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An Investigation Of In-Session Client Change Language And Stage Of Change

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AN INVESTIGATION OF IN-SESSION CLIENT CHANGE LANGUAGE AND
STAGE OF CHANGE

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MASTER'S PROGRAM IN CLINICAL PSYCHOLOGY

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AN INVESTIGATION OF IN-SESSION CLIENT CHANGE LANGUAGE AND
STAGE OF CHANGE

By

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THESIS

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ABSTRACT

In the practice of Motivational Interviewing, recognizing language is important for understanding where a persona stands in terms of readiness to change when considering a behavior change, such as risky alcohol use. Few studies have examined relationships between language expressed in a BMI and survey measures of stage of readiness to change. The purpose of the present study was to evaluate the types of client language in a single BMI session and associations with stage of change among a sample of emergency room/trauma department patients screened for positive BAC and/or risky alcohol use ($n = 196$). Using structural equation modeling, a confirmatory factor analysis found support for two categories of client language: language in the direction of change (Change Talk [CT]) and language in the direction away from change (Sustain Talk [ST]). Model estimations found less than adequate model fit, and comparisons of client language between the precontemplation, contemplation and action stages of change demonstrated mixed support for the proposed relationships. Results from this study corroborate existing evidence of language expressed in both directions of change (i.e., ambivalence), and inform differences in language expressed by people in the various stages of change. The implications of the present findings in understanding client language during a BMI as an indicator for stage of change are discussed.

Keywords: Motivational Interviewing, brief motivational intervention, client language, stage of change, alcohol use

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INTRODUCTION

Motivational Interviewing (MI) is an attentive communication approach that has been applied in settings that are interested in improving the quality and effectiveness of talking with clients in order to facilitate behavior change. Emanating from the substance use field and growing up alongside the transtheoretical model (TTM) of change (Prochaska & DiClemente, 1982), MI interventions are designed to understand the importance of client motivation and level of readiness to change. Thus, the practice of MI as a clinical method places particular focus on language as a primary component of the underlying change mechanisms. This paper seeks to investigate the structure of client language as described by the types of change language proposed by MI theory. This investigation will also assess the relationship between a client's stage to change and language during a brief motivational intervention for alcohol misuse.

THEORY OF MOTIVATIONAL INTERVIEWING

MI was born from the perspectives of client-centered counseling as a therapeutic style, integrating humanistic and cognitive-behavioral traditions into an empathic, collaborative conversation that aims to guide the client toward increases in motivation for behavior change. The developer of MI, William Miller, is a clinical psychologist who was interested in a particular way of conversing with people such as to evoke and strengthen their own personal motivations for change (Miller, 1983). MI places particular emphasis on interpersonal processes for building motivation toward behavior change in situations where ambivalence (i.e., the simultaneous feeling of wanting and not wanting something, or wanting two opposing things) surrounds behavioral and life choices. While other counseling methods may be more overtly directive in nature, the guided, collaborative conversation style of MI approaches ambivalence as an essential component for uncovering the client's core values and primary goals for motivating change. The

inter-relationship between ambivalence and values, Rollnick says, is the substance of MI (Heather & Stockwell, 2004).

The conversational counseling style of MI is not itself a form of therapy. Rather, MI is an intentional practice with a unique perspective from which conversations about change are approached. This MI approach can be integrated with existing treatment and therapeutic methods (e.g., cognitive-behavioral therapy [Buckner & Schmidt, 2009;], transtheoretical [Erol & Erdogan, 2008] and gestalt [Engle & Arkowitz, 2006]) approaches, and medical and psychotherapies [Heffner et al., 2010; Olsen, Smith, Oei, & Douglas, 2012]). Essentially, MI can be seen a compilation of the effective underlying conditions from prior theories. The origins of client-centered counseling, upon which the practice of MI was built, were initially proposed by Carl Rogers (1942). Rogers and his colleagues investigated theories about how counselor skills can facilitate change and noted three critical conditions for creating a safe and supportive atmosphere. These conditions, accurate empathy, nonpossessive warmth, and genuineness, provide the basis for the essential elements of the mind and the heart-set of the MI clinical practice. Without the four key elements of the MI spirit (i.e., partnership, acceptance, compassion, and evocation), the practice of MI can quickly become a “cynical trick” of steering and manipulating clients into the right choice (Miller & Rollnick, 2013).

Essential components of MI also draw from other theories, pulling together influential factors of therapy that lead to behavior change. The theory of cognitive dissonance (Festinger, 1957), for example, considers the relationships among an individual’s cognitions as influential in motivating change. Festinger explains how incongruences between beliefs or values and behaviors can produce discomfort, and can therefore generate pressure or intention within the individual to make changes such as to alleviate the unpleasant state of dissonance. The practice

of MI therefore incorporates an in-depth exploration of the individual's core values and goals to build such dissonance, or discrepancy. The power exerted by building such discrepancy between life values and current behavior is said to ignite motivation and behavior change, particularly among those who are not yet expressing ambivalence (Miller & Rollnick, 2013).

Stemming from cognitive dissonance, self-perception theory provides an extension to the phenomenon of creating discrepancy between behavior and "internal stimuli." According to Bem (1967), a client's self-descriptive verbal statements about stimuli directly in his/her control are considered among the most descriptive of the individual's true attitudes and state. The developers of MI embraced this verbalization of intrapersonal conflict between current behavior and deeply held goals and values as the underlying factor indicating an individual's perceived importance to change (Miller & Rollnick, 2002). Using this discrepancy, MI seeks to evoke verbalizations around ambivalence as a generator for an individual's motivation to change. Thus, MI as a clinical approach uses the integration of these theories and techniques to better understand one of the most critical components of behavior change: motivation (Lundahl & Burke, 2009).

Overall, MI is intentionally designed to elicit a client's own motivation while working toward resolution of ambivalence and clarification of values, generally in the direction of behavior change. MI has been found to be effective at client engagement and improvement across a variety of health outcomes, including high-risk drinking, smoking, drug use, sexual behaviors, and diet and exercise (Dunn, Deroo, & Rivara, 2001; Burke, Arkowitz, & Menchola, 2003; Rubak, Sandbaek, Lauritzen, & Christensen, 2005; Lundahl & Burke, 2009; Lundahl, Kunz, Brownell, Tollefson, & Burke, 2010; Lundahl et al., 2013). Due to the range of behaviors with which MI can be applied, each session requires the initial definition of a target behavior

upon which the conversation will be focused, and, ultimately, a desired goal or plan for change that may be developed. For example, a range of possible target behaviors for MI in the context of diet and exercise exist (e.g., cholesterol levels, physical activity) for which an individualized change plan can be collaboratively generated (e.g., eliminating specific foods from diet, setting an attainable exercise routine). MI in the context of substance use may consider target behaviors such as driving under the influence or serious health risks, upon which change plans, such as abstinence or managing use, can be derived.

The efficacy of MI is based in the counselor's proficient use of techniques to increase client in-session change language and decrease sustain language. Within "proper therapeutic conditions" (Miller & Rose, 2009) such as accurate empathy and positive regard, clients feel safe to explore the possibility of change, which, ultimately leads to behavior outcomes. MI does not require a medical or doctoral degree to be learned and executed; rather, it is intended to be a clinical tool that is easy to learn and to be used by a range of health providers (e.g., counselors, nurses, social workers, promotoras). Still, MI involves a complex set of skills that are used flexibly, and learning proficient use of this skill requires more than that which can be learned through a single workshop or self-teaching (Miller & Rollnick, 2009).

In general, a practitioner of MI is instructed to talk less than the client, use reflections more than questions, use mostly open ended questions, and, importantly, avoid getting ahead of the client's readiness to change. Further use of MI skills includes selective elaboration and reinforcement of language in favor of change by reflecting, summarizing, and affirming change language, as well as careful responding to language against change and diminishing discord. By exploring an individual's perceived levels of importance and confidence related to achieving his/her goals, a change plan tailored to the individual's stage of change can be developed, when

appropriate. The identification and clarification of an individual's own reasons and goals guides the collaborative development of an individualized change plan and allows for further exploration to address possible barriers. Thus, MI can be described as a collaborative series of processes that honors and emphasizes the individual's autonomy and seeks to understand his/her internal frame of reference with the purpose of guiding the resolution of ambivalence and strengthening motivation for change (Miller & Rollnick, 2013).

MI IN BRIEF INTERVENTION

While the MI style can be integrated with long-term therapeutic methods across a range of settings, brief interactions have also adapted the MI conversation approach. For example, efforts to address substance use and related public health concerns have led researchers to implement screening and brief intervention in hospitals and medical clinics. While screening procedures are used merely to identify individuals at-risk of problematic alcohol and substance use, brief interventions are designed to help motivate identified individuals, with the ultimate goal of reducing risky behavior and related problems. These brief interactions aim to help individuals better understand their own level of risk and promote behavior change within a single 5- to 30-minute conversation. Over thirty years of clinical trial investigations and systematic reviews have supported the effectiveness of brief intervention in reducing substance use and related problems across various settings, including hospitals and primary care (Bien, Miller, & Tonigan, 1993; Kahan, Wilson, & Becker, 1995; Ashenden, Silagy, & Weller, 1997; Wilk, Jensen, & Havighurst, 1997; Moyer, Finney, Swearingen, & Vergun, 2002; Poikolainen, 1999; Dunn, Deroo, & Rivara, 2001; D'Onofrio & Degutis, 2002; Institute for Research, Education and Training in Addictions [IRETA], n.d.).

Given the high rates of patients with positive blood alcohol concentration that are frequently admitted to emergency and trauma departments (U.S. Department of Health and Human Services [USDHHS], 2006; IRETA, n.d.), the implementation of effective protocols to

identify and address the needs of such patients is exigent. Per a 2006 publication by the American College of Surgeons Committee on Trauma, trauma centers have been identified as an ideal setting in which brief intervention interactions “can use the teachable moments generated by the injury to implement an effective prevention strategy, for example, alcohol counseling for problem drinking” (USDHHS, 2006). This report goes on to highlight the importance of implementing screening and brief intervention mechanisms for identifying patients with problematic alcohol use in Level I and II trauma centers. As of 2006, in order to be classified as a Level I trauma center, the Committee on Trauma mandates procedures of screening for high-risk drinkers and implementation of brief intervention procedures for identified individuals (USDHHS, 2006).

Healthcare providers trained in providing brief interventions can capture the recent incident or injury and capitalize on the related motivating effects, in order to increase patient motivation to change high-risk drinking behavior (USDHHS, 2006). Years of investigations have found brief interventions to be more effective than control or no treatment, and as effective as other forms of intervention (i.e., brief counseling, self-help psychoeducational material) while maintaining time- and cost-efficiency above all (Bien, Miller, & Tonigan, 1993; Wilk, Jensen, & Havighurst, 1997; Moyer, Finney, Swearingen, & Vergun, 2002; Moyer & Finney, 2004; Bertholet, Daeppen, Wietlisbach, Fleming, & Burnand, 2005). Evidence-based brief interventions generally encompass the following components: (1) providing the patient with information/feedback, (2) understanding the patient’s drinking experiences and enhancing motivation, and (3) providing respectful, professional advice (USDHHS, 2006). While most brief interventions generally implement some cognitive behavioral strategies aimed at substance use reduction, the practice of MI has been added as an approach to enhance the quality of brief interventions (Miller & Rollnick, 2002).

The use of advanced MI skills within a brief intervention allows for both the provider (i.e., interventionist) and the client to explore contributing factors to his/her behaviors, experiences, and motivations to change, while at the same time encouraging and informing the

development of personalized goals for change. This approach, known as Brief Motivational Intervention (BMI), has been adopted as a recommended approach for enhancing the efficacy of brief intervention for individuals at risk for serious alcohol and other substance use in hospital and healthcare settings (IRETA, n.d.).

Elements of MI that are essential to its practice within a BMI include the expression of accurate empathy, cultivating discrepancy and exploring ambivalence using open-ended questions, reflections, and summaries, and responding appropriately to discord, with particular attention to avoiding the argument in favor of change (World Health Organization [WHO], 2010). MI as a clinical approach to brief interventions places emphasis on therapeutic empathy and promotes client autonomy and self-efficacy, which have been found to be important elements in motivating change (WHO, 2010).

In the context of alcohol use, the opportunistic nature of BMI capitalizes on the “teachable moment” generated by the recent injury in which the person may be more open to consider the harmful effects of high-risk drinking, which can serve as significant a contributor toward instilling motivation to change (Vasilaki, Hosier, & Cox, 2006). A patient’s level of motivation to change has also been identified and established as an important factor contributing to successful treatment of alcohol and other substance use problems (Noonan, & Moyers, 1997; Cox & Klinger, 2004; Vasilaki, Hosier, & Cox, 2006). While brief interventions generally aim to promote moderation and ultimately abstention from risky substance use (National Institute on Alcohol Abuse and Alcoholism, 2005), the MI approach within BMI allows for a greater focus on motivating individual progress through the process of change, centralizing the intervention on the individual’s present experiences, values, and interests and the collaborative development the clients’ vision of possible options for change (Vasilaki, Hosier, & Cox, 2006; Miller & Rollnick, 2013). Thus, BMI capitalizes on intentional change, fostering an atmosphere of self-informed, self-directed change, and increasing intrinsic motivation, which may provide a more meaningful translation into behavior change (Gaume, Bertholet, Faouzi, Gmel, & Daeppen, 2010). Over

recent years, researchers have found support for BMI over standard care (i.e., general medical practice guidelines for patients with alcohol problems in an ED setting) alone (Longabaugh et al., 2001; Spirito et al., 2004; Mello et al., 2005; Field, Caetano, Harris, Frankowski, & Roudsari, 2010; Gaume, Bertholet, Faouzi, Gmel, & Daepfen, 2010; Vasilaki, Hosier, & Cox, 2006). Further investigations on randomized control trials of BMI have found added efficacy for individuals with heavy drinking and low dependence, as opposed to individuals with more severe alcohol dependence (Moyer & Finney, 2004; Vasilaki, Hosier, & Cox, 2006).

Overall, the person-centered focus and skill of MI augments the efficacy of these brief interventions that are intended to build motivation to change high-risk behavior in both voluntary and non-treatment seeking situations (e.g., emergency departments, primary care) and with a range of levels of substance dependence (Vasilaki, Hosier, & Cox, 2006). As a means for capturing the working processes underlying these interventions, investigations have turned to better understand the active components of what occurs during a BMI.

CLIENT LANGUAGE

Ambivalence is a natural human experience that is often prominent in psychological difficulties (Miller & Rollnick, 2002; DiClemente, 2003; Engle & Arkowitz, 2006; Miller & Rollnick, 2013). Characteristic of experiencing ambivalence, any progress toward change is accompanied by movement away from change, in favor of maintaining the status quo.

Ambivalence, therefore, represents feeling both ways about making a change. By focusing the conversation on eliciting the person's own reasons and motivations for change, BMI works to foster verbalizations of intrapersonal "self-talk" to help the person get "unstuck" from ambivalence (Miller & Rollnick, 2013). The challenge undertaken by MI is then to intensify ambivalence, building and resolving discrepancy in the direction of commitment to change (Miller & Rollnick, 2002).

Language has long been considered an expression of consciousness and a rich source of information about the therapeutic process (Furberg, 1971; Amrhein, Miller, Yahne, Palmer, & Fulcher, 2003). The way language communicates is explanatory, in that it conveys information about the “author” (i.e., speaker/client) and resonates on different levels of experience (Watzlawick, 1978), linking conscious expression and choice with verbal processes (Prochaska & DiClemente, 1982). This mechanism provides the linguistic basis of MI (Miller & Rose, 2009), as both the technical and relational hypotheses of MI theory hold client language as a central variable in the process of increasing verbal commitment to subsequent behavior change (Miller & Rose, 2009).

Studies on the nature of in-session client language have found that client verbal commitments vary in both type and strength, based on different motivational factors (Amrhein, Miller, Yahne, Palmer, & Fulcher, 2003). Through careful consideration of conversational contexts, looking particularly at the intention and obligation expressed by the valence of client utterances, linguistic researchers distinguished various types of client language (Blum-Kulka, 1989; Amrhein & Martinez, 1993). Considering the expectation that is conveyed through the various client utterances, differences in strength were also identified as an indicator of the degree of commitment being communicated (Furberg, 1971; Amrhein, 1992). Thus, the valence and strength of client utterances were suggested as significant contributors to overall verbal commitment (Amrhein, Miller, Yahne, Palmer, & Fulcher, 2003).

Studies have also suggested in-session client language may serve as a better indicator of commitment compared to self-report responses to readiness and commitment survey questions. Cluster analyses by Amrhein and colleagues (2003) closely examined a group of “discrepant” clients who self-reported abstinence from drug use yet had positive drug urine screens and found

that, despite dishonest self-reports of use, the pattern of commitment language during an MI session adequately identified them with “strugglers,” which indicated their true level of commitment and correctly predicted poor outcomes. Results from this study provided evidence for the authenticity of information that can be derived from client language in MI when compared to that from traditional client self-report survey measures.

The developers of MI first defined client “commitment” utterances as “self-motivational statements” (Miller & Rollnick, 1991), which progressed to being referred to as *change talk* ([CT]; Miller & Rollnick, 2002), defined as statements in favor of change (i.e., the conceptual opposite of resistance and language against change, in favor of maintaining current behaviors). More recent investigations of client language in MI defined and categorized the various subtypes CT (Amrhein, Miller, Yahne, Palmer, & Fulcher, 2003; Miller & Rollnick, 2013). *Preparatory change talk* is described language that reflects the pro-change side of ambivalence. Preparatory CT includes statements of *desire* ([D], i.e., wanting a change; “I would like to stop spending so much money when I go out drinking”), *ability* ([A], i.e., self-perceived ability to make a change; “I could try going out to drink on only one day during the week”), *reasons* ([R], i.e., specific reasons for making a change; “I would probably have more money to spend on other things”), or *need* ([N], i.e., expressions of importance or urgency to change; “I have to put an end to this, I can’t go on like this anymore”). *Mobilizing change talk*, on the other hand, reflects further commitment and movement toward the resolution of ambivalence, in the direction of change. Mobilizing CT includes statements of *commitment* ([C], i.e., indicating the likelihood of action; “I am going to stop offering to drive when my friends and I go out drinking”), *activation* ([A], i.e., implying commitment without explicitly stating it; “I am ready to start taking control of my life now”), and *taking steps* ([Ts], i.e., indications of things already done in the direction of

change; “I signed up for a support group last week”). Together, these seven categories of CT, commonly referred to as DARN CATs, represent a range of client intention and commitment to change.

In the case of ambivalence, any language spoken in favor of change can also be spoken “as an equal and opposite reaction on behalf of the status quo” (Miller & Rollnick, 2013). In other words, each of the DARN CATs categories can also be reflected as intention to maintain current behaviors, away from the direction of change. Statements made in this context are now referred to as *sustain talk* (ST). Expressions such as “I don’t want to stop drinking,” “drinking helps me relax and socialize,” “there’s no way I’m going to stop drinking on Thursday’s,” and “I skipped work today to go drink with my friends” represent a lack of intention to change and a stronger intention to maintain current behaviors by reflecting the DARN CATs range of ideas in the form of ST. Thus, extending MI’s application of dissonance and self-perception, expression of ST has been found to be associated with maintenance of the status quo (Miller & Rollnick, 2013).

The overall goal of an MI session is to increase client motivation through verbalized expressions of change (CT), strengthening belief in those statements, and thus reinforcing motivation and commitment (Miller & Rollnick, 2002, 2013), while at the same time, instructing interventionists to dedicate less time exploring ST. In other words, by probing a client’s expressions of readiness and willingness to explore change, MI promotes the progression of verbal commitments to actual behavior change. This careful process of increasing motivation through MI appoints client language as a central mechanism of change, indicating in-session client expressions as an avenue for evaluating motivation and predicting behavior outcomes (Amrhein, Miller, Yahne, Palmer, & Fulcher, 2003; Moyers, Martin, Christopher, Houck,

Tonigan, & Amrhein, 2007; Gaume, Gmel, Faouzi, & Daeppen, 2008; Hallgren & Moyers, 2011).

STAGE OF READINESS TO CHANGE

For years, a clients' decision to change was assumed to be a result of therapeutic interaction, yet the internal processes undergone by an individual in order to make behavior changes remained unclear (Prochaska & DiClemente, 1982; Rice & Greenberg, 1984). Health professionals have come to understand that positive behavior change often occurs naturally, without the aid of therapy (Prochaska, DiClemente, & Norcross, 1992), and that the processes underlying behavior change seem to be the same with or without professional assistance or formal treatment (Miller & Rollnick, 2002). Ultimately, therapeutic approaches can be seen as facilitating a natural process of transition to change (Rice & Greenberg, 1984; Miller & Rollnick, 2002). However, the need for further investigation of an individual's own motivation as an indicator of readiness, commitment, and behavior change outcomes remains.

This impending need to better understand how and when people undergo behavior change has driven health psychology researchers to attempt to model these humanistic change processes (Rice & Greenberg, 1984; Prochaska, DiClemente, & Norcross, 1992; Weinstein, Rothman, & Sutton, 1998). Most established theories of health behavior (e.g., health belief model [Hochbaum, Rosenstock, & Kegels, 1952], theory of reasoned action [Fishbein, 1979], and theory of planned behavior [Ajzen, 2011]) aim to identify variables that, when combined, inform the likelihood of action (Weinstein, Rothman, & Sutton, 1998). These theories place each individual along a continuum of likelihood to act, giving these theories of human behavior their respective classification as *continuum theories*. Through specification of the schema that underlie the continuum of how health behavior change ensues, years of investigations have led to an increased use of stage models (Weinstein, Rothman, & Sutton, 1998), particularly in the substance use literature (Prochaska, DiClemente, & Norcross, 1992; Lundahl & Burke, 2009).

In 1979, researchers Prochaska and DiClemente investigated the myriad of theories and therapeutic approaches in practice, with the aim of formulating an overarching model that could identify and encompass the common underlying processes of individual change (Prochaska, Norcross, & DiClemente, 1994). Thus emerged the Transtheoretical Model (TTM), which, initially, presented an integration of global theories and specific techniques in ten basic processes of *how* change occurs (Prochaska & DiClemente, 1992). The TTM proposed the following processes as essential to producing change, with or without professional therapy: consciousness raising, self- and social-liberation, counterconditioning, stimulus control, self- and environmental-reevaluation, reinforcement management, helping relationships, and dramatic relief (Prochaska & DiClemente, 1982). Studies investigating the processes of change proposed by this model indicated their organic use among individuals who consider modifying problematic behavior without therapeutic assistance (Prochaska & DiClemente, 2005).

While the proposed processes of the TTM modeled how change occurs, *when* change occurs among therapy-seekers and non-seekers remained unclear. Investigations of individuals who had recently undergone smoking behavior change with and without professional help led DiClemente and Prochaska to further understand when the TTM processes of change were being adopted (DiClemente & Prochaska, 1982). In their study, research participants were asked to relate their experiences with changes in their smoking behaviors to three specific periods: Decision to Change, Active Change, and Maintenance. These stages were derived from similar health behavior-related stages of change initially proposed by Horn (1976): Contemplating Change, Deciding to Change, Short-term Change, and Long-term Change. From this investigation, DiClemente and Prochaska learned that participants reported using different processes at different times along the course of making their change, such that verbal processes were more important during the Deciding to Change stage, while behavioral processes were more important during the Active Change and Maintenance stages (DiClemente & Prochaska, 1982). This new understanding of the stages of change allowed theorists and therapists to no longer assume that all individuals present in the same stage along the process of change

(Prochaska & DiClemente, 2005). Health behavior change researchers and therapists were now gaining a better understanding of the interaction between the stages and processes of change, and of the temporal nature of change as it develops over time (Prochaska, Norcross, & DiClemente, 1994).

Further investigations of movement through the initially proposed stages of change led to a greater focus on optimizing the unfolding change processes and the application of appropriate, timely, therapeutic techniques with each individual. Prochaska & DiClemente continued their efforts toward providing a comprehensive model of the stages and processes of change. An analysis of volunteer smokers and recent quitters investigated five stages of change: Precontemplation ([Pc], i.e., immotives; smokers that reported no intention of quitting in the next year); Contemplation ([C], i.e., contemplators; regular smokers for the past year who reported seriously thinking about quitting in the next year); Action ([A], i.e., recent quitters; individuals who had quit on their own within the past 6 months); Maintenance ([M], i.e., long-term quitters; individuals who had maintained their nonsmoking for at least 6 months); and Relapse ([R], i.e., recent relapsers; individuals who had failed their quit attempt within the past year). Results from this investigation corroborated the pattern of the first four stages, and, from an exploratory analysis, found that the relapse group endorsed behaviors similar to those in the C and A groups. In addition, this study provided extended support for the identification of specific processes endorsed by individuals throughout each of the stages (Prochaska & DiClemente, 1982).

The stages and processes of change quickly drew attention from therapists, clinicians, and behavior change experts, commanding further explorations of the structures and an established means of measurement. Based on the behavioral definitions of the stages established by Prochaska & DiClemente (1982), the Stages of Change Questionnaire was devised as a continuous measure of the proposed stages (McConaughy, Prochaska, & Velicer, 1983). This work investigated the stages by classifying schema based on attitudes and behaviors expressed by participants regarding behavior change. Results from a principal component analysis supported the Pc, C, A, and M stages, while failing to distinguish a clear structure for a Decision-

Making stage. Use of this four-stage model became widespread and was confirmed across a range of settings, including outpatient alcohol-treatment (DiClemente & Hughes, 1990). Evidence for the validity of the stage classifications was strong (Prochaska & DiClemente, 1986), and evidence to support construct and predictive validity of the stages model was growing (Lam, McMahon, Priddy, & Gehred-Schultz, 1988; Biener, Abrams, & Follick, 1988). This measurement scale was also consistently related to self-efficacy and decision-making constructs (DiClemente, 1986; DiClemente, Prochaska, & Gibertini, 1985; Velicer, DiClemente, Prochaska, & Brandenburg, 1985).

For years, this continuous construct of the four-stage model was accepted (Prochaska & DiClemente, 1982, 1986; Prochaska, Velicer, DiClemente, & Fava, 1988). Not until later did researchers consider further investigating cluster analyses that had identified a unique profile between the C and A stages, which was identified by participants who endorsed a combination of attitudes and behaviors observed in the C and A stages. The profiles indicated by this analysis suggest that, rather than simply being in one stage or another, people tend to report characteristics of involvement in each of those two stages at any given time point (McConaughy, Prochaska, & Velicer, 1983; McConaughy, DiClemente, Prochaska, & Velicer, 1989). Thus, DiClemente and colleagues (1991) conducted a more detailed investigation of the C stage by creating subgroups of recent relapsers and chronic contemplators, allowing for an investigation of characteristics from which the Preparation (P) stage was then established. This study provided among the first longitudinal results on short-term cessation behaviors, indicating an increased association between change behaviors and movement along the stages over time, with particular interest to characteristics endorsed between C and A stages (DiClemente et al., 1991). Thus, the interrelatedness that exists among the stages was sought to further investigate the movement from one stage to the next and the fluctuating progress between stages at any point in time (McConaughy, DiClemente, Prochaska, & Velicer, 1989)

Further applications of the TTM aimed to establish this stage model framework within processes of intentional change, that is, change that occurs with or without therapeutic assistance

(Prochaska, DiClemente, & Norcross, 1992). While this process of change was initially proposed as a linear progression through the series of stages, more recent work by Mahoney (1991) found that individuals “experience both regressions and progressions in [this] complex dynamic,” suggesting an oscillating nature to the process of individual change (Engle & Arkowitz, 2006). In addition, a better understanding of the common role that relapse has within addictive behaviors allowed researchers to move from a linear perspective of change to a spiral approach, encompassing relapse as a part of the process in recycling through the initial stages (Prochaska, DiClemente, & Norcross, 1992). Because the underlying process of change was found to be common among self- and assisted change, the importance of “doing the right things (processes) at the right times (stages)” (Prochaska, DiClemente, & Norcross, 1992) was supported and extended to behavior change that was intentional and self-motivated.

Most notably, this research highlighted the importance of assessing readiness to change and appropriately tailoring intervention approaches and change goals (Prochaska, DiClemente, & Norcross, 1992). Evidence that self-changers tend to engage in behaviors that are unequivocal to their current stage generated further interest in the effective guiding of self-change within a natural environment, such as primary care or emergency room settings. More recent research has found support for the integration of stages and processes of change and for arguments in favor of the importance of effective tailoring of interventions and feedback to the patient’s stage of change (Dijkstra, Conijn, & de Vries, 2006; Prochaska & DiClemente, 2005). An early meta-analysis conducted by Rosen (2000) of 47 studies investigated processes of the TTM in predicting cognitive-affective and behavioral health outcomes. On average, variation in cognitive-affective processes by stage had a mean effect size of $\eta^2 = .11$ (range = 0.01 to .26), a moderate to large effect. These effect sizes did not vary significantly by health problem, groups, stage, or intervention. On the other hand, variation in behavioral processes by stage had a mean effect size of $\eta^2 = .14$ (range = 0.04 to .34), a characterized as a large effect. This effect size tended to be higher in studies with more groups/stages (Spearman’s $\rho = .34$, $p < .01$) and varied by health problem, such that effects were larger in studies in exercise than studies of substance

use or psychological problems. The effect size for behavioral processes was also larger among untreated samples compared to samples already in treatment for the target problem, [χ^2 (5, N = 44) = 14.5, p < .01]. A more recent meta-analysis of 39 studies by Norcross, Krebs, & Prochaska (2011) (2,554 total psychotherapy patients) assessed the ability of stages of change in predicting psychotherapy outcomes. This investigation reported a mean effect size of d = .46 with a 95% CI of .35 to .58 (range = -.20 to .27). This medium effect demonstrates a reliable prediction of outcomes by stage of change, such that the amount of progress clients make during treatment tends to be a function of pretreatment stage of change. This meta-analysis also sought to investigate the outcomes of psychotherapy treatment matched to specific stage of change. Although no controlled group studies met inclusion criteria for this specific aim, these researchers did find support for stage matching treatments in studies focused on other health behaviors or with more than one session. Closer investigations of these studies reported some research-based therapist behaviors as particularly conducive to improving outcomes beyond basic assessment of the client's stage of change. Altogether, this meta-analysis allowed researchers to summarize common proposed therapeutic factors that inform treatment matching processes, such as promoting stage identification and avoiding mismatching, as well as the anticipation of "recycling" before achieving long-term maintenance (Norcross, Krebs, & Prochaska, 2011).

Notably included in these behaviors is awareness to not treat all patients as though they are in the A stage by setting realistic goals for the client, switching the intervention's focus from being action-oriented (i.e., driving all clients toward action) to a stage paradigm, which moves the client progressively, from one stage to the next at a time. The TTM ultimately recognizes that moving an individual from one stage to another is a worthwhile goal, as it will increase the likelihood that the individual will eventually progress to achieve subsequent A and M stages (Prochaska & Goldstein, 1991). For example, while movement from precontemplation to contemplation may not result in an observable or measurable change in alcohol use, therapeutic

practice recognizes this as positive progress that may be likely to result in further progress toward action in the future.

THE CURRENT STUDY

The conceptualization of behavior change process as progression through a series of stages over time informs the efficacy of applying differential approaches relative to the stages of change. By identifying a client's stage of readiness to change, the therapist's role then becomes to match the client's level of readiness by tailoring the relational stance and therapeutic approaches and supporting the client's own stage progression through increased motivation. In MI, readiness and motivation have been operationalized as the client's own statements about his/her own desire and likelihood of making a change. More recent advances from psycholinguistic investigations (Amrhein, Miller, Yahne, Palmer, & Fulcher, 2003; Aharonovich, Amrhein, Bisaga, Nunes, & Hasin, 2009; Moyers, Martin, Houck, Christopher, & Tonigan, 2009; Hallgren & Moyers, 2011) have found preliminary support for client language as an indicator of motivation, therefore proposing synergy between readiness and motivation expressed by client language and the stages of readiness to change proposed by the TTM. If the stages of change are accurately reflected by the type of client language expressed in a BMI, interventionists could more efficiently implement corresponding intervention approaches in the time-constrained context of a BMI such as to motivate tailored progression toward behavior change.

Despite this established connection between a client's stage of change and language during an intervention, few studies have directly investigated these relationships. Thus, the current investigation seeks to evaluate the proposed association between a client's stage of readiness to change and language expressed within a BMI. It is hypothesized that clients in the precontemplation stage of change will express greater ST and less CT than those in the

contemplation stage of change. It is also hypothesized that clients in the action stage of change will express less ST and greater CT than those in the contemplation stage of change.

METHOD

PARTICIPANTS

Data for this current study are derived from the Multidisciplinary Approach to Reduce Injury and Alcohol Use (MARIA) II project (NIH R01AA015439), a collaboration of researchers from the UT School of Public Health with surgery and trauma departments at various sites which sought to investigate alcohol use and the efficacy of BMI among patients in a hospital emergency room setting. Although a brief description of the parent study is provided below, the primary aims and further descriptive information can be found elsewhere (see Field, Caetano, Harris, Frankowski, & Roudsari, 2010).

Patients treated by emergency/trauma departments for accident or injury were considered eligible for screening in this study. Patients identified as eligible by hospital care staff were screened for (1) high-risk alcohol use, as indicated by the Alcohol Use Disorder Identification Test (AUDIT-C; Bush, Kivlahan, McDonnell, Fihn, & Bradley, 1998), or (2) alcohol at the time of injury, as indicated by a positive blood alcohol concentration. Further, patients screened positive for either alcohol item had to be at least 18 years of age and had to be able to provide contact information for follow-up purposes. Patients were excluded from eligibility if they had a traumatic brain injury and/or if they were unable to provide written informed consent. In order to minimize risk and potential discomfort during the interview, actively psychotic, suicidal and/or homicidal patients, and sexual assault victims were also excluded from this study. Patients intoxicated at the time of admission to the ED were maintained in observation for 23 hours in order to rule out severe injury and were approached by research staff only after symptoms of acute intoxication subsided. All patients were able to participate only after reaching medical stability and being cleared by hospital staff to the research team. Because the reliability and validity of some assessment tools used have not been established in languages other than English, non-English-speaking participants were excluded.

Eligible participants provided consent to participate and were then randomly assigned to one of three treatment groups: brief advice (BA; $n = 200$), brief intervention (BI; $n = 203$), or

brief intervention + booster (BIB; $n = 193$) within blocks defined by stage of change (precontemplation or contemplation vs. action) such as to allocate patients in each of the stages of change equally among the treatment conditions. Patients in the BA condition received brief advice, which met the minimal intervention standards mandated by the American College of Surgeons. The BI and BIB conditions received the same brief intervention for alcohol use. Participants in the BIB condition were contacted four weeks after the initial intervention to complete the booster session. All participants were contacted for follow-up at 3-, 6-, and 12-months post initial intervention. Participants were compensated after each assessment, totaling \$150 for completion of baseline, booster, 3-, 6-, and 12-month sessions. Given the nature of the current analysis, only participants in the BI and BIB conditions were considered for analysis. From this subset, only participants with audio/transcript data were included in the current analyses ($n = 196$) such as to investigate intervention language.

The brief intervention in this study was based and structured in MI, combining the general components of a brief intervention (e.g., feedback, providing information and resources; USDHHS, 2006) with the four core processes of MI (engaging, focusing, evoking, & planning; Miller & Rollnick, 2013). Interventionists were clinicians trained and supervised by a clinical psychologist with experience in training clinicians in advanced MI and expertise in brief interventions in trauma settings. All interventions were audio recorded to monitor adherence to treatment protocol and MI practice using the Motivational Interviewing Treatment Integrity manual, and for further linguistic analysis. Weekly group supervision for interventionists included a review of individual cases, transcripts, and interventionist ratings, as well as clinical exercises to further practice and enhance MI interventionist skill. Feedback from interventionist ratings was used to ensure MI adherence and to further develop MI proficiency. Had MI proficiency at any point not been withheld, interventionists participated in additional training and supervision until threshold proficiency was achieved.

MEASURES

Because of the secondary nature of this investigation, measures for the current analysis are taken from a larger set of assessment variables. Further information on the measures used in the parent study are reported elsewhere (see Field, Caetano, Harris, Frankowski, & Roudsari, 2010). For the purpose of the current investigation, only the measures of interest and participants with audio/transcript data will be included and reported.

READINESS TO CHANGE

Before participating in the BMI, each participant completed a baseline battery of assessments. Among these measures, the treatment version of the Readiness to Change Questionnaire RCQ[TV] (Heather, Luce, Peck, Dubnar, & James, 1999; see Appendix) was used to assess readiness to change drinking (see Appendix A). The RCQ[TV] was developed as a brief and conceptually simple measure to evaluate readiness to change drinking for clinical treatment purposes. This measure has been used with populations in various settings, such as alcohol treatment centers (Dale et al., 2011) and community health centers (Gates, Sabioni, Copeland, Le Foll, & Gowing, 2016), as well as with non-clinical (Rumpf, Hapke, Meyer, & John, 2002) and mental health patients (Graham, 2004). Criticisms about the limitations that arise from the arbitrary divisions of the readiness continuum that result from the RCQ[TV] and similar readiness questionnaires have been argued (Sutton, 2000; West, 2005). However, this measure continues providing clinical utility for population screening of patients with alcohol use.

The RCQ[TV] is a 15-item measure and is comprised of three subscales, each composed of 5 items: precontemplation (PC), contemplation (C), and action (A). Items are scored on a 5-point Likert scale, ranging from strongly disagree (-2) to strongly agree (+2). Total scores for subscale items were summed (minimum = -10, maximum = +10) such that each individual's highest subscale score indicated his/her stage of readiness to change. For the purpose of the current research question, a referent group will be assigned such as to establish comparisons between the stages of change. Ongoing work with the MARIA II project has investigated the use

of the 12-item RCQ[TV] with this sample and found the PC stage to be inadequate as group of reference as indicated by contradictory findings of the conceptualization of this group (e.g., more likely to abstain from alcohol use and reported less alcohol problems; Field, Morera, Cabriaes, Cardoso, 2017). Thus, the C group was suggested as the appropriate reference group. Thus, the PC and A stages will be contrasted against the C stage (i.e., PCvsC, AvsC). These contrasts between stages of change are the independent variables of interest in this study.

The RCQ[TV] has proven to have good to modest internal consistency: item total correlations for the subscales were: PC = 0.30 to 0.40; C = 0.30 to 0.40; A = 0.32 to 0.67; Cronbach's alphas for the three subscales were: PC = 0.68; C = 0.60; A = 0.77. Initial evaluations of test-retest reliability among 19 participants indicated the following subscale score correlations: PC = 0.74 ($p < .001$); C = 0.69 ($p < .01$); A = 0.86 ($p < .001$). As a measure for concurrent validity, subscale scores for the RCQ[TV] were compared with subscale scores of the URICA (Hasler, Klaghofer, & Buddeberg, 2003) and indicated moderate yet statistically significant correlations: PC = .53 ($p < .001$), C = .39 ($p < .001$), A = .56 ($p < .001$) (McConaughy, Prochaska, & Velicer, 1983). The RCQ[TV] has since been revised (Heather & Honekopp, 2008).

THE MOTIVATIONAL INTERVIEWING SKILLS CODE (MISC) 2.5

To assess MI adherence and in-session therapist and client language, BMIs (either audio recordings or transcriptions) were coded by four Master-level clinicians trained in the MISC 2.5 (see Appendix B for a coded transcript sample). The MISC is the original behavioral coding system that provides detailed, comprehensive information about patient and therapist language processes in a MI. The MISC has been used to ensure integrity of MI practice in clinical trial interventions, to conduct research on the therapeutic process and interaction, to examine relationships between the MI process and client outcomes, and to evaluate the efficacy and growth of MI training among practitioners. The MISC 2.5 (Houck, Moyers, Miller, Glynn, & Hallgren, 2010) was developed from previous MISC versions (e.g., MISC 2.1 [Miller, Moyers,

Ernst, & Amrhein, 2008], MISC 2.0 [Miller, Moyers, Ernst, & Amrhein, 2003], MISC 1.0 [Miller, 2000]) and other MI coding systems (e.g., SCOPE [Martin, Moyers, Houck, Christopher, & Miller, 2005]), adding the ability to more accurately capture subtleties within both client and therapist language throughout an MI interaction. Due to its novelty in the field, very few studies have reported using the MISC 2.5 (Moyers, Houck, Glynn, Hallgren, & Manuel, 2017). The MISC 2.5 provides therapist and client ratings, which provide the basis from which MI summary scores are generated, and serve as a gauge for overall MI therapist proficiency and client engagement.

Coding with the MISC 2.5 requires three run-throughs, or passes, which include (1) global ratings, (2) parsing, and (3) behavioral coding. In the first pass, the entire session is listened to and rated on seven 5-point Likert-type global ratings. These ratings are intended to characterize dimensions of the entire interaction based on the coder's overall impression and evaluation of the session. These global elements reflect the important theoretical principles of MI style for the interventionist (i.e., empathic listening and accurate understanding, support of self-efficacy, eliciting and developing discrepancy, and a collaborative spirit), and the client-centered construct of client "experiencing" in MI (i.e., exploration of discrepancy based on personal goals and values).

In the second pass, both interventionist and client speech is parsed into utterances, or complete units of thought. In the third pass, a second coder assigns behavioral codes that categorize each specific unit of language indicated by the parsed utterances. There are 19 interventionist behavior codes, which are then used to generate summary scores for evaluating overall MI adherence and proficiency. These scores are intended to reflect the interventionists' characteristics of conversation-style that distinguishes MI from other types of therapeutic interactions.

Similarly, client speech behaviors are characterized as either neutral statements (i.e., Follow/Neutral) or change language. Change language behaviors are subclassified based on (1) valence and (2) strength. Valence is coded either in the direction of change (+) or away from

change (-), while strength is distinguished by the different types of change language (preparatory and mobilizing types) as described by MI theory. The different types of change language behavioral codes in the MISC 2.5 include Desire (D), Ability (A), Reason (R), Need (N), Commitment (C), Taking Steps (Ts), and Other (O). While the DARNCTs codes in the MISC 2.5 are designed by to match the types of change talk described by MI theory, the O code is designed to capture language that clearly reflects some degree of change, but is not strong enough to fit any of the other categories. For example, O is assigned to statements of problem recognition or denial, or to hypothetical statements. Dependent variables of interest in this study include all client language identified by the MISC 2.5 coding system (+/- [DARNCTsO]).

APPROACH TO ANALYSES

In order to conduct this investigation, this study will have to first establish the factor structure of the various types of client language regarding the categories of change language described by MI theory (ST and CT). Using Mplus software (Muthén & Muthén, 2007), a confirmatory factor analysis will seek to establish the factor structure of CT and ST at different latent levels (see Figures 1-4). Multilevel model estimation in structural equation modeling will also evaluate the relationships between client language and stage of readiness to change. Although the language variables of interest (+/- DARNCTsO) are count data, multilevel modeling has been suggested as the best estimation method for such data (Muthén, 2013). This study, to our knowledge, would be the first to evaluate this latent structure with the latest version of the MISC coding manual (Houck, Moyers, Miller, Glynn, & Hallgren, 2010).

Model 1 (see Appendix C, Figure 1) investigates client language as factors of the most general categories, ST and CT. It is hypothesized that (+)DARNCTsO will load on a single factor, CT. Conversely, it is hypothesized that (-)DARNCTsO will load on a single factor, ST. For the path analysis, it is hypothesized that participants in the precontemplation stage will have greater ST and less CT than participants in the contemplation stage. Similarly, it is hypothesized

that participants in the action stage will have less ST and more CT than participants in the contemplation stage.

Model 2 (see Appendix C, Figure 2) subclassifies CT into two factors, preparatory and mobilizing. It is hypothesized that (+)DARNO will load on one factor, preparatory CT, and (+)CTs will load on another factor, mobilizing CT. Because O+ is comprised of change language that is not better described by the other types of CT, it is hypothesized to load onto the preparatory CT factor, as it does not convey the strength of the mobilizing CT categories. Similar to Model 1, it is hypothesized that (-)DARNCTsO will load on a single factor, ST. For the path analysis in this model, it is hypothesized that participants in the precontemplation stage will have greater ST and less mobilizing CT than participants in the contemplation stage. Similarly, it is hypothesized that participants in the action stage will have less ST and more mobilizing CT than participants in the contemplation stage. No significant differences on preparatory CT are predicted for either comparison.

Post-hoc power analyses for determining model fit were based on estimations for Root Mean Square Error of Approximation. Sample estimations for exact model fit ($RMSEA_{null} = .05$, $RMSEA_{alt} = .01$) resulted in 139 participants needed for this analysis. Thus, the current sample ($n = 196$) provides sufficient power to examine the proposed models.

RESULTS

DEMOGRAPHICS

For the purpose of this investigation, results will be reported only for participants included in the current analyses ($n = 196$); descriptive information can be found in Table 1.1. Of the participants included in this study, 71% screened positive for BAC at the time of injury; the remaining participants screened positive on the AUDIT-C. Participants were 75% male and were, on average, 35.5 years of age. Participants were largely White (44%), followed by African American and Hispanic (27%, 22%, respectively). A majority of participants were recruited at Baylor University Medical Center (56%), followed by Brackenridge Hospital (37%) and Methodist Hospital (7%).

Participants in this study represented a range of alcohol-related risk, as identified by the AUDIT (Saunders, Aasland, Babor, de la Fuente, Grant, 1993): 39% scored in the “low-risk” range, 47% scored in the “high-risk” range, and 13% scored in the range of “possible alcohol dependence.” Participants were also categorized with regard to their stage of change: 31% scored in precontemplations stage, 26% scored in contemplation, and 43% scored in the action stage. Tables 1.2, 1.3, and 1.4 provide means and standard deviations, correlations, and covariances for the client language variables.

MODEL 1

Table 2.1 presents the standardized factor loadings for ST and CT. According to the cutoff criteria for model fit suggested by Hu and Bentler (1999) ($CFI \geq .95$, $RMSEA \leq .06$, $SRMR \leq .08$), Model 1 provided less than adequate fit to these data ($\chi^2 = 204.006$, $df = 93$, $p < .001$; $CFI = .722$; $RMSEA = .078$, 90% CI [.064, .093]; $SRMR = .078$).

Compared to participants in the contemplation stage, participants in the precontemplation stage were more likely to have less ST and CT ($B = -0.038$, $S.E. = 0.039$, $p = 0.329$, and $B = -0.684$, $S.E. = 0.259$, $p = 0.008$, respectively). Although the relationship between precontemplation and ST was not in the expected direction, this path did not reach statistical

significance. However, the relationship between precontemplation and CT was in the expected direction and was statistically significant. Compared to participants in the contemplation stage, participants in the action stage were more likely to have less ST and more CT ($B = -0.027$, $S.E. = 0.041$, $p = 0.507$, and $B = 0.184$, $S.E. = 0.335$, $p = 0.583$, respectively). These paths were both in the respective expected directions, although neither reached statistical significance.

MODEL 2

Table 2.2 presents the standardized factor loadings for ST, preparatory CT, and mobilizing CT for this model. According to Hu and Bentler's suggested model fit criteria (1999), Model 2 did not provide adequate fit to these data ($\chi^2 = 180.172$, $df = 89$, $p < .001$; CFI = .772; RMSEA = .072, 90% CI [.057, .088]; SRMR = .073).

Compared to participants in the contemplation stage, participants in the precontemplation stage were more likely to have less ST ($B = -0.026$, $S.E. = 0.031$, $p = 0.402$), less preparatory CT ($B = -0.573$, $S.E. = 0.260$, $p = 0.027$), and less mobilizing CT ($B = -2.182$, $S.E. = 0.767$, $p = 0.004$). Again, although the relationship between precontemplation and ST was not in the expected direction, this path did not reach statistical significance. However, the relationship between precontemplation and mobilizing CT was in the expected direction and was statistically significant. Compared to participants in the contemplation stage, participants in the action stage were more likely to have less ST ($B = -0.017$, $S.E. = 0.030$, $p = 0.580$), more preparatory CT ($B = 0.075$, $S.E. = 0.308$, $p = 0.809$), and more mobilizing CT ($B = 1.827$, $S.E. = 1.001$, $p = 0.068$). Although none of the comparisons of language between action and contemplation reached statistical significance, the effects were in the expected directions.

REVISIONS – MODEL 3

Given these results, Model 1 and Model 2 were evaluated and compared such as to identify the best-fitting representation of these data. Comparisons of fit indices suggested minimal differences, such that neither model was significantly better ($\Delta CFI = -0.05$, $\Delta RMSEA = 0.006$). Closer examinations of correlations, covariances, and factor loadings among language

variables indicated TS- as a weak indicator. It was also appropriate and necessary to estimate D+ and D- freely, such as to better capture the relationships with CT and ST, respectively. As an attempt to adjust degrees of freedom and improve model fit, correlations between the language indicators [(+DARNOC) with -(DARNOC)] were removed. Thus, these revisions removed Ts from both ST and CT in both models 1 2. Given that the Mobilizing CT factor is indicated by only two items (C+ and Ts+), removal of Ts+ would no longer allow for a Mobilizing CT factor to be identified. As a result, Model 2 was considered no longer appropriate for these proposed revisions. Model 1 was therefore revised into Model 3 (see Appendix C, Figure 5) such as to continue evaluating the proposed relationships within client language among these data.

Table 2.3 presents the standardized factor loadings for ST and CT in Model 3. All indicators were freely estimated and loaded significantly onto their proposed, respective ST and CT factors. However, according to Hu and Bentler's suggested model fit criteria (1999), this revised model also did not provide adequate fit to these data ($\chi^2 = 164.077$, $df = 73$, $p < .001$; CFI = .729; RMSEA = .080, 90% CI [.064, .096]; SRMR = .083). Examinations of the paths comparing participants in the contemplation and precontemplation stages, participants in precontemplation were more likely to have less ST and CT ($B = -0.160$, $S.E. = 0.184$, $p = 0.384$, and $B = -0.427$, $S.E. = 0.183$, $p = 0.020$, respectively). Again, although the relationship between precontemplation and ST was not in the expected direction, this path did not reach statistical significance. However, the relationship between precontemplation and CT was in the expected direction and was statistically significant. Compared to participants in the contemplation stage, participants in the action stage were more likely to have less ST and more CT ($B = -0.148$, $S.E. = 0.211$, $p = 0.483$, and $B = 0.109$, $S.E. = 0.211$, $p = 0.605$, respectively). Although these paths were both in the expected directions, respectively, neither reached statistical significance.

DISCUSSION

There are a number of salient findings from this study that merit enumeration. The statistical models in the current study have attempted to capture dimensions of client language and their associations with stage of readiness to change. These data provide support for CT and ST as separate categories, indicated by client language in the direction of, and in the direction away from change, respectively. These results indicate the opposing nature of client language, CT and ST, that are characteristic of ambivalence. This differentiation of client language in the direction toward and away from change evidence the working mechanisms underlying the theoretical basis of MI (e.g., self-perception, cognitive dissonance) and support the current state of training and practice of MI (e.g., acknowledge ambivalence, explore discrepancy). Thus, these findings are consistent with MI theory (Miller & Rollnick, 2013), previous research (Heather & Stockwell, 2004; Lundahl & Burke, 2009), and the present study's hypotheses.

Although these data found evidence for the directionality of client change language in this BMI, there was insufficient support for hypotheses regarding the strength of client language (i.e., Preparatory and Mobilizing). While MI argues for the importance of building change language strength from preparatory to mobilizing such as to augment the likelihood of translation to observed behavior change, the present study was unable to support such distinctions. In addition, these data found the Ts- indicator was unrelated to the other ST indicators. The improved factor loadings that resulted after removal of the Ts indicator from both CT and ST suggest a distinct quality about Ts language. A study by Martin, Christopher, Houck, and Moyers (2011) used a different yet related MI coding method (SCOPE; Martin, Moyers, Houck, Christopher, & Miller, 2005) and found Ts+ and Ts- as indicators of the same factor, separate from indicators of ST and CT. Thus, there is support to explore these variables freely from the other language indicators.

As for the associations between client language and stage of change, three of four proposed hypotheses were supported, such that, compared to participants in the contemplation

stage, participants in the precontemplation stage expressed less CT, and participants in the action stage expressed less ST and greater CT. However, given the mixed significance among these findings, caution should be exercised when generalizing interpretations. Also important to note is the unexpected finding in which participants in precontemplation had less ST than participants in contemplation. The present findings corroborate previous evaluations of characteristics of readiness to change specific to precontemplators in this sample (Field, Morera, Cabriaes, Cardoso, 2017) which have described members of this group as more likely to abstain from alcohol use and to report less alcohol problems. Thus, these findings continue to highlight the unique nature of precontemplators. For the practice of MI, these findings bring to question the influence of ST during a directional BMI for alcohol use among similar populations. In fully understanding these findings, it is important to assess the potential limitations of motivational interviewing, the TTM of behavior change, and their relationship to one another.

CRITICISMS OF MI

While MI has been recognized as an empirically-supported treatment by the APA Division 12 (2006) and has been accepted as an approved and/or mandated treatment in public health agencies across the country, empirical support for MI cannot be taken without caution. Notably, research has found that effect sizes for MI are not only usually small to medium, but also tend to be quite variable (Miller & Rollnick, 2013). These inconsistent effects are influenced by common site effects (Hettema, Steele, & Miller, 2005; Ball et al., 2007), negative trials (Lundahl, Kunz, Brownell, Tollefson, & Burke, 2010; Carroll et al., 2006; Carroll, Libby, Sheehan, & Hyland, 2001; Miller, Yahne, & Tonigan, 2003), and variation across outcome groups (Burke, Arkowitz, & Menchola, 2003; Lundahl & Burke, 2009; Lundahl et al., 2013). In addition, effects have been found to diminish across 3-, 6- and 12-month follow-up (Hettema, Steele, & Miller, 2005; Lundahl, Kunz, Brownell, Tollefson, & Burke, 2010).

It is important to keep in mind that MI was not developed as a stand-alone form of treatment or therapy (Miller & Rollnick, 2013). Rather, MI is usually integrated with other

treatments, such as cognitive-behavioral approaches (Ali, Hagshenas, Reza, Ira, & Maryam, 2011; Arkowitz & Westra, 2004; Kertes, Westra, Angus, & Marcus, 2011; Merlo et al., 2010; Runyon, Deblinger, & Schroeder, 2009), acceptance and commitment therapy-based treatments (Bricker & Tollison, 2011), or interpersonal therapy (Grote, Swartz, & Zuckoff, 2008), and is more commonly integrated as a supplement to non-treatments, such as education or public health efforts (Bowen et al., 2002; VanWormer & Boucher, 2004; Welch, Zagarins, Feinberg, & Garb, 2011; Armstrong et al., 2011). Another salient point of consideration for understanding the integration of MI with other treatments is the effect that adherence to treatment protocol may have on the true practice of MI. Importantly, research has found no effect of MI among studies that abide by a restrictive therapist protocol (Hettema, Steele, & Miller, 2005; Miller, Wilbourne, & Hettema, 2003). Thus, these manualized treatment protocols prevent the MI therapist from responding appropriately to client reluctance and ST (Miller & Rollnick, 2013).

The overall effect of MI has also been substantially linked to therapist effects (Miller, Benefield, & Tonigan, 1993; Project MATCH Research Group, 1998). CT and ST have been repeatedly linked to therapist behavior across correlational, sequential, and experimental investigations (Gaume, Bertholet, Faouzi, Gmel, & Daeppen, 2010; Moyers & Martin, 2006; Moyers et al., 2007; Glynn & Moyers, 2010; Vader et al., 2010). Levels of therapist empathy, MI-inconsistent responses (e.g., confronting, directing), and MI fidelity for cultivating CT have been suggested as influential therapist factors in the overall efficacy of MI (Baer et al., 2012; Miller & Rollnick, 2013). Yet, there is still much to be learned about the underlying processes of language in MI. Thus, in order to fully understand the nature of client language in an intervention, it is recommended that therapist behaviors are considered.

On this note, there is also much to be said about the process of evaluating MI practice, which is informed primarily by coding and analysis of in-session behaviors. Miller and Rollnick (2013) have found “no better way to get right inside what is happening in a conversation about change” (p.390) than structural coding of conversations. While coding does provide substantial information on MI practice and can serve to inform underlying processes, it can be an arduous

task. In particular, the MISC coding tool is known to be quite complex to learn to use reliably (Madson, Campbell, Barrett, Brondino, & Melchert, 2005). However, while other more efficient options for coding MI with improved reliability do exist (e.g., Motivational Interviewing Treatment Integrity 4.2.1; Moyers, Martin, Catley, Harris, & Ahluwalia, 2003), these tools are designed to evaluate therapist language, and thus do not provide information on client language that is necessary to inform investigations such as the present one. Understanding client language is essential to understanding the practice of MI. While psychometric support for the MISC is sparse (Moyers, Martin, Catley, Harris, & Ahluwalia, 2003), it remains an essential tool for capturing relevant processes involving client behaviors during a MI.

CRITICISMS OF THE TTM

A potentially more challenging aspect of interpreting these findings are the limitations of the TTM itself. While the TTM has been supported across a variety of problem behaviors and subpopulations, substantial inconsistent findings also exist. One major critique of the TTM is the discreteness of the proposed stages. Researchers have consistently argued for the complex and continuous nature of the multifaceted behavior that is human change (Budd & Rollnick, 1996; Bandura, 1997; Bunton, Baldwin, Flynn, & Whitelaw, 2000; Adams & White, 2004). Researchers have also reported difficulty evidencing the homogenous classification of stages through algorithms based on self-report assessments, suggesting a need to sub-classify individuals within the main proposed stages (Lechner, Brug, de Vries, van Assema, & Mudde, 1998; Etter & Perneger, 1999). For example, precontemplators who do not self-identify with standard definitions of high-risk substance use (e.g., social drinkers, non-daily smokers) may be inclined to respond differently to readiness to change measures, which create room for differences in the discrete categorization of stages of change (Brug et al., 2005).

Research on the TTM has also been criticized for placing greater focus on refining the stages of change model and for relying on work that is cross-sectional, narrative, or replications of previous work, rather than investigating long-term effects on health outcomes by way of

randomized control trials (Bunton, Baldwin, Flynn, & Whitelaw, 2000; Sutton, 2000; de Vet, de Nooijer, de Vries, & Brug, 2005). Given the relatively modest results from the few reported behavioral outcome studies, evaluations of the TTM have thus emphasized its usefulness in guiding professional practice more than identifying improvement in patient health outcomes. These critiques also highlight the significant influence of individual characteristics on expected outcomes, such as personal experiences with the target behavior and the age at which intentional behavior change becomes significant (Glanz, Rimer, & Viswanath, 2008).

While the TTM has been used to justify the existence of the processes of change, critics have continued to highlight the inability of this model to provide explanations (Bunton, Baldwin, Flynn, & Whitelaw, 2000). Rather, the TTM has been criticized as merely a model for categorizing and describing dispositional stages, as it has been argued to provide no real explanation of how change occurs from the processes. As a result of the TTM's inability to provide information about the nature or etiology problematic behavior, this model has been labeled 'atheoretical' (Noble & Davidson, 1993; Bandura, 1997).

Although the behavior change field has recently taken up the argument opposing continued use of the TTM, particularly in the context of progression through the stages to actual observed behavior change, the TTM's concepts from which the stages of change were derived remain fundamental (Brug et al., 2005). The TTM understands behavior change is incremental, occurring as progression through a series of steps that requires individualized approaches rather than a unidimensional "all or none" process (DiClemente & Velasquez, 2002). The TTM views change as progress from an initial PC stage, where the person is currently not considering change, to C, where evaluation of the consideration for and against change is generated. Achieving these initial stages leads an individual to the A stage, where a specific behavioral plan is decided upon and adopted, and where the timeline for sustaining long-term change (M stage) begins. Although progression within the early stages may indeed not necessarily be reflected in changes in behavior, such progression is important to improve the likelihood of subsequent changes (Brug et al., 2005).

Whether this process occurs with or without assistance from a professional, progression through the stages requires complex and often unfamiliar thinking, efforts, and action (DiClemente & Velasquez, 2002). In any case, motivation has remained a necessary ingredient for igniting and directing this transition through the process of change (Rollnick, Mason, & Butler, 1999). In an opportunistic BMI, the role of the MI interventionist is to keep “in step” with the client, walking side-by-side with his/her readiness, meanwhile serving as a guide through subsequent stages with the ultimate goal of igniting commitment to change. This sensitivity to readiness is what allows a practitioner of MI to maintain resistance levels low and sustain rapport with clients through more difficult situations (Rollnick & Allison, 2004). Thus, while the principles and skills of MI are important and useful throughout all stages, MI has been found to be especially useful when working with clients in the precontemplation and contemplation stages (Miller & Rollnick, 2002). Ultimately, the fundamental insight of the TTM has allowed us to learn how a client’s starting point of readiness can influence the course of a conversation and the likelihood of observing actual behavior change (Miller & Rollnick, 2013).

LIMITATIONS

Beyond issues specific to MI and the TTM, the current study is not without its limitations. Because of the primary interest of the current investigation, only participants for which intervention audio/transcript information was available were included in analyses. Therefore, this study did not investigate comparisons between participants included in this study and participants who opted to not have the session recorded and were not included. Thus, there additional factors may be influencing the present results, such as stage of readiness to change, alcohol use severity (risk level), or alcohol-related problems. In addition, this study evaluated a single BMI session, which proves difficult to reevaluate and can only inform the efficacy of similar opportunistic, single-session interventions. Lastly, the use of structural equation modeling as a research method presents its own general limitations. For example, an endless possibility of models that can be developed to estimate data exist. Therefore, the models

evaluated in this study represent only a small subset of the actual model that best describes patterns in the data. In addition, criticisms about testing parameter approximations in SEM exist and are said to be often ignored (Tomarken & Waller, 2005). Despite these limitations, a number of important conclusions can be reached based on these findings.

Various client expressions of language in directions both toward and away from change can be identified within a single BMI conversation. These expressions are characteristic of experiencing ambivalence about making a change, which can play an important role in understanding a person's readiness to make a change. Aside from, or in addition to traditional classification of stage of change by survey measures, understanding the dimensions of client language may reveal additional information regarding an individual's readiness to change, particularly in the case of "precontemplators."

FUTURE DIRECTIONS

Because client language in a MI conversation can heavily depend on therapist's behaviors, subsequent efforts to capture relationships between a client's stage of readiness to change and language that is expressed during a BMI should consider these therapist effects. For example, the MISC 2.5 coding system provides classification of therapist behavior that details strength and valence similar to client language codes (e.g., Simple Reflection [+/-], Complex Reflection [+/-]). Evaluating interactions between therapist behaviors and client language would provide an additional layer of understanding client change language in similar BMI conversations. Further investigations may also consider closer examination of the precontemplation stage, such as to better understand the nature of language expressed by participants in this category. Future research might consider evaluating lower-order categories among participants who score in the precontampation stage and/or differences in relevant predictors among precontemplators, such as alcohol related problems and risk level.

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APPENDIX A

Readiness to Change Questionnaire – Treatment Version

The following questions are designed to identify how you personally feel about your drinking right now. Please think about your current situation and drinking habits, even if you have given up drinking completely.

	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
It's a waste of time thinking about my drinking because I do not have a problem.	-2	-1	0	1	2
I enjoy my drinking but sometimes I drink too much.	-2	-1	0	1	2
I am trying to stop drinking or drink less than I used to.	-2	-1	0	1	2
There is nothing seriously wrong with my drinking.	-2	-1	0	1	2
Sometimes I think I should quit or cut down on my drinking.	-2	-1	0	1	2
Anyone can talk about wanting to do something about their drinking, but I'm actually doing something about it.	-2	-1	0	1	2
I am a fairly normal drinker.	-2	-1	0	1	2
My drinking is a problem sometimes.	-2	-1	0	1	2
I am actually changing my drinking habits right now (either cutting down or quitting).	-2	-1	0	1	2

Giving up or drinking less alcohol would be pointless for me.	-2	-1	0	1	2
I am weighing up the advantages and disadvantages of my present drinking habits.	-2	-1	0	1	2
I have started to carry out a plan to cut down or quit drinking.	-2	-1	0	1	2
There is nothing I really need to change about my drinking.	-2	-1	0	1	2
Sometimes I wonder if my drinking is out of control.	-2	-1	0	1	2
I am actively working on my drinking problem.	-2	-1	0	1	2

APPENDIX B

MISC 2.5 Coded Excerpt

I	I'm curious, in terms of your injury, how related do you think drinking was to your injury?	CQ
P	considering the fact that I really didn't want to drink. It was just in the middle of the night and I was exhausted and the lights were off... / I mean I know alcohol played a role in it, / but it was also dark and it was in the middle of the night and I was half asleep and I tripped over his mom's furniture	O- O+ O-
I	well so you think it did, / but it didn't. / So if you had to give me a number between one and ten, where one is completely not related and ten is yeah, drinking and the injury were completely related	SR+ SR- CQ
P	five	FN
I	five, so middle of the road, 50/50	SR0
P	I mean I wasn't completed inebriated, but I was still half asleep and it was dark and I couldn't see what I was doing, so I tripped over the furniture	O-
I	stumbling around and then this happens, mm-hmm. / So from what I'm hearing, if I have it right it sounds like when times get rough for you, you turn to drinking as a way to cope and you've seen that for a long time	SR0 SR-
P	yeah	R-
I	what are the thing you like about your drinking?	OQ
P	that it relaxes me... you know, dealing with my problems and my drinking and stuff	R-
I	yeah, so in terms of what you like about your drinking, it just helps you cope. It helps relax	SR-
P	well yeah / and I like to have a few drinks, you know. / I work and I have two kids and it eases me, you know what I mean	R- D- R-
I	it's a way for you to enjoy yourself and unwind	CR-
P	right / and don't- you know like I said, I you know have a beer or two, and just you know want to relax. / Sunday I did have more than what I was expecting and that's the shots, because I don't drink heavy. I drink- usually I drink beer	R- R- FN
I	yeah, like a beer or two	SR0
P	yeah	FN
I	what makes Sunday different for you?	OQ
P	um...that I was stressed out... and I didn't have my kids home, so... I know, I'm just stressed out. I have a lot going on in my life	R- R-
I	right and that's understandable	SU
P	I lost my job. The last job, my job I lost my vehicle. So I have a lot going on. I	R-

	just had a baby... I have two kids, so I can hit the last one [sounds like] you know, the way I should [Crying]	
I	and you're being hard on yourself and-	CR-
P	I'm just stressed out	R-
I	and it's almost like your stress is so overwhelming	CR-
P	it is overwhelming. It's very overwhelming and I just have a lot of family issues. My grandma just died in September so that's you know, I just had a baby. It's a lot, you know	R-
I	yeah, all the emotions, everything. It just piles up. / I'm wondering though in the past, I mean what are some coping things you've used that have worked for you?	SR+ CQ
P	just had a talk with my family and my friends- as far as drinking?	O+
I	well just normal sort of coping	SR+
P	talk about it, you know, talking. I don't think- you know, / I know admitting the first step is admitting I have a problem. You know I do admit that I drink more than I should... / I don't think that I'm an alcoholic	O+ O+ O-
I	right, right. Yeah, things pile on for people and it just sounds like in the past you've turned to family. You've turned to friends. You talk it out and / right now something's different in your life where maybe you're not talking as much and you are relying on drinking	SR+ CR-
P	yeah	R-
I	yeah, so you're saying in terms of what you like is it's a way for you to unwind, and right now you've got a lot piled on your plate	SR-
P	right	R-
I	and it really bothers you that you feel like you can't provide, you can't be the mother you want to be is what I'm hearing	CR-
P	right	R-
I	being devil's advocate here, what are the things you don't like about your drinking?	OQ
P	sometimes it happens more than too many	R+
I	so getting a little carried away there. / What else don't you like?	SR+ OQ
P	I don't like that I have to drink to ease my problems... to unwind and stuff	R+
I	okay, well tell me about that a little bit more. / I mean you're not pleased about that, / but what about it?	OQ SR+ OQ
P	it's just I don't know. I grew up in a home with a lot of alcohol, so it don't run in my blood, but it- I grew up in it	FN
I	it was a way of life. It was there. You saw it	CR0
P	right. / It was easier to go to the store and get beer than it is to go get a bag of weed or you know, / I don't even want to resort to that. First of all I don't have	FN R-

	the money and I don't want that lifestyle, you know	FN
I	you're setting limits on yourself. You're trying to be reasonable, watching the money, watching the finances and earlier during the survey you said you don't even want to do drugs because the kids are there, / so it sounded like that's a conscious choice you're making to try and protect them	CR0 CR0
P	they're number one in my life	FN
I	yeah, they mean a lot to you	CR0
P	right	FN

APPENDIX C

Table 1.1 Socio-Demographic Characteristics and Alcohol-Use Descriptive Information

	n (%)	M (SD)	Range
Screening			
BAC	141 (71.9)		
AUDIT-C	38 (19.4)		
Age	196	35.51 (12.051)	18 – 51
Gender			
Male	146 (74.5)		
Female	50 (25.5)		
Setting			
Baylor UMC	110 (56.1)		
Methodist	14 (7.1)		
Brackenridge	72 (36.7)		
Race/Ethnicity			
White	86 (43.9)		
African American	52 (26.5)		
Hispanic/Latino	44 (22.4)		
Other	14 (7.1)		
AUDIT			
Total	196	11.22 (8.142)	1 – 40
Low-risk	77 (39.3)		1 – 7
High-risk	92 (46.9)		8 – 19
Possible Dependence	26 (13.3)		20 – 40
Stage of Change			
Precontemplation	61 (31.1)		
Contemplation	50 (25.5)		
Action	84 (42.9)		

Table 1.2 Table of Means – Client Language Variables

	M (SD)	Range
D+	1.333 (2.284)	0 – 17
A+	1.964 (2.213)	0 – 12
R+	8.836 (9.940)	0 – 61
N+	1.128 (1.879)	0 – 10
O+	3.990 (6.335)	0 – 43
C+	4.041 (5.666)	0 – 42
Ts+	0.738 (1.591)	0 – 12
D-	0.385 (0.890)	0 – 7
A-	0.492 (1.242)	0 – 9
R-	4.364 (5.358)	0 – 33
N-	0.179 (0.510)	0 – 3
O-	1.169 (2.137)	0 – 12
C-	0.467 (1.147)	0 – 10
Ts-	0.005 (0.071)	0 – 1

Table 1.3 Correlation Table – Client Language Variables

	D+	A+	R+	N+	O+	C+	Ts+	D-	A-	R-	N-	O-	C-	TS-
D+	1													
A+	0.26 9	1												
R+	0.40 4	0.37 0	1											
N+	0.50 5	0.37 1	0.18 8	1										
O+	0.49 0	0.37 5	0.56 2	0.49 5	1									
C+	0.46 2	0.41 2	0.32 0	0.36 8	0.30 6	1								
Ts+	0.02 0	- 0.09 6	0.12 0	0.11 4	0.13 8	0.10 2	1							
D-	- 0.03 8	0.06 4	0.07 5	0.05 3	0.01 0	0.07 4	- 0.06 7	1						
A-	0.22 1	0.12 8	0.26 6	0.08 5	0.28 2	0.11 2	- 0.02 8	0.02 8	1					
R-	0.16 0	0.28 0	0.56 7	0.19 4	0.47 8	0.03 5	- 0.03 7	0.09 3	0.34 0	1				
N-	- 0.01 6	0.10 6	0.00 2	0.07 2	0.08 5	- 0.03 1	- 0.01 2	0.07 4	0.26 5	0.22 4	1			
O-	0.09 6	0.28 2	0.42 8	0.14 0	0.33 0	0.13 1	- 0.02 9	0.16 3	0.08 8	0.49 8	0.12 7	1		
C-	- 0.06 5	0.10 4	0.11 4	- 0.07 8	0.07 6	0.09 3	0.10 3	0.35 2	0.19 5	0.25 2	0.17 2	0.23 6	1	
Ts-	- 0.04 2	- 0.03 1	- 0.05 7	- 0.04 3	- 0.04 5	- 0.05 1	0.01 2	- 0.03 1	- 0.02 8	- 0.00 5	0.11 6	- 0.03 9	- 0.02 9	1

Table 1.4 Covariance Table – Client Language Variables

	D+	A+	R+	N+	O+	C+	Ts+	D-	A-	R-	N-	O-	C-	TS-
D	5.2													
+	24													
A	1.3	4.9												
+	63	01												
R	9.2	8.1	99.1											
+	04	64	48											
N	2.1	1.5	3.53	3.5										
+	79	46	1	45										
O	7.1	5.2	35.5	5.9	40.2									
+	27	68	45	14	89									
C	6.0	5.1	18.0	3.9	11.0	32.2								
+	07	82	84	38	26	66								
Ts	0.0	-	1.90	0.3	1.39	0.92	2.5							
+	72	0.3 39	0	43	9	8	45							
D-	-	0.1	0.12	0.0	0.05	0.37	-	0.7						
	0.0 77	27	7	90	6	6	0.0 95	95						
A-	0.6	0.3	0.35	0.1	2.23	0.86	-	0.0	1.5					
	29	53	3	99	2	6	0.0 56	31	50					
R-	1.9	3.3	3.32	1.9	16.3	1.06	-	0.4	2.2	28.8				
	71	28	8	63	08	7	0.3 17	47	73	31				
N-	-	0.1	0.00	0.0	0.27	-	-	0.0	0.1	0.61	0.2			
	0.0 19	20	9	70	5	0.09 0	0.0 10	34	69	5	61			
O-	0.4	1.3	9.12	0.5	4.49	1.59	-	0.3	0.2	5.72	0.1	4.5		
	69	36	6	66	1	1	0.1 00	11	36	2	40	85		
C-	-	0.2	1.30	-	0.55	0.60	0.1	0.3	0.2	1.55	0.1	0.5	1.3	
	0.1 72	64	4	0.1 68	1	4	90	61	79	6	01	80	22	
Ts	-	-	-	-	-	-	0.0	-	-	-	0.0	-	-	0.0
-	0.0 07	0.0 05	0.04 0	0.0 06	0.02 1	0.02 1	01	0.0 02	0.0 03	0.00 2	0.0 04	0.0 06	0.0 02	0.0 05

Table 2.1 Model 1 CFA Standardized Factor Loadings, Standard Errors, and Significance

ST			CT		
	λ (SE)	p		λ (SE)	p
D-	1.000 (0.000)	999.000	D+	1.000 (0.000)	999.000
A-	3.397 (2.524)	0.178	A+	0.783 (0.214)	0.000*
R-	24.100 (13.897)	0.083	R+	3.938 (1.070)	0.000*
N-	1.047 (0.797)	0.189	N+	0.754 (0.159)	0.000*
O-	7.307 (3.543)	0.039*	O+	3.093 (0.835)	0.000*
C-	2.758 (1.707)	0.106	C+	2.128 (0.372)	0.000*
Ts-	-0.008 (0.007)	0.279	Ts+	0.122 (0.121)	0.315

Table 2.2 Model 2 CFA Standardized Factor Loadings, Standard Errors, and Significance

ST			Preparatory CT			Mobilizing CT		
	λ (SE)	p		λ (SE)	p		λ (SE)	p
D-	1.000 (0.000)	999.000	D+	1.000 (0.000)	999.000	C+	1.000 (0.000)	999.000
A-	4.069 (3.574)	0.255	A+	0.837 (0.234)	0.000*	Ts+	0.084 (0.059)	0.153
R-	34.447 (24.275)	0.156	R+	4.501 (1.254)	0.000*			
N-	1.241 (1.129)	0.272	N+	0.771 (0.161)	0.000*			
O-	9.446 (5.801)	0.103	O+	3.388 (0.907)	0.000*			
C-	2.907 (2.215)	0.189						
Ts-	-0.009 (5.801)	0.422						

Table 2.3 Model 3 CFA Standardized Factor Loadings, Standard Errors, and Significance

ST			CT		
	λ (SE)	p		λ (SE)	p
D-	0.151 (0.075)	0.044*	D+	1.494 (0.354)	0.000*
A-	0.497 (0.190)	0.009*	A+	1.151 (0.198)	0.000*
R-	4.374 (0.614)	0.000*	R+	6.535 (0.833)	0.000*
N-	0.139 (0.069)	0.042*	N+	1.051 (0.269)	0.000*
O-	1.275 (0.197)	0.000*	O+	4.863 (0.703)	0.000*
C-	0.377 (0.136)	0.006*	C+	2.805 (0.748)	0.000*

APPENDIX D

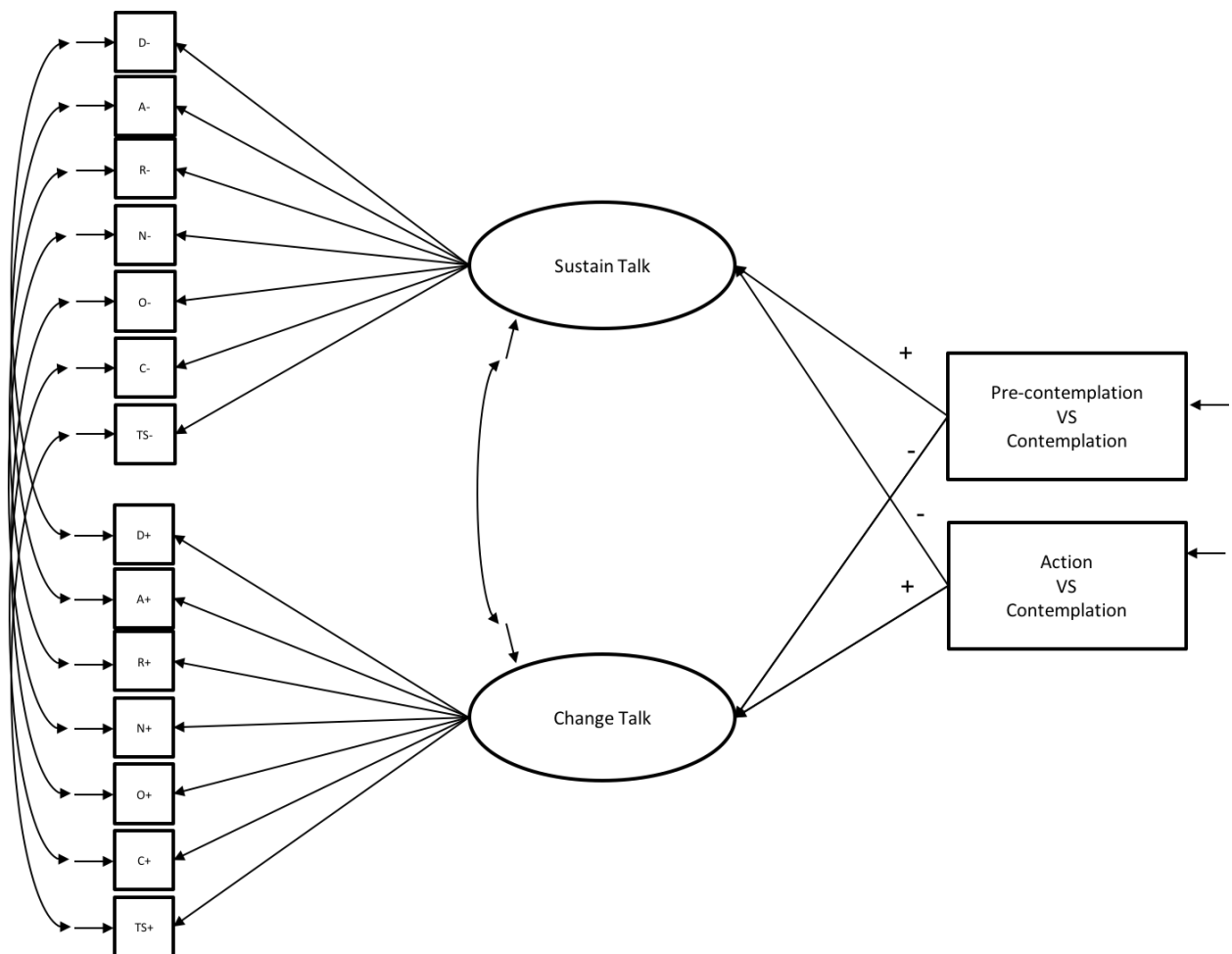


Figure 1.1: Model 1

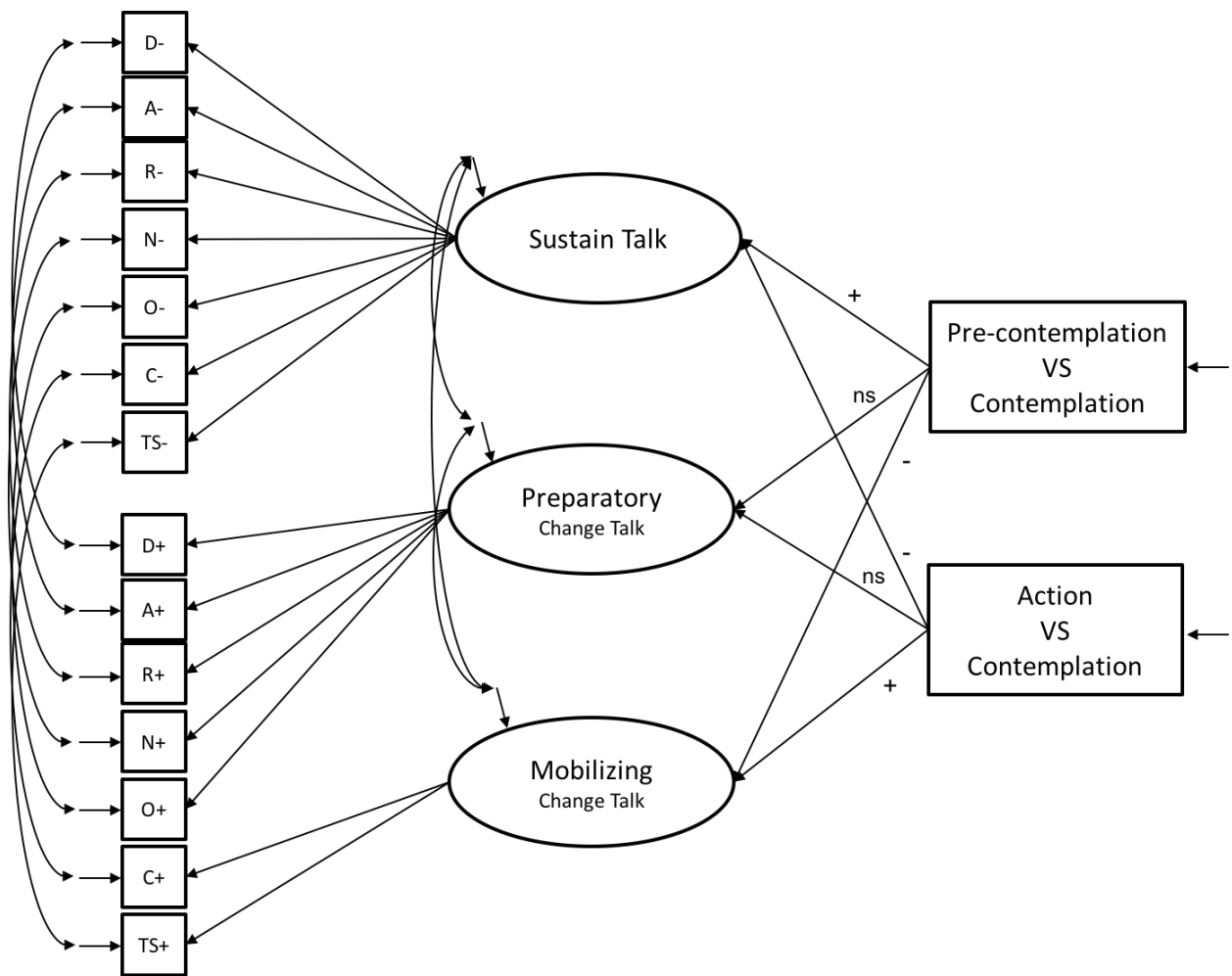


Figure 1.2: Model 2

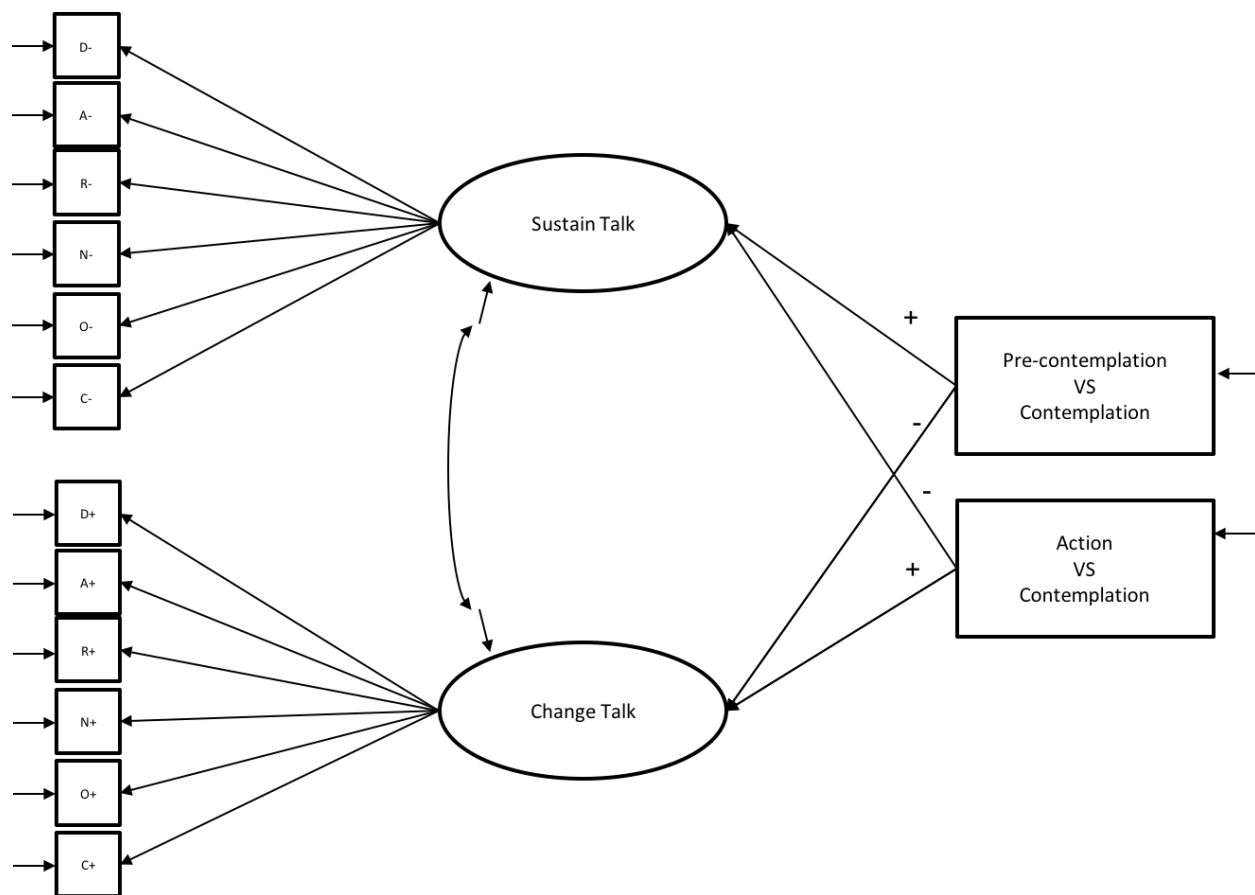


Figure 1.3: Model 3

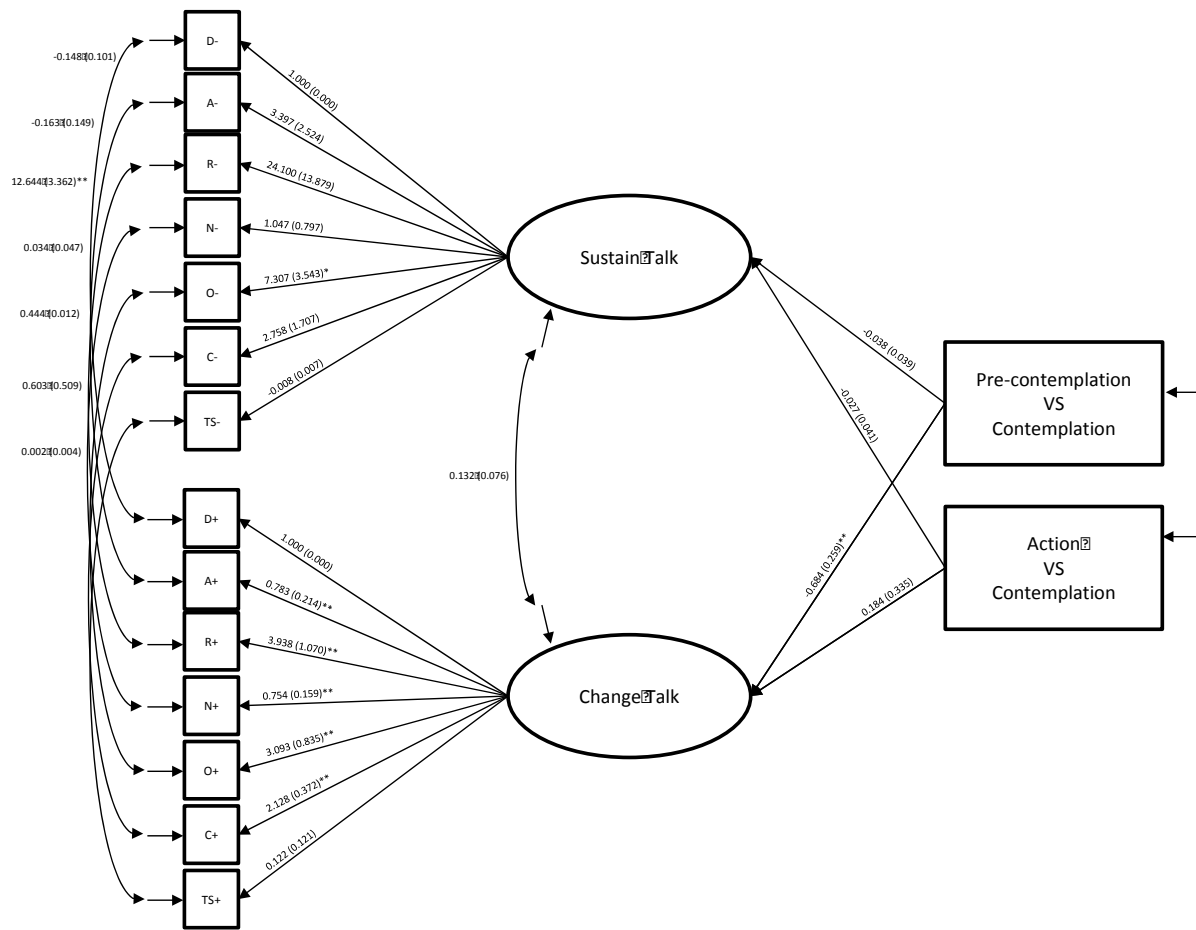


Figure 2.1: Model 1 Results

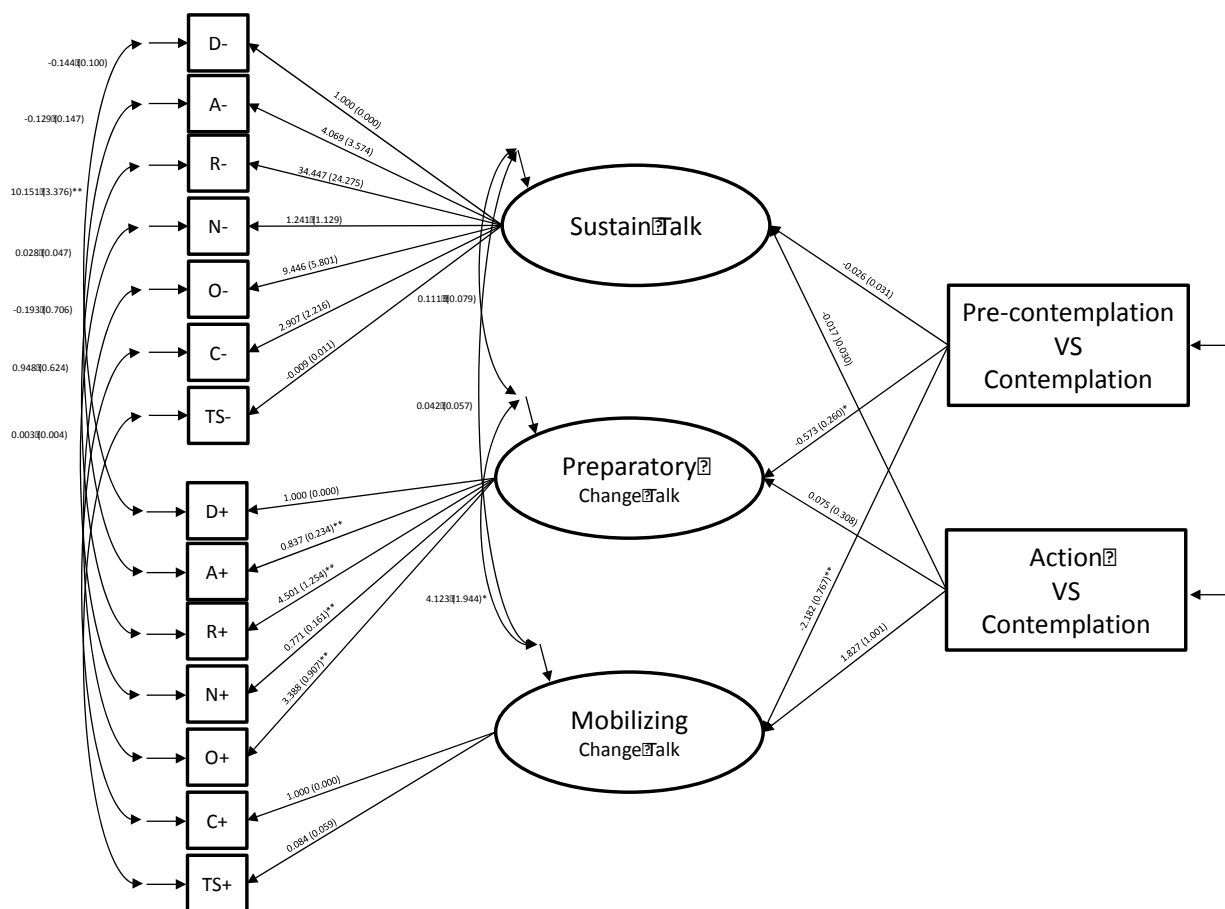


Figure 2.2: Model 2 Results

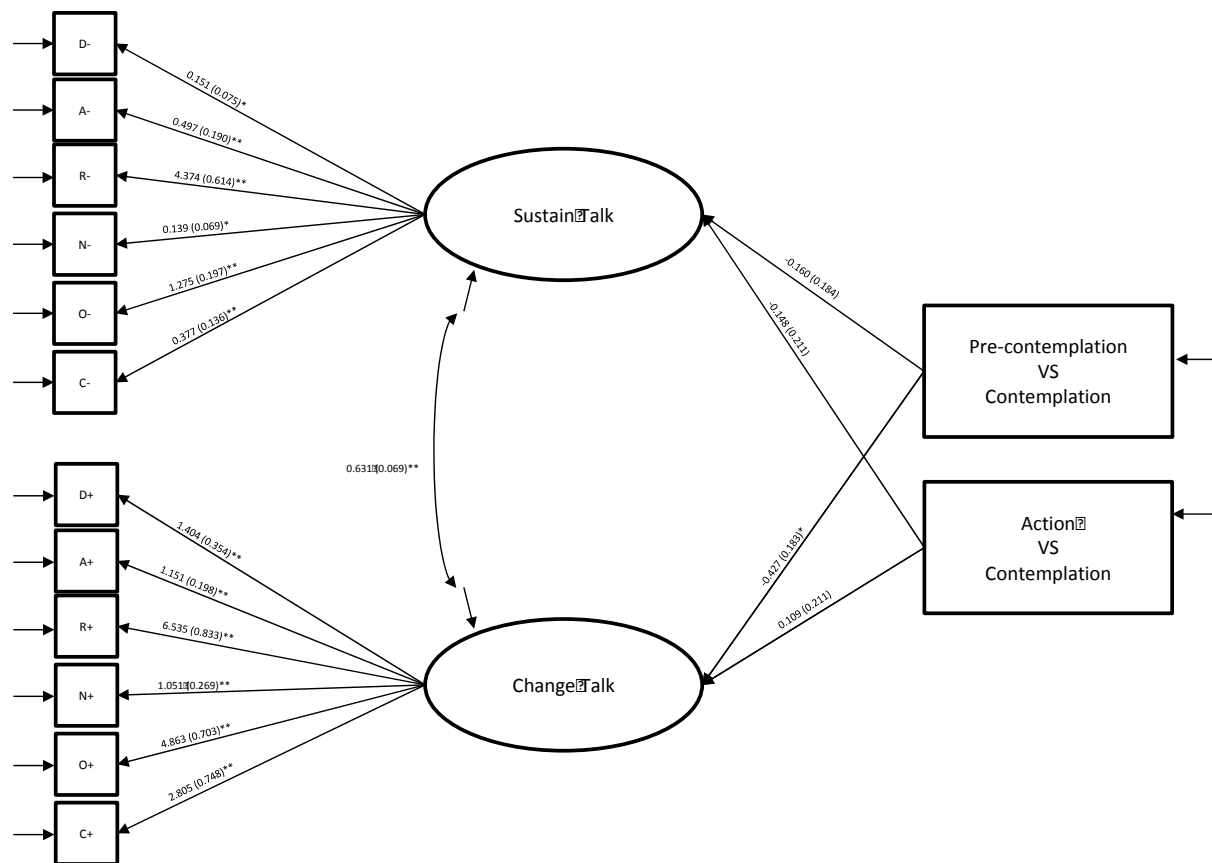


Figure 2.3: Model 3 Results

VITA

Reyna Puentes received a double Bachelor of Science in Psychology and Biological Sciences from The University of Texas at El Paso in 2013. Her training in Motivational Interviewing began during her graduate studies in 2015 while working on a clinical trial which sought to investigate the efficacy of a culturally-enhanced brief motivational intervention (BMI) compared to a standard, non-adapted BMI. Reyna's more recent work in Motivational Interviewing has involved providing training in both MI and BMI to diverse populations, including community health providers, supervision/probation officers, recovery coaches, school counselors, pharmacists, social workers, and health promotoras. Reyna's interest in the effects of substance misuse have informed her earlier work in tobacco cessation, her current work in alcohol research, and her more recent interests in applying BMI with other substances, such as opioid misuse. Reyna has presented research at state, national, and international conferences, which include the Society for Behavioral Medicine, the Research Society on Alcoholism, the Association for Medical Research and Education in Substance Abuse, and the Latinas Researchers Network.

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