also be useful at informing therapeutic approach. An individual who is adept at generating alternative perspectives but feels a lack of control over distressing thoughts and situations would likely benefit more from development of self-efficacy skills rather than cognitive restructuring skills.

It may be important to include evaluation of cognitive appraisal in future studies due to the relationship between appraisal, coping, therapy, and mental health (Beck et al.,

1979; Cheng et al., 2014; Folkman & Lazarus, 1985; Folkman & Moskowitz, 2004). An inflexible, negative style of appraisal is a core component of depression and is linked to rigid adherence to unhelpful coping (Beck et al., 1979; Cheng et al., 2014; Kashdan & Rottenberg, 2010). Therapeutic approaches such as CBT and ACT target negative appraisals by developing alternative perspectives to challenge the negative appraisal (CBT) or eliminate the valence of the appraisal altogether (ACT) in order to reduce distress (Beck et al., 1979; Hayes et al., 2012). Therefore, the ability to consider alternative approaches and perspectives would be expected to be linked to more balanced appraisals and enable response to therapy.

It would be beneficial to evaluate cognitive flexibility longitudinally over the course of therapy. If it is found that cognitive flexibility improves over the course of successful therapy, it may implicate cognitive flexibility as a key mechanism of change in the therapy process. Johnco et al. (2014b) found a statistically significant improvement in cognitive flexibility at post-treatment, providing evidence for the malleability of cognitive flexibility. Further research is needed to replicate this finding and determine whether an improvement in cognitive flexibility is associated with similar improvements in acquisition of coping skills, cognitive restructuring skills, and reduction in distress.

Evidence gathered in the current study provides preliminary support for the influence of cognitive flexibility on factors related to psychotherapy. Additional research will help elucidate the relationships between cognitive flexibility and aspects of the therapy process. A greater understanding of these relationships may provide insight into mechanisms of therapeutic change and allow future researchers to develop more effective treatment for flexibility-related psychopathology.

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APPENDIX A

NOTICE OF UPCOMING RESEARCH STUDY

Benjamin T. Johnson
Michael Wierzbicki, Ph.D.
Department of Psychology
Marquette University

Beginning [DATE], a research study will be conducted using data collected at the Marquette University Center for Psychological Services. The purpose of this research study is to examine the relationships among several psychological variables, including personality factors, coping, and emotional distress. It is hoped that information gained from this study may lead to the development of better treatment for psychological problems.

Beginning on [DATE], you will notice several additional forms included with the CORE. If you wish to participate, we ask that you read and sign the consent form, then complete the two brief questionnaires. It is expected that **completing these forms will take about 5-10 minutes,** at which point your participation is complete. Additional information will also be gathered from your file. No identifying information will be gathered or used in this study, and once data is collected, no link will exist between the collected data and your file.

Please note:

- Participation will be **VOLUNTARY**. You are not required to participate.
- **YOUR TREATMENT WILL NOT BE AFFECTED** in any way by whether or not you decide to participate.
- All information collected for the study will be **CONFIDENTIAL.**

If you have any questions, please ask the administrative assistant or contact Benjamin T. Johnson at (414) 288-3659 or Dr. Michael Wierzbicki at (414) 288-7560.

APPENDIX B

MARQUETTE UNIVERSITY RESEARCH STUDY

Benjamin T. Johnson
Michael Wierzbicki, Ph.D.
Department of Psychology

The following pages are part of a research study being conducted at Marquette University. If you wish to participate, please read and sign the consent form and complete the two brief questionnaires. **Completion of these forms is expected to take 5-10 minutes**. If you have previously completed these forms, your participation is complete and you do not need to complete these forms again.

Please note: Participation is VOLUNTARY. You are not required to participate. Your treatment at the Center for Psychological Services will not be affected in any way by whether or not you decide to participate.

If you have any questions, please ask the administrative assistant or contact Benjamin T. Johnson at (414) 288-3659 or Dr. Michael Wierzbicki at (414) 288-7560.

APPENDIX C

MARQUETTE UNIVERSITY

AGREEMENT OF CONSENT FOR RESEARCH PARTICIPANTS
The Relationship between Cognitive Flexibility, Coping, and Psychotherapy
Benjamin T. Johnson
Michael Wierzbicki, Ph.D.
Department of Psychology

You have been invited to participate in this research study. Before you agree to participate, it is important that you read and understand the following information. Participation is completely voluntary. Please ask questions about anything you do not understand before deciding whether or not to participate.

PURPOSE: The purpose of this research study is to examine the relationships among several psychological variables, including personality factors, coping, and emotional distress. You will be one of approximately 40 participants in this research study.

PROCEDURES: Several additional forms will be included with the CORE questionnaire that you complete upon arriving for an appointment. Participation entails reading and signing the consent forms, then completing the two additional questionnaires. These questionnaires are commonly used to measure individual characteristics, including personality factors and coping behaviors. Information will also be collected from your client file at the Marquette Center for Psychological Services (CPS). This information will include demographic information (age, sex, race, etc.), and psychological test results. For this purpose, your client file number will be collected. Other information that may be used to identify you (name, address, phone number, date of birth, etc.) will ***not*** be collected as part of this study.

DURATION: Your participation will consist of completing two brief questionnaires **expected to take 10 minutes** to complete.

RISKS: The risks associated with participation in this study are no greater than you would experience in everyday life. The risk of breach of confidentiality is considered minimal. The same confidentiality safeguards used by the CPS to protect the privacy of your information will be followed during the course of this research. Your file will never be removed from the CPS and no protected health information will be collected. All data that is collected will be coded when entered into a database so that it cannot be directly linked to your file or identifying information. Only aggregate data will be publicly presented. Psychological risks of participation are considered minimal. Questionnaires will ask about personality factors and coping behaviors. If answering these questions becomes uncomfortable for you, you may choose to skip over those items or you may discontinue your participation at any time.

BENEFITS: There are no direct benefits to you for participating in this study. This research may benefit society by providing a better understanding of the relationships

between individual characteristics and distress. This understanding may lead to the development of more effective treatment for psychological distress.

CONFIDENTIALITY: All information you reveal in this study will be kept confidential. All data entered into the research database will be coded using an arbitrary subject number. A separate link will exist between subject number and CPS client file number and will only be accessible by the principal investigator and co-investigator. This link will only be used to match research questionnaire data to data collected from your client file at CPS or accessed in the event that this data is used in future research. When the results of the study are published, no individual participant will be identified; only group results will be reported. The questionnaires you complete as part of this study will be shredded upon completion of the study. The electronic data file will be saved indefinitely in the event that future researchers may wish to reanalyze the data. These research records may be inspected by the Marquette University Institutional Review Board or its designees and (as allowable by law) state and federal agencies.

VOLUNTARY NATURE OF PARTICIPATION: Participating in this study is completely voluntary. Your decision of whether or not to participate will have no influence on the care you receive at the CPS. You may withdraw from the study and stop participating at any time without penalty or loss of benefits to which you are otherwise entitled. If, after participating, you wish not to have your data included in this study, please contact the Benjamin Johnson (contact information below).

CONTACT INFORMATION: If you have any questions about this research project, you can contact Benjamin Johnson (288-3659; benjamin.johnson@mu.edu) or Dr. Michael Wierzbicki (288-7560; michael.wierzbicki@mu.edu). If you have questions or concerns about your rights as a research participant, you can contact Marquette University's Office of Research Compliance at (414) 288-7570.

I HAVE HAD THE OPPORTUNITY TO READ THIS CONSENT FORM, ASK QUESTIONS ABOUT THE RESEARCH PROJECT AND AM PREPARED TO PARTICIPATE IN THIS PROJECT.

_____
(Printed Name of Participant)

_____ _____
(Signature of Participant) Date

_____
(Printed Name of Individual Obtaining Consent)

_____ _____
(Signature of Individual Obtaining Consent) Date

APPENDIX D

MARQUETTE UNIVERSITY

Authorization to Use or Disclose Protected Health Information in Research

Written authorization from the patient is required by law. All items must be complete to be considered valid.

1. Print Name of Research Participant _____Date of Birth: ____/_____/_____
2. I authorize the use and/or disclosure of Protected Health Information (*Health Information*) as described below.
   a) Name of person or organization authorized to use, release or disclose the Health Information: *Marquette University Center for Psychological Services*
   b) Name of Principal Investigator and his/her Research Team authorized to receive the Health Information: *Benjamin T. Johnson, Michael Wierzbicki, Ph.D.*
   c) Name of Other Organization(s) authorized to receive the Health Information (for example Study Sponsor, Institutional Review Board, or Government Agencies): *None*
   d) Description of Health Information to be released (for example Research Medical Records, all Medical Records, Laboratory Reports, Results of Psychological Examinations, etc.): *Client file number, results of psychological examinations, non-identifying information from the intake questionnaire*
   e) This Health Information is being released to conduct the Research Study (IRB #, Title, and Purpose): *HR-2911; The relationship between cognitive flexibility, coping, and psychotherapy; This study seeks to examine the relationship between cognitive flexibility, coping styles, and psychotherapy variables such as time in therapy. This may lead to a better understanding of psychological distress and subsequent development of more effective treatment.*
   f) The information to be released may include information relating to the diagnosis and/or treatment of mental illness, alcohol/drug abuse, HIV test results, developmental disabilities, and genetic testing results unless I give written instructions not to release such information.
3. I have the right to cancel or revoke this authorization at any time. If I want to cancel this authorization, I must do so in writing and present it to the Principal Investigator or his/her Research Team. I understand that the cancellation (revocation) may not apply to information that has already been released, or if it would interfere with the integrity of the study.
4. I have a right to inspect and/or receive a copy of the Health Information to be released and that I may be charged for any copies of the records that I receive. Access to health information created or obtained for this research study may be temporarily suspended until the study has been completed. Once the study is completed, I will again have access to my health information.
5. If I agree to sign this authorization, I must be provided with a signed copy of this form.
6. If no prior notice to revoke this authorization is received, this authorization will expire on (select one): ☒ At the end of the study ☐ ____Years after the end of the study ☐ _____ (enter specific date)
8. The information disclosed may be redisclosed by the recipient and may no longer be protected by the Federal privacy rules.
9. I may refuse to sign this authorization, and that my refusal to sign will not affect my ability to obtain non-study related treatment.
10. If additional Health Information is required other than what has been identified above, another authorization form must be completed and signed.

_____ _____

Signature of Participant or Legal Representative Date

_____ _____

If signed by Legal Representative, Relationship to Participant Signature of Witness