BISOCIATION AND SECOND-ORDER CHANGE: RELATIONSHIPS AMONG
TOLERANCE FOR AMBIGUITY, SENSE OF HUMOR, AND HUMOR STYLES

By

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Individual differences in Tolerance for Ambiguity (TFA) are important in predicting how people deal with data subject to multiple interpretations (ambiguity) in contexts including therapy and conflict resolution. This study examines models of humor based on bisociation and meta-pattern recognition, using humor variables to predict TFA, and implications/applications for therapy, second-order change, and future research. Using an unrestricted online sample of 691 adult participants it was found that higher levels of sense of humor were significantly associated with higher levels of TFA ($\beta = .30; p < .001$), even after controlling for social desirability. Adding humor styles (HS) to the regression model further increased predictive power. TFA was positively associated with Affiliative and Self-enhancing styles, and not associated with the "potentially detrimental" styles (Aggressive and Self-defeating). The largest correlation with TFA occurred with Self-enhancing HS ($r = .33, p < .01$). Relationships between HS, social dominance, and TFA were also investigated. Constructivist and Gestalt therapists had higher levels of TFA than those with orientations based on rationalist assumptions. Results of a previous study relating humor to HS were replicated in expected directions.
CHAPTER 1
INTRODUCTION

Individuals are often faced with situations that do not easily fit into existing ways of thinking. Most of these situations can be interpreted in a number of different ways. The perception that something is open to multiple interpretations is called interpretive multiplicity, or ambiguity. Many ambiguous situations may even appear to have interpretations that are contradictory or even paradoxical from a certain perspective. The bisociation model describes humor as a meta-recognition of the same sort of pattern. In this sense, ambiguity and humor share important features: they both involve first-order discontinuity and second-order, or meta-pattern, awareness. The expected relationships between Tolerance for Ambiguity, various humor variables, and the theoretical orientations that focus more on second-order change, will be explored fully in the following sections, after a discussion of the importance and difficulties of predicting Tolerance for Ambiguity.

The Importance of Predicting Tolerance for Ambiguity

The ability to deal with ambiguity is an important component of an individual's ability to interact with others and succeed in a complex, ever-changing world (Granello, 2001). Tolerance for ambiguity is positively related to self-actualization (Foxman, 1976), managerial effectiveness (Roskin & Margerison, 1983), and dealing well with technological change (Myers, Henderson-King, & Henderson-King, 1997). It has been negatively related to anxiety and mood disorders (Andersen & Schwartz, 1992; Myers et al., 1997), authoritarianism (Rokeach, 1960), avoidance (Curley, Yates, & Abrams, 1996), rigidity and close-mindedness (Dixon, Willingham, Chandler, & McDougal, 1986), and perfectionism (Wittenberg & Norcross, 2001). It has also been related to decision making (Ben-Zur & Wardi, 1994), avoidance (Curley et al., 1996), and being ethnically prejudiced, uncreative, anxious, extra punitive, and aggressive (Bochner, 1965).
However, while Tolerance for Ambiguity is an important predictive variable (Furnham & Ribchester, 1995), the fact that Tolerance for Ambiguity refers to a covert disposition, or broad pattern of thinking, makes it impossible to observe directly (Budner, 1962). This suggests the importance of identifying other variables with conceptual relationships to Tolerance for Ambiguity and more overt behavioral manifestations subject to both observation and direct intervention. An understudied domain that meets these criteria and has been used in both therapy and conflict resolution with a great deal of success is the area of humor (Keller, 1984).

Humor is often a sign of embracing ambiguity – an indication of an individual's paradoxical recognition that something is both equal to and not equal to something else (Bateson, 1953). Humor is used to deal with ambiguity because "serious discourse simply cannot cope with its own interpretive multiplicity" (Mulkay, 1988, p. 214). This implies that when we reach the constricting limits associated with our ordinary use of language (Wittgenstein, 1953/1967), humor may be a higher-order way of dealing with the inherent ambiguity. Indeed, a study of the use of humor in organizations concluded "humour to be a promising mechanism for locating and studying paradox and ambiguity..." (Hatch & Erhlich, p. 524). That humor has been found useful for studying ambiguity in organizations suggests the importance of investigating further ways of using humor related variables as a mechanism for studying Tolerance for Ambiguity in individuals.

All individuals do not react the same way when confronted with ambiguous situations or stimuli (McLain, 1993). Individual differences in tolerance and intolerance for ambiguity have been investigated by various psychological researchers for almost 60 years, beginning with the work of Frenkkel-Brunswik and her colleagues (Frenkel-Brunswik, 1949a, 1949b; Frenkel-
Brunswik, Blake, & Ramsey, 1951), and continuing into the present (Egan, Santos, & Bloom, 2007; Koller & Salzberger, 2007).

The same patterns of black-and-white thinking that constitute intolerance for ambiguity play a critical role in relationships at various levels – both interpersonal and international. The United Nations has affirmed the importance of understanding and developing such attitudes as a prerequisite for lasting tranquility (Jones, 2007). Others have related these same attitudes which definite national and international cultures of peace to individual happiness (Curle, 1996; Kirschenbaum & Henderson, 1990; Rogers, 1987; Rogers & Ryback, 1984). Tolerance for ambiguity appears to be one of the most central attitudes required to promote peace and reduce conflict between individuals and countries. Rogers and Ryback (1984) wrote in *One Alternative to Nuclear Planetary Suicide* (the title of which itself demonstrates the use of humor for promoting Tolerance for Ambiguity):

> It is important to recognize that in any serious dispute between groups, the underlying pattern is exceedingly simple. Group A is convinced of the fact that "We are right and you are wrong. We are good and you are bad." Unfortunately, Group B has the identical point of view. They firmly believe that "We are right and you are wrong. We are good and you are bad." This simple pattern holds true both at the level of the neighborhood squabble and at the highest international level…If we are to achieve reduction in tension or any resolution of differences, the existence of this pattern must be recognized… (p. 92)

It seems clear that this underlying pattern of intolerance for ambiguity, which leads to the kind of conflict Rogers spoke about more than 20 years ago, remains as relevant as ever today. The role of intolerance for ambiguity is apparent in the wake of September 11th on both sides in the global war on terrorism (Booth & Dunne, 2002; Mistler, 2003), and contributes to the escalation of a number of conflicts in the Middle-East, Africa, and tensions between The United States and countries like China, North Korea, Russia, and Iran. Both America and the international community are still faced with patterns in which peace is undermined by conflicts
quite often framed as a battle between good and evil, one side the sole inheritors of perfect
infallible truth doing battle against select individuals, groups, or countries. This suggests the
contemporary relevance and ongoing importance of understanding individual differences in
tolerance/intolerance for ambiguity for reducing conflict escalation through polarization (Budner,
1962; Frenkel-Brunswik, 1949a; Furnham & Ribchester, 1995; Mistler, 2002, 2003;
Ramsbotham, Woodhouse, & Miall, 2005). In the context of such broad implications stretching
all the way to international conflict resolution, what is the relevance of psychological research on
individual differences in Tolerance for Ambiguity?

The answer is summed up by The Preamble to The UNESCO Constitution, which declares,
"since wars begin in the minds of men, it is in the minds of men that the defenses of peace must
be constructed" (United Nations Educational Scientific and Cultural Organization (UNESCO),
1945). Indeed, pointing to the important role of perceptions and attitudes, Johan Galtung (1959,
1976, 1985), in his early and influential model of conflict, has suggested that both symmetric and
asymmetric conflict could be understood as a relationship between three things: attitudes,
behavior, and contradiction (an actual or perceived incompatibility of goals).

In this triangle model of conflict, attitudes, behaviors, and a perceived contradictory
situation must all be present for a full conflict to occur. Thus we can view the logical relationship
between these three central interacting elements of conflict in two primary ways: often referred
to as the ‘instrumental’ and ‘expressive’ approaches. The instrumental approach holds that
factors in the environment lead to a situation in which two parties have incompatible goals,
resulting in conflictual attitudes and behaviors. In the alternative, expressive understanding, the
dispute is largely traced back to psychological processes involving emotions, attitudes, and
perceptions that in turn affect behaviors and lead to the development of conflict (Mitchell, 1989).
This latter view is taken as the foundation for much psychological research, focusing on the importance of perception in developing attitudes (Berger & Luckman, 1966; Berger & Luckmann, 2002; Kohler, 1938, 1969; Kohler, 1992; Mahoney, 1991; Thoresen, 1988). It is this approach that is the premise of the present study.

The interest in human attitudes and motivations as they relate to international conflict has largely focused on conflicts that come about when basic human drives are in some way impeded (Burton, 1987, 1990). As more people turn their attention to the core polarizing "either/or" attitudes that are intolerant of ambiguity, the importance of research on variables that predict individual differences in how people tolerate ambiguity is becoming more clear, for both international conflict (Mitchell, 1989) and psychotherapy (Bochner, 1965; Budner, 1962; Chen & Hooijberg, 2000; Foxman, 1976; Frenkel-Brunswik, 1949a, 1949b).

A situation is likely to be perceived as more or less ambiguous depending on the amount of uncertainty, change, stability, and/or the degree to which it confronts the individual with problems that do not fit into existing ways of thinking (Dermer, 1973; Duncan, 1972; Ho & Rodgers, 1993). Many researchers have focused on individuals' perceptions of ambiguous stimuli as threatening (e.g. Budner, 1962; Campbell & Tesser; Dermer, 1973; Frone, 1990; Kirton, 1981; MacDonald, 1970), and on individuals actions to deal with cognitive dissonance (Egan et al., 2007; Elliot & Devine, 1994; Festinger, 1957; Festinger & Carlsmith, 1959; Koller & Salzberger, 2007; Pincus, 1990; Pratt, 1980) and reduce ambiguity (Lewin & Stephens, 1994; MacDonald, 1970; Martin & Westie, 1959).

The therapeutic implications of understanding and predicting Tolerance for Ambiguity are notable. Foxman (1976) found that individuals who were higher in Tolerance for Ambiguity were also higher in self-actualization, and others have suggested that Tolerance for Ambiguity
could be useful in identifying level of readiness for change in therapy (see Budd & Rollnick, 1996; Prochaska, DiClemente, & Norcross, 1992; Prochaska & Norcross, 2001). This suggests the importance of continued research on other variables related to Tolerance for Ambiguity. To the degree that such variables can be observed directly, prediction, and perhaps eventually even alteration, of the more covert attitudes of Tolerance for Ambiguity is possible. A number of such variables exist in the area of humor.

The Connection Between Humor, Second-Order Change, and Ambiguity

Humor, jokes, and their psychological implications have "not received nearly as much philosophical consideration as they deserve in view of the part they play in our mental life," wrote Freud (1905/1989, p. 6) in the opening chapter of his book on jokes. As we turn the corner of a new century, psychology, along with a number of other disciplines, has taken up Freud's call to study humor in greater depth. This is perhaps nowhere more evident than in the acceptance of the role of humor in the therapy room. A number of handbooks have been published dedicated specifically to collecting humor research relevant to the clinician (Fry & Salameh, 1987, 1993; Nevo, 2001; Salameh & Fry, 2001). Humor's place in therapy is gaining respect. The healing power of humor has been valued for some time, but it is, "only of late has the paradox of taking humor seriously been taken seriously" (Keller, 1984, p. 1).

There may even be a deep connection between humor and certain models of therapy. Fisher (1970) identifies a number of possible models for the psychotherapist, which include therapist as court jester. It is worth noting that Shakespeare gave many of his most insightful lines to the character of the jester. Perhaps this is because both therapy and humor are concerned in large part with helping people see things they don't otherwise see, and helping people see old things in a new way (Kelly, 1963; Mahoney, 1991; Mahoney & Lyddon, 1988). Both humor and Gestalt Therapy, for example, often use frustration, reversal, timing, and exaggeration to help
achieve their effect (Perls, Hefferline, & Goodman, 1994; Van De Riet, Korb, & Gorrell, 1980). Humor, like some forms of therapy, is also closely related to sensitivity to second-order messages – meaning messages about messages (Lyddon, 1990, 1998; Lyddon & Satterfield, 1994).

At a structural level, humor, ambiguity, and second-order change all share an important element in common: they can all be modeled by "cusp catastrophe", also known as first-order discontinuity. With respect to this relationship between humor, ambiguity, and second-order change "a joke can thus be considered a kind of structured ambiguity, the punch line precipitating the [first-order] catastrophe of [the second-order] switching interpretations" (Paulos, 1982, p. 85). In this sense, "the structure of a scientific revolution is similar to the structure of a joke" (Paulos, 1982, p. 106). There are also important relationships between "first- and second-order change evident in various renditions of developmental and systems theories" (Lyddon, 1990, p. 123). Thus, this concept of second-order change is a central one, and is discussed especially in the section relating second-order change to particular therapeutic orientations. This may also explain why some have argued that humor plays a critical role in therapy, and is "not just a tangential adjunct to the 'real work'" (Farrelly & Brandsma, 1974, p. 95).

Extensive research has revealed the beneficial effects of humor for improved psychological health (Lefcourt, 2001) and physiological well-being (Clay, 1997; Martin, 2001; McGuire, 1999; Ziegler, 1995). While theorists have debated the role of the initial incongruity (Nerhardt, 1976, 1977) versus the final resolution of incongruity at the end of a joke (Shultz, 1972; Suls, 1972), studies have shown the importance of incongruity in one form or another as a cross-cultural factor in nearly all jokes (Castell & Goldstein, 1977). There is remarkable similarity between
ambiguity, which may "be perceived as having multiple and incompatible interpretations" (McLain, 1993, p. 184), and the bisociation (Apter, 1982; Koestler, 1964, p. 35) way of understanding many forms of humor. That is, in most humor "a situation, person, event, or idea is simultaneously perceived from the perspective of two self-consistent but normally incompatible or disparate frames of reference" (Martin, 2007, p. 85).

In 2002 a number of political leaders, global activists, media executives, and comedians teamed up to form Comedy for Peace, an international NGO dedicated to the use of comedy to promote global peace through humor. The CEOs of major companies like CNN, The President of the Palestinian Welfare Association, and other government and non-government organizations, as well as comedians, joined together to use humor to promote co-existence. Since then they have organized a number of successful conferences, including a prominent one in 2004 where the U.S. Consulate in Jerusalem requested a joint Palestinian-Israeli comedy festival, joking about the serious issues which they experience every day. They joked about checkpoints and suicide bombers, honor killing, surveillance and occupation, and people from both sides came together, and they laughed.

A similar event was held at The University of Florida in 2007 when, after a rise in tensions between Muslims and Jewish students on campus provoked a series of back and forth escalation, the university invited the two comedian team of Comedy's Odd-Couple, billed as: One Muslim. One Jew. One Stage. "What sounds like a set-up to a punch line is actually the point of 'The Laugh in Peace Tour,' featuring Muslim comic Azhar Usman and Rabbi Bob Alper" (Csillag, 2007, p. 10). The comedians performed humor that poked fun at stereotypes, and highlighted similarities between groups often perceived as diametrically opposed. And, people laughed – Jews and Muslims alike.
An interest in the use of humor to promote therapeutic healing, help overcome divides, and make important points that transcend apparent ambiguity is far from new (Trueblood, 1964). A number of important scholars and philosophers have taken a profound interest in humor in the past 2000 years. Aristotle and Plato both largely focused on the kind of humor and laughter that is divisive, though Aristotle did give some hints that he recognized the relationship between humor and incongruity (Aristotle, Apostle, Dobbs, & Parslow, 1990; Aristotle & Thomson, 1953; Plato & Bury, 1897). Cicero, perhaps predictably, took an interest in the use of humor in public speaking, also limiting himself to ridicule as paradigmatic of laughter. Cicero, however, was also among the first Western writers to point out that ambiguity is related to and can heighten humor (Cicero, May, & Wisse, 2001). Hobbes (Hobbes & Holbach, 1971; Hobbes & Macpherson, 1968) extends the perspective offered by Plato and Aristotle, focusing further on the kind of humor which results from realizing that we are superior to someone else. Hutcheson (Hutcheson, 1971) critiques Hobbes, pointing to a number of the positive uses of humor, including its pleasant and affiliative functions. Hutcheson was also among the first Western thinkers to highlight the ways in which humor promotes mental tolerance and flexibility.

Descartes also considered in more detail the relation of humor to positive emotions. His model is somewhat dulled by his typical ungrounded physiological speculation, though he does offer important insights into the role of moderation in humor, proposing something of an inverted-u curve (e.g. Yerkes & Dodson, 1908) relationship between joy and humor, where both too little and too much joy prevents our bursting into laughter (Descartes, Haldane, & Ross, 1911). Both Kant and Schopenhaur also give their attention to the role of incongruity in humor. However, where Kant relates humor to violated expectation, Schopenhauer stresses humor as related to incongruence that occurs between sensory perception and abstract knowledge (Kant &
Bernard, 2005; Schopenhauer, Haldane, & Kemp, 1883). For Schopenhauer humor is a sign that our abstract rational knowledge needs to be corrected in light of feedback from the real world. That is, Schopenhauer is arguing that not only is humor fun, but it is also useful.

Humor is extremely useful, says Kierkegaard, who also highlights the role of incongruity and Tolerance for Ambiguity (Kierkegaard, Hong, Hong, & Malantschuk, 1967). Humor, he argues, marks the second-to-last stage of development in existential awareness, placing humor higher than both the aesthetic and ethical spheres. Kierkegaard (Kierkegaard, Hong, & Hong, 1992) writes, "The comical is present in every stage of life… for wherever there is life, there is contradiction, and wherever there is contradiction, the comical is present " (p.448). He reminds us that it is "quite as dubious to be pathetic and serious in the wrong place, as it is to laugh in the wrong place" (p. 259).

President Jimmy Carter (Carter, 1995) understood the importance of being both humorous and serious in the right places, and wrote about the critical importance of humor in the historic Camp David Accords he mediated between Prime minister Menachem Begin of Israel and President Anwar Al-Sadat of Egypt. Dr. Hunter Campbell (a.k.a. Patch Adams), founder of a teaching center and clinic that trains doctors in the use of humor (The Gesundheit! Institute, 2008) and the basis for a popular film Patch Adams ("Patch Adams," 1998), has advocated a transformation of medical practice that includes the central use of humor.

Understanding both humor and Tolerance for Ambiguity has profound implications for a number of fields, including both international conflict resolution and psychotherapy. It is also clear that humor has been used to help reduce conflict, transcend apparent contradictions, and encourage therapeutic healing of all kinds (Johnson, 1976). So, the relationship between certain kinds of humor and Tolerance for Ambiguity appears to work in practice, but does it work in
theory? Or, more accurately, is there any scientific, empirical evidence to support this body of anecdotal reports about the relationship between humor and Tolerance for Ambiguity?

Although the relationship between humor and Tolerance for Ambiguity seems both likely and important, little empirical research exists investigating the relationship between these variables. The few studies that do exist (Ruch, Busse, & Franz-josef, 1996; Ruch & Hehl, 1983), while underscoring the feasibility of research in this area, contain major empirical and theoretical weaknesses. The present study aims to address this gap in the existing literature by investigating the relationship between humor related variables and Tolerance for Ambiguity with a number of important differences, including using measures with a more comprehensive theoretical framework and better overall psychometric properties, looking at both general humor and various humor styles, using a less restricted general adult population, and examining the possibility of moderating variables.

The remainder of this paper will be structured as follows: an in-depth overview of the literature surrounding Tolerance for Ambiguity; a review of the findings relating tolerance and intolerance for ambiguity to a number of domains, including psychotherapy and distinctions between first- and second-order change; an examination of various theories of humor and consideration of the incongruity-bisociation model that highlights meta-level parallels in the structural patterns of humor, second-order change, and the typology of Tolerance for Ambiguity. Strengths and weaknesses of previous studies on Tolerance for Ambiguity and humor related variables will be outlined, including a discussion of the importance of using self-report dispositional measures, and of examining not only general sense of humor but also specific humor styles. In considering each of these humor styles separately, specific hypotheses about their expected relationship to Tolerance for Ambiguity will be offered, both individually and in
relation to the distinction between benevolent/benign and potentially injurious humor styles
(Martin, 2007; Martin, Puhlik-Doris, Larsen, Gray, & Weir, 2003), and the possible moderating
role of Social Dominance Orientation (Pratto, Sidanius, Stallworth, & Malle, 1994). Following
each section of theoretical analysis will be various hypotheses about empirical relationships one
might expect to see between the constructs discussed, including sense of humor, humor styles,
Social Dominance Orientation, constructivist and rationalist based theoretical orientations, and
Tolerance for Ambiguity. Finally, a description of the current study methodology will be offered.
CHAPTER 2  
LITERATURE REVIEW

Following the broad conceptual review in the preceding chapter, this chapter will be dedicated to a specific review of the more recent scientific literature supporting specific predictions about the relationship between sense of humor, humor styles, Social Dominance Orientation, and Tolerance for Ambiguity. This review begins with an overview of the literature surrounding Tolerance for Ambiguity. Next is an exploration of the import of tolerance and intolerance for ambiguity in a number of domains, including the relevance of tolerance of ambiguity to psychotherapy and second-order change.

Subsequently, various theories of humor are examined, and the incongruity-bisociation model is considered. Through the incongruity/bisociation model of humor possible meta-level parallels in the structure of humor and the typology of both second-order change and Tolerance for Ambiguity become clear. The next section will examine strengths and weaknesses of previous studies which have examined Tolerance for Ambiguity and humor related variables. This includes a discussion of the importance of using self-report dispositional measures, and of examining not only general sense of humor but also specific humor styles. In considering each of these humor styles separately, specific hypotheses about their expected relationship to Tolerance for Ambiguity will be offered. This section will also investigate the theoretical distinction between benevolent/benign humor and potentially injurious humor styles, and possible relationships between the latter and Social Dominance Orientation.

Following each section of theoretical analysis various hypothesis are drawn about the expected empirical relationships between the variables discussed. This chapter will conclude with a brief summary, and a review of specific hypotheses.
Tolerance for Ambiguity

Defining Tolerance for Ambiguity as a Construct

A situation is likely to be perceived as more or less ambiguous depending on the amount of uncertainty, change, stability, and/or the degree to which it confronts the individual with problems that do not fit into existing viewpoints or ways of thinking (Dermer, 1973; Duncan, 1972; Ho & Rodgers, 1993). However, individuals do not all react the same when confronted with ambiguous situations or stimuli. Individual differences in this arena have been investigated by various psychological researchers for almost 60 years, beginning with the work of Frenkkel-Brunswik and her colleagues in the middle of the last century (Frenkel-Brunswik, 1949a, 1949b; Frenkel-Brunswik et al., 1951). These early perspectives closely relate intolerance of ambiguity to authoritarianism and prejudice (Frenkel-Brunswik, 1949a). Modern perspectives on multiculturalism are influenced by early research on Tolerance for Ambiguity, relating intolerance of ambiguity to “intolerance of diversity among people,” (McLain, 1993, p. 184), and to being ethnically prejudiced (Bochner, 1965; Furnham & Ribchester, 1995). More recent studies have also confirmed this relationship, finding ambiguity tolerance to be negatively associated with supporting diversity interventions (Chen & Hooijberg, 2000).

A number of approaches to defining ambiguous stimuli have been outlined in the literature. Budner (1962) offered a definition for perceived ambiguity, which included stimuli that is novel, complex, and/or insoluble within a framework of Aristotelian logic (i.e. subject to multiple interpretations, which violates logical principles of non-contradiction and/or exclusion of middle). Others have offered descriptions of ambiguity in terms of second-order probability – that is, suggesting that the amount of ambiguity present in any situation could be operationalized in terms of the certainty with which a person could estimate the probability of various branches of an outcome- or decision-tree representing a given problem-space (Ellsberg, 1961).
Many researchers have focused on individuals' perceptions of ambiguous stimuli as threatening (e.g. Budner, 1962; Campbell & Tesser; Dermer, 1973; Frone, 1990; Kirton, 1981; MacDonald, 1970), and on individuals' actions to reduce ambiguity (Lewin & Stephens, 1994; MacDonald, 1970; Martin & Westie, 1959). Four major ways of dealing with perceived ambiguity have been identified – the first three can be described as "intolerance", while the forth is considered "tolerance" of ambiguity.

Among the first three, perceived ambiguity can be reduced most obviously by removing oneself from the situation where the possibility exists (Furnham & Ribchester, 1995). It is also possible to reduce the perception of ambiguity by denying its existence and preferring 'black-and-white' information, in order to reduce cognitive dissonance (Egan et al., 2007; Elliot & Devine, 1994; Festinger, 1957; Festinger & Carlsmith, 1959; Koller & Salzberger, 2007; Pincus, 1990; Pratt, 1980). Many attempt to reduce ambiguity by collecting more information about situations perceived as ambiguous (Bennett, Herold, & Ashford, 1990; Budner, 1962; Chong, 1998). However, this does not always work because ambiguity may not be the result of insufficient information and cannot necessarily be equated with uncertainty. Some researchers, however, have used the concepts of intolerance for ambiguity and intolerance for uncertainty indiscriminately (e.g. Andersen & Schwartz, 1992; Ashford & Cumming, 1985; Majid & Pragasam, 1997; Myers et al., 1997). While attitudes and behavioral responses to uncertain situations may be affected by an individual's tolerance for uncertainty (Faircloth & Richhiute, 1981; Gul, 1986; Lal & Hassel, 1998; McGhee, Shields, & Birnberg, 1978), intolerance for uncertainty and intolerance for ambiguity are distinct constructs (Cantor, Smith, French, & Mezzich, 1980; Chen, Pham, & Boustany, 2001; Kosko, 1993; Kosko & Burgess, 1998). While uncertainty may often be reduced by collecting additional data, additional information or
precision may leave ambiguity unchanged or even increased. Other research has been more effective at separating the concepts of ambiguity and uncertainty, arguing that while they have some things in common, they should be considered as distinct phenomena (Grenier, Barrette, & Ladouceur, 2005). Doing so enhances the validity of self-report questionnaires used to examine both intolerance of ambiguity and intolerance of uncertainty (Grenier et al., 2005). Furthermore, while research involving Tolerance for Ambiguity is extensive, intolerance for uncertainty has primarily been examined only as it relates to anxiety disorders (Ladouceur, Gosselin, & Dugas, 2000).

The forth option is not to attempt to reduce ambiguity, but rather to be tolerant of it. While some (Krohne, 1989, 1993) have argued that ambiguity refers to the properties of the stimuli, this fails to consider context and perception, core elements in understanding ambiguity (Wittgenstein, 1953/1967). Indeed, both Gestalt psychologists (Kohler, 1938, 1969; Kohler, 1992) and others have pointed out the nature of perception as a creative act (Berger & Luckman, 1966; Berger & Luckmann, 2002; Mahoney, 1991; Thoresen, 1988). Therefore, ambiguity is better understood conceptually in relationship to a context, and connected to perception rather than stimuli (further supporting a design using self-report measures, for the object of investigation is properly tolerance of perceived ambiguity).

This tolerance – the freedom to understand situations, not as less ambiguous, but as less threatening – may be the most relevant option for further examination. In a world where ambiguity cannot be avoided (Wilkinson, 2006), and reducing complex situations to black-and-white terms is understood as undesirable, individuals may none the less reconstrue situations even when it is not possible to deny the underlying facts (Kelly, 1963). That is, where ambiguity is perceived, a person's next step – his or her approach to interpreting and tolerance for that
ambiguity – becomes the important question. The definition for Tolerance for Ambiguity used in this study is the one given by Mclain (1993), which forms the framework for the Multiple Stimulus Types Ambiguity Tolerance (MSTAT) measure: "Tolerance for ambiguity is defined [...] as a range, from rejection to attraction, of reactions to stimuli perceived as unfamiliar, complex, dynamically uncertain, or subject to multiple conflicting interpretations" (p. 184).

**More on How Tolerance for Ambiguity Matters**

Tolerance for ambiguity “is a powerful predictive variable… the correlates of [Tolerance for Ambiguity] are cognitive, perceptual, and attitudinal, which may account for why the ambiguity tolerance research literature is spread across so many different subdisciplinary fields within psychology (Furnham & Ribchester, 1995, p. 189).” Tolerance for ambiguity is related to being (a) authoritarian, (b) dogmatic (Rokeach, 1960), (c) rigid, (d) closed minded (Dixon et al., 1986), (e) ethnically prejudiced, (f) uncreative, (g) anxious, (h) extra punitive, and (i) aggressive (Bochner, 1965). Research also suggests a relationship exists between Tolerance for Ambiguity and decision making (Ben-Zur & Wardi, 1994), avoidance (Curley et al., 1996), facing technological risks, (Myers et al., 1997), anxiety and mood disorders (Andersen & Schwartz, 1992; Myers et al., 1997), and managerial effectiveness (Roskin & Margerison, 1983).

Individuals with a high Tolerance for Ambiguity, not surprisingly, seem to excel in the performance of ambiguous tasks (Ebeling & Spear, 1980; Lyonski & Durvasula, 1990; MacDonald, 1970). Those with intolerance for ambiguity attempt to reduce the feeling of being threatened in ambiguous situations by preferring stimuli that is readily interpretable. This means that those with low Tolerance for Ambiguity may tend to disproportionately value quantitative over qualitative, abstract, or other more conceptual information (Dermer, 1973). While people who are intolerant of ambiguity seem to resist complexity and over-privilege black-and-white
numerical information, computers have actually started to overcome such binary limits using "fuzzy logic" (Cantor et al., 1980; Chen et al., 2001; Kosko, 1993; Kosko & Burgess, 1998).

A number of the primary characteristics of Tolerance for Ambiguity that have been outlined (Bochner, 1965) also seem to overlap directly with those processes identified as core aspects of conflict polarization (Mistler, 2003). These include “rigid dichotomizing into fixed categories”, the “inability to allow for the coexistence of positive and negative features in the same object, for example, ‘good’ and ‘bad’ traits in the same person”, “early selection and maintenance of one solution in a perceptually ambiguous situation”, and “positive rejection of the different or unusual” (Furnham & Ribchester, 1995, p. 180).

A number of studies have shown the effects of Tolerance for Ambiguity on managerial opinions about the appropriateness of accounting and control systems (e.g. Brownell & Hirst, 1986; Collins, 1978; Harrison, 1993) and individual differences in perceptions of the importance of various categories of information (Dermer, 1973; Lal & Hassel, 1998; Oliver & Flamholtz, 1978), amount of information (Dermer, 1973; McGhee et al., 1978), and decision confidence given varying amounts of information (Gul, 1984, 1986). Tolerance for ambiguity and a leader's ability to deal with change are at the center of what Wilkinson (2006) calls the "Ambiguity Advantage".

**Therapeutic Specific Implications**

There are also important implications for Tolerance for Ambiguity especially relevant to a therapeutic context. There are a number of reasons and a good deal of previous research that suggests Tolerance for Ambiguity may be relevant to both the development and theoretical orientation of the therapist as well as the ways in which clients approach and are open to change. First, the literature that suggests possible differences in Tolerance for Ambiguity based on therapist orientation and association with second-order change will be presented, followed by
previous research on the relationship between tolerance and a number of variables with strong clinical relevance.

**Second-order change and constructivist versus rationalist orientations**

Watzlawick and colleagues (1974) pointed out an important distinction between first- and second-order change based on set theory. They distinguish differences and changes that are based on the relationships between elements in a set or group (first-order) and others that are related to changes in the nature of the relationships themselves, or the relationships between sets (second-order). First-order change allows for the rearrangement of items within a group without redefining of the group – that is the coherence of the system is maintained. Second-order change takes place when the definition of the system and the rules for the relationships among members are altered. This can have the effect of creating a first-order discontinuity. For example, moving the white queen across the board to take black's bishop might be an example of a first-order change. Second-order change, in this case, doesn't involve moving another piece in response, but rather, perhaps, changing to playing checkers instead. First-order change is a rearrangement of items within existing rules while second-order change means moving between games or altering the rules of the game itself.

Even when individual thought patterns, families, or organizations get stuck with respect to first-order patterns, there can be an openness to second-order change if the rules governing the relationship among members of the set can be altered. Lyddon (Lyddon, 1990) writes:

A review of the scientific and scholarly literature suggests that the first- and second-order distinction functions as a powerful conceptual scheme for describing types of change within several domains of inquiry. For example, first- and second-order change have been respectively termed *theory* and *paradigm change* in the philosophy of science (Kuhn, Dewey, & Neurath, 1970), *continuous and discontinuous* change in topology (Zeeman, 1976) *negative feedback* and *positive feedback* loops in communication theory (Raush, Greif, & Nugent, 1979), *weak and radical restructuring* in educational psychology (Vosniadou & Brewer, 1987), *movement within and movement through forms* in adult epistemic development (Basseches & Gruber, 1984), *alpha (or single loop)* and *gamma*
(or double loop) change in organizational development theory (Argyris & Schön, 1978; Golembiewski, Billingsley, & Yeager, 1976) maintenance (or peripheral) and deep (or core) change in psychotherapy (Guidano & Liotti, 1983; Mahoney, 1980), and surface structure translation and deep structure transformation in transpersonal psychology (Wilber, 1983) (p. 123).

This distinction between first- and second-order change is related to Tolerance for Ambiguity, because the amount of ambiguity present in any situation can be operationalized in terms of the certainty with which a person can estimate the second-order likelihood of the each possible interpretation of the data – that is, the probability of various branches of an outcome- or decision-tree representing a given problem-space (Ellsberg, 1961). Thus, it is likely that those with the best ability for second-order thought and pattern recognition will be the most tolerant of ambiguity.

It has been shown that psychotherapists report greater Tolerance for Ambiguity than research psychologists, indicating that there is a strong link between the practice of therapy and Tolerance for Ambiguity (Radeke & Mahoney, 1997, 2000). It is also especially important for therapists with constructivist epistemological positions to be tolerant of ambiguity, as these therapies are less inclined to use explicit goal setting and treatment plans (Mahoney, 1995). Indeed, building on important insights by Gestalt psychologists (Eysenck, 1942b; Hartmann, 2006; Kohler, 1969; Kohler, 1992), Gestalt therapists have also highlighted this basic constructivist position that all perception is a creative act involving the interpretation of ambiguity from a particular perspective (Perls, 1969; Perls et al., 1994; Van De Riet et al., 1980; Yontef, 1997). This remains equally true of both therapists and clients, and thus Tolerance for Ambiguity is an important variable for all therapeutic interactions.

Mahoney and colleagues (Mahoney, 1988, 1991; Mahoney & Gabriel, 1987) have divided contemporary cognitive therapy approaches into two general typologies: rationalist and
constructivist. The rational approach focuses on the elimination of emotional responses to irrational cognition by rationally challenging beliefs, where as the constructivist approach challenges rationalist assumption about the nature of the relationship between emotion and cognition, instead seeing humans as self-organizing developing systems, and encouraging emotional expression, experiencing and exploration as a way of facilitating cognitive change and creating new meanings. Lyddon (1990) has suggested that "the rationalist perspective tends to exemplify an approach to counseling that focuses on the goal of first-order change, whereas the constructivist perspective tends to represent an approach to counseling designed to facilitate second-order change" (p. 124). Lyddon has called for empirical scrutiny to support this proposition.

If constructivist perspectives are more associated with second-order thinking and change than rationalist perspectives (Lyddon, 1990), and this distinction between first- and second-order change is related to Tolerance for Ambiguity because the amount of ambiguity present in any situation can be operationalized in terms of the certainty with which a person can estimate the second-order likelihood of possible interpretations (Ellsberg, 1961), then it is reasonable to expect (Hypothesis: H8a) that those with a constructivist orientation will have higher levels of Tolerance for Ambiguity than those with rationalist orientations. Gestalt Therapy also takes the basic constructivist position that all perception is a creative act involving the interpretation of ambiguity from a particular perspective (Perls, 1969; Perls et al., 1994; Van De Riet et al., 1980; Yontef, 1997) and, following Lyddon's (1990) distinction, also encourages emotional expression, experiencing, and exploration as a way of facilitating change and creating new meanings. Thus, it is also hypothesized (H8b) that those with a Gestalt orientation would show higher levels of Tolerance for Ambiguity than those with a rationalist orientation.
Relationship to client variables and readiness for change

In addition to being central to the identity development of the therapist (Mistler, 2007), Tolerance for Ambiguity is related to a long list of variables important for client change as well. Shavit (1975) found that ego strength is a function of the combination of internal locus of evaluation and Tolerance for Ambiguity. Individuals in the high Tolerance for Ambiguity and internal locus of control group showed a significantly lower amount of projection than any other group. Locus of control alone did not significantly predict projection, but the interaction of Tolerance for Ambiguity and locus of control did. Tolerance for ambiguity has also been found to be positively correlated with openness and negatively associated with neuroticism (Wolfradt & Rademacher, 1999).

Indeed Foxman (1976) found that individuals who were higher in Tolerance for Ambiguity were also higher in self-actualization, which led him, along with many others, to the idea that Tolerance for Ambiguity should be useful in identifying level of "readiness for change" in therapy (see Budd & Rollnick, 1996; Prochaska et al., 1992; Prochaska & Norcross, 2001). Understanding a persons' level of Tolerance for Ambiguity helps us make predictions about how that person might react with confronted with new or unfamiliar settings. Thus, it may be useful early on in making decisions about the use of limited resources in managed care settings. Having insight into a client's level of Tolerance for Ambiguity might also be helpful in gauging the appropriateness of specific treatment plans, or at least predicting client reactions to them.

Modalities such as mediation, hypnosis, and mindfulness training are likely to confront the client with a high level of ambiguity, especially early on. Furnham and Richester (1995) write:

Tolerance for ambiguity appears to have clinical applicability [and]… may serve as a baseline for what to expect as the client shifts to less familiar and less structured modes of consciousness are experienced. Assessment of [Tolerance for Ambiguity] might also be used to screen out individuals who may not be ready to handle techniques involving this type of consciousness change. (p. 187)
The preceding review supports a conclusion that Tolerance for Ambiguity is important in a number of contexts, from business to international relations, and from computers to individuals in psychotherapy. However, Tolerance for Ambiguity is hard to observe directly. This suggests the importance of research on more overt variables associated with Tolerance for Ambiguity.

There is a great deal of theoretical support to suggest a possible relationship between Tolerance for Ambiguity and humor. However, there has been little research relating the two and a number of gaps in the related literature exist surrounding the relationship between Tolerance for Ambiguity and humor.

Humor

Importance and Criticisms of Humor Theory

A historical review of the literature surrounding sense of humor (Martin, 1998) quickly reveals psychologists' ongoing interest in the study of both humor in general and individual differences in the expression and effects of humor. Extensive research has revealed the beneficial effects of humor for both improved psychological health (Lefcourt, 2001) and physiological well-being (Clay, 1997; Martin, 2001; McGuire, 1999; Ziegler, 1995). Sigmund Freud (1928/1950) called humor the highest of the defense mechanisms because it allows protection from unwanted emotions without denying the reality of the situation. Freud also wrote about the importance of understanding individual differences in humor. Indeed, understanding differences in the way people experience and use humor may prove a fruitful resource for making discoveries about more over processes of the human mind. Some has even suggested that, "Humour tells us more about how the brain works, as mind, than does any other behaviour of the mind - including reason. It indicates other thinking methods… and the possibility of changes in perception" (1991, p. 20).
There are nearly a hundred different theories of humor, most of them differing from one
another in only minor ways (Greig, 1923). While those that have been most influential in
psychological humor research can be grouped into some broad categories (Morreall, 1987), most
of the broad theories of humor are too vague and imprecise to be helpful in a research context
(Martin, 2007). A primary reason for this debilitating vagueness is that the various theories of
humor try to explain too many different types of humor (Ritchie, 1999, 2001, 2004).

Rather than understanding humor broadly as a single thing, both humor and a sense of
humor may be more fruitfully conceptualized as a "class of loosely related traits" (Martin et al.,
2003, p. 51). Several empirical studies have also supported the multidimensional nature of humor
(Andrews; Cattell & Luborsky, 1947; Eysenck, 1943; Wilson, 1979). Thus, humor may be better
understood using the notion of family resemblance (Wittgenstein, 1953/1967) – an individual
having the same nose as one cousin and the same eyes as an uncle, but with no single feature that
all members of the family share. In the same way, perhaps there is no single feature that can be
found across all forms of humor, but a number of different features that account for overlapping
subsets. It is such a conceptualization that leads to the rejection of the idea of a grand theory of
humor (Ritchie, 2004). Thus, the current study asserts that instead of looking for proof or
disproof of a particular theory of humor, a more beneficial way to investigate humor is by
looking at individual differences in humor styles. In the next section, the focus will therefore not
be on developing or defending a grand theory that explains all forms of humor, but rather on
reviewing the theoretical grounds for expecting a relationship between any humor related
variables and Tolerance for Ambiguity.

The Relationship Between Humor and Tolerance for Ambiguity?

While theorists have debated the role of incongruity (Nerhardt, 1976, 1977) versus
incongruity resolution (Shultz, 1972; Suls, 1972) in humor, studies have shown the importance
of incongruity as a cross-cultural factor in an overwhelming majority of jokes (Castell & Goldstein, 1977). Koestler's concept of bisociation is one of the most prominent early formulations of an incongruity based theory (Martin, 2007). Bisociation is when a single thing "is made to vibrate simultaneously on two different wavelengths" (Koestler, 1964, p. 35). Apter (1982) uses the term synergy in a similar way, describing the mental process of holding two different or even contradictory perspectives in mind at the same time (or in quickly alternative oscillation). What is important, however, in distinguishing this concept from other incongruity models, is that the things is both true and not true at the same time. That is, while there appears to be incongruity from a certain perspective, there is at the same time a meta-pattern recognition of similarity. It is not simply the incongruity which is humorous alone, but the dual-vibration that occurs with the recognition of similarity and dissimilarity at different levels. This dual-vibration or oscillation can actually be quite enjoyable (Koestler, 1964), further suggesting how a great deal of humor might be understood through this lens of transcending apparent ambiguity.

It is worth underscoring the remarkable level of similarity between descriptions of ambiguity, something that may "be perceived as having multiple and incompatible interpretations" (McLain, 1993, p. 184), and descriptions of bisociation in humor, "in which a situation, person, event, or idea is simultaneously perceived from the perspective of two self-consistent but normally incompatible or disparate frames of reference" (Martin, 2007, p. 85). Indeed, this striking similarity leads one to imagine that humor variables should be in some way related to the concepts of Tolerance for Ambiguity (Ruch, Busse et al., 1996; Ruch & Hehl, 1983). Morreall (1991) also suggests such a link, writing that humor "fosters a family of traits and activities, collectively referred to as mental flexibility, that includes a tolerance for novelty, ambiguity, and change" (p. 359). Barden (2007) also concludes that Tolerance for Ambiguity
and humor are inextricably linked. The theoretical evidence presented in the preceding sections suggesting that the nature of humor parallels the nature of ambiguity, leads to the primary hypothesis (H1) of this study: higher levels of humor will be related to higher levels of Tolerance for Ambiguity. The next section will examine previous empirical studies of the relationship between Tolerance for Ambiguity and humor related variables.

**Strengths and Weaknesses of Previous Humor and Ambiguity Studies**

There have been only two notable published studies that examine Tolerance for Ambiguity and any humor related variables (Ruch, Busse et al., 1996; Ruch & Hehl, 1983). Both asked participants to rank the level of funniness for certain types of cartoons. No published research exists that examines the relationship between Tolerance for Ambiguity and either general sense of humor or humor styles. These two studies offer both an excellent starting point and a number of important gaps to be addressed with further research.

The first published study relating humor and Tolerance for Ambiguity (Ruch & Hehl, 1983) focused on examining the relationship between importance of resolution of incongruity (see especially Shultz, 1976; Suls, 1972) and Tolerance for Ambiguity. In this context incongruity was defined as "… a conflict between what is expected and what actually occurs in the joke" and resolution as a "second, more subtle aspect of jokes which renders incongruity meaningful or appropriate by resolving or explaining it" (Shultz, 1976, pp. 12-13, as cited in Ruch & Hehl, 1983). In this study, 143 non-psychology students at the University of Düsseldorf were given booklets with 120 joke-cartoons total, along with several other measures including a German translation of a rarely used measure of Tolerance for Ambiguity developed as part of an unpublished Master's thesis. Tolerant and intolerant groups were allocated based on "extreme scores" (0-4 considered tolerant and 13-20 considered intolerant, out of a theoretical 0-28 and observed 0-20 point range on this intolerance for ambiguity scale, were used to divide people
into groups). This resulted in 16 people in the tolerant group and 17 in the intolerant group. Analyses of variance were performed confirming the study's primary hypothesis that the group of intolerant subjects would rate "insolvable" jokes as funnier than the tolerant group and that intolerant subjects were more likely to reject "nonsense" jokes than the tolerant group.

Intolerance of ambiguity was found to correlate with the appreciation of incongruity-resolution jokes (r=0.19, \( p < 0.05 \)) and with the rejection of nonsense jokes (r = 0.19, \( p < 0.05 \)).

This study had a number of important weaknesses. The total sample size was 33, and the sample was limited to paid college students. The study used a translation of an unpublished scale with internal consistency (Cronbach's \( \alpha \)) of only .45 as its sole measure of Tolerance for Ambiguity. The study also failed to measure any dispositional humor traits, such as general sense of humor or humor styles preference. While the highest correlation found here for intolerance of ambiguity with every single joke does not exceed .4, the authors point out that the joke types were able to explain 58% of the reliable variance of the intolerance of ambiguity questionnaire. This suggests that a study that uses measures with higher reliability and more targeted validity designed to assess humor style preferences rather than situation-specific reactions may be able to explain a significant amount of the variance in individual differences in Tolerance for Ambiguity.

Poor psychometric properties aside, there are also serious concerns with this approach to humor measurement. The usefulness of joke or cartoon based humor measures is especially limited given that "canned jokes represent only a small proportion of the humor that we experience in our everyday social interactions" (Martin, 2007, p. 12). Indeed, one study found that only 11% of daily laughter occurred in response to jokes, while 17% was elicited by the media, and 72% arose spontaneously during social interactions 89%. Absent a presence of most
forms of media in the therapy room, these results suggest that almost all of the humor in a therapeutic context likely result from spontaneous interaction, underscoring further the importance of examining humor from a dispositional rather than joke-specific-reactions perspective. Another of the most compelling arguments for the understanding of humor as dispositional rather than situation-specific is the assertion that the experience of humor itself actually only occurs *intrapersonally*. This means that the target of humor falls away in the final analysis of the experience, and it is the motivation, attitudes and perceptions of the subject that are most relevant.

The second published study, by Ruch, Busse, and Hehl (1996) used 50 jokes and cartoons as a measure of humor appreciation and the Intolerance of Ambiguity Scale (Kischkel, 1984) to measure the extent to which individuals consider ambiguity as a source of threat rather than challenge. The primary purpose of this study was to examine the relationship between humor and proposed punishment for crimes. The actual relationship between scores on joke ratings and Tolerance for Ambiguity were not reported.

However, this study did arrive at a startling and important conclusion. Rated funniness of incongruity-resolution humor was a better predictor of preferences for maximal or minimal punishment than either conservatism or tough-mindedness. Indeed, the authors conclude that those individuals who appreciated humor of a particular type were actually *more* punitive than those who were more 'humorless' across the board. That individual differences in types of humor was a better predictor than a general high or low sense of humor suggests not only the importance of studying humor as a predictor of other variables, but also leads to a hypothesis (H2) that individual differences in humor style will be a better predictor of Tolerance for
Ambiguity than general sense of humor alone. The next section will accordingly examine the
concepts of humor styles and their measurement.

**Humor Measurement and the Importance of Humor Styles**

Rather than being understood as a single dimensional trait, humor and a 'sense of humor
may be better conceptualized as a collection of related traits. Buttressed by more recent studies
(Wilson, 1979), early factor-analytical studies clearly supported the multidimensional nature of
humor (Andrews, 1943; Cattell & Luborsky, 1947; Eysenck, 1942a, 1943). This conceptual
organization is similar to Wittgenstein's (1953/1967) notion of family resemblance, in which all
items share various features with one another but no single feature can be found that all items
share. Prominent researchers offer various ways of conceptualizing humor, including (1) a
cognitive ability that may include understanding, devising, or even remembering and re-telling
jokes (Feingold & Mazzella, 1993), (2) an aesthetic response, which includes appreciation of
humor or enjoyment of particular types (Ruch & Hehl, 1998), (3) a habit such as that of laughing
or telling jokes frequently (Craik, Lampert, & Nelson, 1996; Martin & Lefcourt, 1984), (4) an
emotion-related temperament trait, like habitual cheerfulness (Ruch & Kohler, 1998), (5) a
positive or bemused attitude or outlook (Svebak, 1996), and (6) a coping strategy or defense
mechanism (Lefcourt & Martin, 1986).

A variety of self-report measures have been developed and used, each coming out of, and
consequently paying more or less attention to, various ways of understanding humor. For
example, The Situational Humor Response Questionnaire (SHRQ) examines people's reports of
tendencies to smile and laugh in various situations (Martin & Lefcourt, 1984). The Coping
Humor Scale (CHS) looks at the use of humor as a coping mechanism (Martin & Lefcourt,
1983), and a few have been designed to capture the degree to which people report noticing and
enjoying humor, such as The Multidimensional Sense of Humor Scale (MSHS; Thorson &
Powell, 1993). The MSHS has not been widely used, perhaps because the authors do not report sub scale inter-correlations in their publication or measures of convergent validity with other scales. The Sense of Humor Questionnaire (SHQ-6; Svebak, 1996) is the most widely used and reliable measure for general sense of humor, defined as a liking of humor and humor meta-message sensitivity. It has been used in a number of studies (Svebak, Gotestam, & Jensen, 2004) and is recommended for both small and large-scale survey research (Martin, 2007).

Despite general agreement that humor is related to physical and psychological well being, and frequently significant results, several studies involving these measures have failed to show meaningful effect sizes (Kuiper & Martin, 1998; Thorson, Powell, Sarmany-Schuller, & Hampes, 1997 & Hampes, 1997). Indeed, Martin and colleagues (2003) point out that, in contrast to other positive psychology measures such as dispositional optimism (Scheier & Carver, 1985), self-report scales tapping general sense of humor often correlate with measures of psychological health and well-being at less than .25.

One important factor that may be responsible for the lack of more convincing evidence supporting humor's efficacy is the failure of most measures to distinguish between various styles of humor. Indeed, like perfectionism (Rice, Leever, Christopher, & Porter, 2006; Rice, Leever, Noggle, & Lapsley, 2007; Slaney, Rice, Mobley, Trippi, & Ashby, 2001) and other complex, multidimensional traits, humor appears to have both adaptive and maladaptive forms (Kuiper & Martin, 1998; Martin, 2001). Freud (1928/1950), Allport (1961), and Maslow (1954) all made a distinction between healthy and unhealthy uses of humor. This points to the idea that healthy psychological function is associated with distinctive uses or styles of humor, and that some forms of humor may actually have a negative effect. What is important then is not simply the generic presence of humor, but rather the presence or preference for particular kinds of humor, as
well as the absence of others. As a consequence, what is needed is not simply a measure of humor, but rather a measure of specific humor styles. Martin and colleagues (2003) have identified four distinct humor styles – *Affiliative humor, Self-enhancing humor, Aggressive humor*, and *Self-defeating humor* – and validated the Humor Styles Questionnaire (HSQ) as a method of measuring them.

**Affiliative humor**

Affiliative humor is generally aimed at "enhanc[ing] interpersonal cohesiveness" (Martin et al., 2003, p. 53). Individuals high in Affiliative humor say funny things, tell jokes, and engage in spontaneous wit to help amuse others (Lefcourt, 2001). They don't take themselves too seriously and may engage in mildly self-deprecating humor, while continuing to maintain a high level of self-acceptance (Vaillant, 1977). Those high in Affiliative humor are likely to joke a lot with their closest friends and enjoy making people laugh. As with humor in general, it is hypothesized (H3a) that higher levels of Affiliative humor will predict higher levels of Tolerance for Ambiguity. Moreover, because Affiliative humor "is an essentially non-hostile, tolerant use of humor that is affirming of self and others" (Martin, 2007, p. 211), meaning that it combines both the Tolerance for Ambiguity suspected of being present in all humor with higher levels of tolerance, it is further hypothesized (H4) that Affiliative humor will be the best single predictor of Tolerance for Ambiguity (i.e. compared to the other three humor styles or general sense of humor).

**Self-enhancing humor**

Self-enhancing humor involves the tendency to maintain a broadly humorous outlook on life in general. Compared to Affiliative humor, Self-enhancing humor has an even stronger *intrapersonal* focus, underscoring the importance of measurement with dispositional self-report instruments. Those high in this trait are frequently amused by the incongruities of life and are
able to maintain this humor even when faced with difficulties (Martin, Kuiper, Olinger, & Dance, 1993). They're likely to endorse items like "Even when I'm by myself, I'm often amused by the absurdities of life," and, even if feeling sad or upset, they are not prone to completely losing their sense of humor (Martin et al., 2003). In this sense, it is closely allied to the concept of coping humor (Martin, 1996), perspective-taking humor (Lefcourt et al., 1995), and humor as an emotional regulator (Dixon, 1980; Martin et al., 1993 Dance, 1993). This form of humor is the closest to Freud's notion of humor as the highest of the defense mechanisms because it allows a protection from unwanted emotions without denying the reality of the situation (Freud, 1928/1950). Given that this form of humor emphasizes the "regulation of negative emotion through humorous perspective-taking" (Martin et al., 2003, p. 54), the same ability to shift perspectives prominent in those with higher Tolerance for Ambiguity, it is hypothesized that (H3b) higher levels of Self-enhancing humor will predict higher levels of Tolerance for Ambiguity.

**Aggressive humor**

Those high in Aggressive humor tend to use humor to criticize or manipulate others, and often include sarcasm, teasing, ridicule, and derision (Janes & Olson, 2000; Zillman, 1983). Even when not intentionally disparaging, this trait relates to tendency to express humor without regard for its potential impact on others often to the point of compulsion, or difficulty resisting the impulse to say funny things that are likely to hurt or alienate others. Thus, those high in Aggressive humor may be likely to tease someone about making a mistake, or otherwise use humor as a way of criticizing or putting people down (Martin et al., 2003).

Smith and Levenson (1976) found that close-minded persons appreciate targeted humor more than open-minded persons, independent of the person(s) targeted. That is, close-minded individuals seem to appreciate jokes that make fun of either themselves or others more than
open-minded individuals. These sort of jokes fall into the Aggressive humor style category, offering evidence that the style of the joke is more important than the target in predicting certain traits. This may also suggest an inverse relationship between Aggressive humor and Tolerance for Ambiguity, which is another hypothesis of the current study: (H3c) higher levels of Aggressive humor are expected to predict lower levels of Tolerance for Ambiguity (i.e. a weak negative relationship).

**Self-defeating humor**

Self-defeating humor involves using excessively self-disparaging humor, often used in an attempt to ingratiate oneself to another group at one's own expense. Some have even suggested this humor style may be used as an attempt to hide underlying negative feelings or avoid dealing constructively with problems (Kubie, 1971). There is an element of emotional neediness and avoidance present in this style (Fabrizi & Pollio, 1987). When having problems or feeling unhappy, individuals high in Self-defeating humor style may cover it up by joking around so that even their closest friends cannot tell how they feel.

Previous research (Shavit, 1975) has found a relationship between self-deprecation and Tolerance for Ambiguity only when controlling for locus of control. No main effect of self-deprecation was found for tolerance-intolerance of ambiguity. Thus, with no evidence for a direct relationship between self-deprecation and Tolerance for Ambiguity, one might imagine that the existence of a relationship between Self-defeating humor style and Tolerance for Ambiguity will be significant if the humor element present in Self-defeating humor is instrumental in the effect. To this end, a small but significant relationship between Self-defeating humor and Tolerance for Ambiguity is expected, specifically hypothesizing (H3d) that higher levels of Self-defeating humor will predict higher levels of Tolerance for Ambiguity (i.e. a weak positive relationship).
Injurious Humor Styles and Social Dominance Orientation

Drawing on a range of theoretical and clinical literature devoted to considering beneficial (adaptive) versus detrimental (maladaptive) forms of humor (Allport, 1961; Freud, 1928/1950; Kubie, 1971; Maslow, 1954; O'Connell, 1960; Strean, 1994; Vaillant, 1977; Ziv, 1984), Martin and colleagues (2003) arrived at a conceptualization that divides the four possible humor styles related to most of the everyday uses of humor into two basic categories. Across one side is the distinction between humor used to enhance the self and humor used to enhance one's relationship with others. Along the other dimension is the distinction between humor that is more-or-less benign and humor that is less accepting and potentially detrimental to a person or group. Of special interest at this point are those two styles considered potentially detrimental or injurious: the Aggressive humor style and the Self-defeating humor style. Both of these styles involve the use of humor with a cost – that cost comes as these humor styles degrade or attack one's self, group, or others (Martin, 1996, 2007). This suggests the possibility of a relationship between the use of Aggressive and Self-defeating humor (both potentially detrimental or injurious to one person or group for the benefit of another person or group), and an individuals' view of the equal or unequal relationship among people and groups: Social Dominance Orientation.

Social dominance orientation reflects the preference for hierarchical rather than egalitarian relations. While this often means the desire that one's own group dominate and be superior to other groups, it also includes the desire to ensure or believe that certain groups are superior to others, regardless of one's membership in either the in- or out-group (Pratto et al., 1994). Indeed, previous research has also suggested the possibility of an inverse relationship between Self-Esteem, as measured with the Rosenberg Self-Esteem Scale (Bochner, 1965), and social dominance, measured using the Social Dominance Orientation Scale (Pratto et al., 1994), as strong as -.29 (p < .01). Therefore, based on the above theory the following interaction effects
(Jaccard, 2001) are hypothesized: (H5a) there will be a moderate positive relationship between Aggressive humor style and Social Dominance Orientation, and (H5b) there will be a moderate positive relationship between Self-defeating humor style and Social Dominance Orientation.

The next question is whether or not it is possible to parse out from constructs for the potentially injurious humor styles some element of Social Dominance Orientation, such that a person could be high in, for example, Aggressive humor, and high or low in Social Dominance Orientation. If this is possible, and if our primary hypothesis above is supported (i.e. there is a relationship between sense of humor and Tolerance for Ambiguity), then it is reasonable to further expect that (H6a) Social Dominance Orientation will moderate the relationship between Aggressive humor style and Tolerance for Ambiguity (controlling for Social Dominance Orientation will increase the strength as well as change the direction of the relationship), and that (H6b) Social Dominance Orientation will moderate the relationship between Self-defeating humor style and Tolerance for Ambiguity (by increasing the strength of the relationship). In both cases, higher scores on the respective humor styles and lower scores in Social Dominance Orientation should yield higher scores on Tolerance for Ambiguity than similarly high scores on Aggressive or Self-defeating humor style with high scores in Social Dominance Orientation.

**Purpose of the Study**

The current study was intended to extend the developing literature investigating Tolerance for Ambiguity, sense of humor, humor styles, and Social Dominance Orientation. The first aim of this study was to fill in a missing element in the existing literature by examining the relationship between important constructs of humor, humor styles, and Tolerance for Ambiguity. This study examines 1) the relationship between sense of humor and an individual’s Tolerance for Ambiguity, 2) the relationship between various humor styles and Tolerance for Ambiguity, 3) the possible moderating effects of Social Dominance Orientation on the relationship between
certain humor styles and Tolerance for Ambiguity, and 4) the relationship between constructivist versus rationalist therapeutic orientations and Tolerance for Ambiguity. This section will briefly summarize the conclusions of the literature before reviewing the hypotheses of this study.

Summary

Following the bisociation model of humor, it is posited that humor is often related to tolerance and/or preference for ambiguity; both are influenced by tolerance for two or more seemingly different or contradictory ideas. This close resemblance between humor and several leading definitions of Tolerance for Ambiguity underpin a primary hypothesis that there is a positive relationship between sense of humor and Tolerance for Ambiguity. Previous research on the relationship between Tolerance for Ambiguity and humor variables, while significant enough to warrant further research, has had a number of important weaknesses. This study has addresses these weaknesses with a larger and less restricted sample population, the use of a dispositional rather than situation-specific measure of humor, and a measure of Tolerance for Ambiguity with more established psychometric properties.

Recent literature has also argued that in addition to being studied as a monolithic construct, individual differences in the use of humor by individuals can be understood as well or even better in terms of a number of different humor styles. This suggests the importance of examining humor styles collectively as better predictors of Tolerance for Ambiguity than general sense of humor alone. Humor styles examined in this study include Affiliative humor, Self-enhancing humor, Aggressive humor, and Self-defeating humor.

Existing literature also suggests a number of hypotheses specific to each humor style. Both Affiliative and Self-enhancing humor styles are expected to have strong positive relationships with Tolerance for Ambiguity, while the more negative and potentially injurious style, Aggressive humor style, is expected to have a negative relationship with Tolerance for
Ambiguity. Previous research has found no direct relationship between self-disparagement and Tolerance for Ambiguity (Shavit, 1975), however Self-defeating humor has been found to correlate weakly with measures of general sense of humor (Martin et al., 2003). Therefore, in the current study Self-defeating humor style was expected to have only a weak positive relationship to Tolerance for Ambiguity as the result of this general sense of humor element. Affiliative humor, because it depends both on a general sense of humor and tolerant attitudes, was predicted to be the best predictor of Tolerance for Ambiguity.

The two potentially injurious forms of humor – Aggressive humor style and Self-defeating humor style – involve the attempt of a person to place one object as superior to the person, object, or group that is the subject of the humor. In Aggressive humor the object of derision is usually someone else, while in Self-defeating humor others are held up and the individual making the joke put down. This suggests a strong relationship between Social Dominance Orientation (a preference for or belief in unequal relationships) and these potentially injurious humor styles (Aggressive and Self-defeating). Furthermore, this highlights the importance of examining Social Dominance Orientation as a variable moderating the relationship between these two potentially injurious humor styles and Tolerance for Ambiguity. Both Aggressive and Self-defeating humor styles involve the use of humor (expected to be positively correlated with Tolerance for Ambiguity) and a belief in social dominance. Therefore, controlling for Social Dominance Orientation is expected to increase the relationship between both of these two potentially injurious humor styles and Tolerance for Ambiguity. Controlling for Social Dominance Orientation is also expected to reverse the direction of the relationship between Aggressive humor and Tolerance for Ambiguity.
Finally, as constructivist perspectives are believed to be more associated with second-order thinking and change than rationalist perspectives (Lyddon, 1990), and ambiguity is related to a person's ability to estimate the second-order likelihood of possible interpretations (Ellsberg, 1961), it is expected that those with a constructivist orientation will have higher levels of Tolerance for Ambiguity than those with rationalist orientations.

**Research Hypotheses**

Following the preceding literature and theoretical propositions, this study examined the following hypotheses through empirical investigation:

**Primary Research Hypotheses**

1) Higher SHQ-6 score (higher levels of sense of humor) will predict higher MSTAT-I scores (higher levels of Tolerance for Ambiguity).

2) A model which includes HSQ-Affiliative, HSQ-Enhancing, HSQ-Aggressive and HSQ-Defeating (accounts for individual differences in all four humor styles) as well as SHQ-6 (general sense of humor) will be a better predictor of MSTAT-I scores (Tolerance for Ambiguity) than SHQ-6 scores alone.

3) Scores on all four humor styles will be related to Tolerance for Ambiguity, namely:
   a. HSQ-Affiliative will have a strong positive correlation with MSTAT-I scores.
   b. HSQ-Enhancing will have a strong positive correlation with MSTAT-I scores.
   c. HSQ-Aggressive will have a weak negative correlation with MSTAT-I scores.
   d. HSQ-Defeating will have weak positive correlation with MSTAT-I scores.

4) HSQ-Affiliative will be the best single predictor of MSTAT-I scores.

**Additional Research Hypotheses**

5) There will be a moderate positive relationship between the potentially injurious humor styles and Social Dominance Orientation, specifically:
   a. A moderate positive relationship between HSQ-Aggressive and SDO.
b. A moderate positive relationship between HSQ-Defeating and SDO.

6) Social dominance orientation will moderate the relationship between potentially detrimental or injurious humor styles and Tolerance for Ambiguity, specifically:

   a. Controlling for SDO score will both increase the strength and change the direction of the relationship between HSQ Aggressive humor style score and MSTAT-I score.

   b. Controlling for SDO score will increase the strength of the relationship between HSQ Self-defeating humor style scores and MSTAT-I score.

7) Previous finding regarding the relationship between sense of humor and all four humor styles will be replicated, but using a broader unrestricted population.

   a. SHQ-6 score is expected to have a strong positive correlation with HSQ sub scale score for Affiliative humor style and Self-enhancing humor style.

   b. SHQ-6 score is expected to have a weak positive correlation with HSQ sub scale score for Aggressive humor style and Self-defeating humor style.

8) Therapists with orientations based primarily on constructivist assumptions will show higher levels of Tolerance for Ambiguity than those with orientations based on rationalist assumptions, specifically:

   a. Those who identify as constructivist will be higher in Tolerance for Ambiguity than those who identify as rational emotive or CBT.

   b. Those who identify as Gestalt, will be higher in Tolerance for Ambiguity than those who identify as rational emotive or CBT.
CHAPTER 3
METHODS

Participants

Recruitment

Participants included adults at least 18 years of age. Participants were recruited online through e-mails sent to a variety of listservs with the relevant Internet-link to the survey, so that individuals can easily access the informed consent page and subsequent survey questions. Internet surveys have become more and more accepted for all kinds of research (Dillman, 2000). According to a December 2007 report by the Pew Internet and American Life Project, 74% of adult women and 76% of adult men in the United States use the internet at least occasionally. This includes 92% of those aged 18-29, 85% of those 30-49, and 72% of those 50-64. Seventy-six percent of those who identify as white, 56% of those who identify as black, and 79% of those who identify as English-speaking Hispanic also use the internet, as well as 64% of those self-identified as rural and 77% of those self-identified as urban or suburban (Pew-Internet-&-American-Life-Project, 2007). Samuel Best and colleagues (2001) have also shown that the psychological mechanisms underlying a number of decisions do not differ between Internet users and the population. This means that when the focus is not on predicting distributions of descriptive data in the larger population, but rather on testing relational hypotheses using analyses like regression, the conclusions reached through internet survey are likely to be the same as those reached through other more costly sampling methods (Best et al., 2001).

This study attempted to reduce bias through use of a wide variety of listservs with high traffic (Kaye & Johnson, 1999). To that end, a number of internet based group listservs were also used to recruit participants. To identify which Listservs to send to, first all Google group lists with over 1000+ members, high traffic, and messages in English were selected. Next, those lists
whose primary purpose was indicated as "Adult-only erotic-content" were excluded. A search of the Google Groups Directory (Google, 2008) with these restrictions, yielded 103 non-region-specific listservs meeting these broad criteria. Of these, the 31 lists that allowed research solicitation were used for recruitment. Examples include "Listserv used to rationally express ideas on religion, philosophy, literature and fine arts", a "Political Forum Listserv", "Alcoholics Anonymous", and a "Face-painting Discussion Listserv". To increase participation by therapists, the e-mail was also sent to "CESNET-L", a listserv concerning counselor ed. & supervision, "GSTALT-L", an ICORS sponsored listserv for therapists with an interest in Gestalt and related approaches, and "AUCCD-L", a listserv for the Association for University and College Counseling Center Directors. To further increase participation, the solicitation email also encouraged recipients to forward the email survey on to others, therefore it is difficult to estimate a response rate. Participation was voluntary and all participants were required to provide informed consent via online form prior to participating in this study. All inventories were completed online and submitted to an online database. The instruments required approximately 25 minutes to complete. The study followed both APA ethical regulations and the guidelines of my affiliate university's institutional review board.

Intolerance of ambiguity has been found to correlate with the appreciation of incongruity-resolution jokes ($r=0.19, p < 0.05$) and with the rejection of nonsense jokes ($r = 0.19, p < 0.05$) (Ruch & Hehl, 1983), yielding an $R^2$ of .036, and a small (Cohen, Cohen, West, & Aiken, 2003) effect size ($f^2=.037$). A power analysis at the commonly accepted statistical power level of 0.8 (Cohen, 1988) was run prior to the study using an a-priori sample size calculator for multiple regression (Soper, 2008). To detect a similarly small effect size regarding the primary hypothesis with a certainty of $p < .05$, a sample of 230 was needed. For the hypotheses with four predictors
in the model, a sample size of 296 is required. Thus, the sample size of 691 was determined to be sufficient for current purposes. Descriptive statistics for the sample used in this study are reported in this following section.

**Descriptive Statistics**

The sample consisted of 691 adults (207 male, 484 female), with a mean age of 40.07 (SD = 13.93). The sample was primarily Caucasian, 80.8% (N=558), followed by Black/African-American, 3.8% (N=26), Hispanic/Latino/a, 3.2% (N=22), Asian-American/Pacific Islander, 3.0% (N=21), Multiracial, 2.9% (N=20), other, 2.9% (N=20), Arab/Arab-American, 2.2% (N=15), and American-Indian/Native-American, 1.3% (N=9). The overwhelming majority of participants reported they were living in the United States, 91% (N=629), followed by The United Kingdom, 2.2% (N=15) and other European countries, 2.2% (N=15), the middle-east, 1.6% (N=11), Canada, 1.3% (N=9), Other not-listed, 1.2% (N=8), Asia, .4% (N=3), and Africa, .1% (N=1).

Participants were also asked to report their annual income within pre-selected ranges to ensure the sample was representative of a variety of economic backgrounds. The largest percentage, 24.7% (N=171), reported an income between $50,000 and $74,999, followed by $35,000-$49,000, 16.1% (N=111), $15,000-$24,999, 11.6% (N=80), $5,000-$14,999, 11.4% (N=79), $75,000-$99,999, 9.1% (N=63), under $4,999, 8.4% (N=58), $100,000-$149,999, 5.4% (N=37), $150,000-$999,999, 2.6% (N=18), and more than $1,000,000, 0.7% (N=5).

Participants were asked to indicate the level of their highest degree, which consisted primarily of MA/MS, 29.2% (N=202), followed by PhD, 27.9% (N=193), BA/BS, 19.8% (N=137), High School or GED, 13.6% (N=94), Other, 4.9% (34), MSW, 1.9% (N=13), PsyD 1% (N=7), JD 0.9% (N=5), and MD 0.7% (N=5). The average participant reported having had their degree for 11.9 years (SD = 10.9).
Participants were asked if they identified as therapist or mental health professional of some kind, to which 37.4% (N=258) indicated "no" and 62.7% (N=433) answered "yes". The 433 participants who did identify as therapists were asked to indicate their primary theoretical orientation. The sample primarily consisted of Humanistic/Person-centered, 20.6% (N=89), followed by Cognitive Behaviorall 17.6% (N=76), Integrative, 14.8% (N=64), Other Not-listed 13.2% (N=57), Interpersonal, 7.6% (N=33%), Gestalt, 6.9% (N=30), Psychodynamic, 6.7% (N=29), Constructivist, 6.5% (N=28), Existential, 3.9% (N=17), and Rational Emotive, 2.3% (N=10).

**Procedures**

Individuals receiving the request for participation who clicked on the included link were redirected to an online survey containing an informed consent, a brief demographics sheet, and the selected battery of measures. Participants were then asked to read and electronically sign the informed consent form. The various measures were placed in three different orders (varied by groups according to the day of the month on which the individual was born, in groups of 1-10, 11-20, 21-31), with the Humor Style questionnaire at the beginning, middle, and end to account for any order effects. Individuals were also asked a set of basic demographic questions including gender, age, ethnic background, name of their highest degree, and the year they obtained their highest degree. Once participants completed the surveys and submitted their responses, they were invited to read a short debriefing, which describes the nature of the study and includes contact information of the researcher.

**Instruments**

**Revised Sense of Humor Questionnaire (SHQ-6; Svebak, 1996)**

There are relatively few measures published in the literature which measure humor related variables at all, including one which measures situational humor responses (Martin & Lefcourt,
one which measures the degree to which people use humor to cope with stress (Martin, 1996), and a State-Trait Cheerfulness Inventory, which does not precisely measure humor at all (Ruch, Köhler, & van Thriel, 1996). Indeed, "cheerfulness conceptually relates to positive affect, rather than to the cognitive core of a sense of humor" (Svebak et al., 2004, p. 69). Thorson and Powell (1993) made an attempt to develop a Multidimensional Sense of Humor Scale, however, full psychometric properties were not reported, including any measure of convergent or divergent validity with other scales, or even correlations among the subscales. This leaves three published measures that examine sense of humor as a dispositional trait – Sense of Humor Questionnaire (Svebak, 1974), the Revised Sense of Humor Questionnaire (Svebak, 1996), and the Humor Styles Questionnaire (Martin et al., 2003), which measures humor styles rather than sense of humor. Poor Cronbach alpha levels have generally been reported for one of the subscales on the original Sense of Humor Questionnaire, leading Svebak (1996) to revise it, removing one subscale, and leaving items from two others. On the original scale, the M-dimension is "related to the cognitive decoding of humorous messages in general" (Svebak, 1974, p. 3), and the L-dimension is related to individual like or dislike of "humorous roles and comic situations" (Svebak, 1974, p. 2). For the Revised Sense of Humor Questionnaire (SHQ-6), the findings supported the existence of a major factor, composed of three items from the original M-dimension and three items from the original L-dimension (Svebak, 1996). Items are scored on a 1 to 4 Likert-type scale, with higher scores indicating greater sense of humor. Sample items include "Do you easily recognize a hint like a twinkle or a slight change in emphasis as a mark of humorous intent", "Would it be easy for you to find something comical, witty, or humorous in most situations if you really tried", and "Humorists irritate me because they so blatantly revel in
getting others to laugh." The test has demonstrated a Cronbach alpha of up to .85, and a Cronbach alpha of .66 in the current study.

**Humor Styles Questionnaire (HSQ; Martin et al., 2003)**

The HSQ, developed by Martin and colleagues (2003) is the only published measure of humor styles. It addresses four dimensions relating to individual differences in uses of humor. These dimensions include Self-enhancing Humor, the relatively benign use of humor to enhance the self, and Affiliative Humor, measuring the use of humor to enhance one's relationships with others. Both of these scales overlap quite a bit with previous humor tests, and the last two scales measure other dimensions of humor, namely the use of humor to enhance the self at the expense of others (Aggressive), and use of humor to enhance relationships at the expense of self (Self-defeating). The instrument is self-administered, and contains 32 items, 8 items for each of the four scales. The measure takes approximately 5 minutes to complete, and respondents are asked to respond on a 7-point Likert scale (ranging from 1= totally disagree to 7 = totally agree). The four 8-item scales show internal consistency coefficients ranging from .77 to .81 and test-retest correlations of .80 to .85. The four scales show Cronbach alphas of .70 to .86 in the current study. The scales show a moderate (maximum r = .36 in both the validation study and the current study) correlation with each other, likely the result of a general use of humor trait, though still small enough to suggest the measurement of distinct facets of humor use (confirmed by the developers using confirmatory factor analysis). Sample items include: "I laugh and joke a lot with my closest friends" (*Affiliative*), "I usually can't think of witty things to say when I'm with other people" (*Affiliative*, reverse scored), "Even when I'm by myself, I'm often amused by the absurdities of life" (*Self-enhancing*), "If I am feeling sad or upset, I usually lose my sense of humor" (*Self-enhancing*, reverse scored), "If someone makes a mistake, I will often tease them about it" (*Aggressive*), "I do not like it when people use humor as a way of criticizing or putting
someone down" (*Aggressive*, reverse scored), "If I am having problems or feeling unhappy, I often cover it up by joking around, so that even my closest friends don't know how I really feel" (*Self-defeating*), and "I don't often say funny things to put myself down." (*Self-defeating*, reverse scored).

**Tolerance for Ambiguity (MSTAT-I; McLain, 1993)**

Several existing measures of ambiguity tolerance have received criticism for poor psychometric properties (MacDonald, 1970; Ray, 1988). Indeed, David McLain (1993) points out that “conceptual and methodological advances and possible changes in the way individuals interpret scale items have occurred in the decades since Budner (1962) developed the most widely used scale for measuring ambiguity tolerance” (pp. 183-184). Accordingly, Tolerance for Ambiguity was measured in this study with the Multiple Stimulus Types Ambiguity Tolerance (MSTAT-I). This scale measures participants’ reactions to perceived ambiguity. David McLain (1993) designed the MSTAT-I as a measure of individual’s reactions to ambiguous situations and stimuli. The MSTAT-I is a 22-item self-administered measure. Respondents are asked to rate how accurately each item describes them on a seven-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Sample items include “I’m drawn to situations which can be interpreted in more than one way”, "I pursue problem situations which are so complex some people call them ‘mind boggling'" (both scored positively), and “I try to avoid problems which don’t seem to have only one ‘best’ solution” (reverse scored). Higher scores reflect higher Tolerance for Ambiguity. MSTAT-I scores have yielded a Cronbach’s alpha of .86 for a sample of 148 undergraduate organizational behavior students at a medium sized mid-western university, and a Cronbach alpha of .90 in the current study. Content validity of the measure was established with positive correlations with three alternative ambiguity tolerance measures. Construct validity of the measure was established with the negative correlations of MSTAT
scores with dogmatism and receptivity to change, and with the positive correlations of MSTAT scores with sensation-seeking.

**Social Dominance Orientation (SDO-A; Pratto et al., 1994)**

Social dominance is measured using the Social Dominance Orientation Scale, Abbreviated Form (SDO-A; Pratto et al., 1994), tapping respondents' preferences for inequality among groups. The SDO-A has eight items, scored on a 7 point Likert-type scale ranging from 1 = very negative to 7 = very positive. The scale score is given as the sum of item ratings, with higher scores indicating greater levels of Social Dominance Orientation. Sample items include, "Inferior groups should stay in their place," (scored positively), "We would have fewer problems if we treated people more equally", and "Group equality should be our ideal" (both reverse scored). SDO-A scores have demonstrated positive correlation with cultural elitism, ethnic prejudice, and sexism. The SDO-A has yielded high reliability estimates, with an average Cronbach alpha of .86 across multiple samples (Pratto et al., 1994) and a Cronbach alpha of .89 in the current study.

**Social Desirability (M-C Short Form; Reynolds, 1982)**

The Marlow-Crowne Social Desirability Scale Short Form (Reynolds, 1982) was used to rule out bias as an artifact of responding in ways one may perceive as desirable or preferred by others. This true or false measure has items constructed such that the "socially desirable" response is unlikely to be true for the majority of respondents. Sample items include, "I'm always willing to admit it when I make a mistake", "I am always courteous, even to people who are disagreeable," and "There have been times when I was quite jealous of the good fortune of others," with the last sample being reverse scored. Higher scores on this scale reflect a tendency to offer a socially desirable response. The longer form of the measure has been shown to be unrelated to measures of psychopathology and correlated with underreporting symptoms (Crowne & Marlowe, 1960). The short form retains the 13 items that had the highest loading
from the original set of 33, and has been found to be highly correlated with the original scale. This scale has a Cronbach alpha of .76 reported for the validation study, and a Cronbach alpha of .71 in the current study.

**Data Treatment and Analytic Strategies**

Survey data was collected using Zoomerang.com. All analyses were performed using SPSS Release 16.0.1 in a Windows environment. Any respondents who answer incorrectly to directed questions (i.e. "Please choose always below" or "Please select never from the list below") were removed to eliminate random responses. Data was then subjected to tests of skewness and kurtosis, to ascertain whether data meets the assumptions of normalcy. To ascertain the associations related to the various hypotheses a number of analyses were employed, the nature and results of which are described in detail in the following chapter.
Preliminary Analyses

Drop-out Comparisons and Ensuring Data Accuracy

The various measures were placed in different orders varied by groups according to a variable believed unrelated to constructs of interest (the day of the month on which the individual was born) to allow for testing of drop-out and order of presentation effects. Prior to the main components of the study being examined, a One-Way ANOVA was run to determine if there were significant differences on our primary measures of interest: between those who dropped out before completing and those who completed the study. The One-Way ANOVA detected no significant differences on Affiliative Humor Style, Self-enhancing Humor Style, Self-defeating Humor Style, Aggressive Humor Style, Tolerance for Ambiguity, or Sense of Humor as measured by the SHQ6 when comparing those who did not complete the study and those who did complete the study, and F values were between .01 and 2.9, and none were significant. Due to the lack of significant differences on the measures above between those who completed and did not complete the entire study, only data from those who did complete the study was retained. One individual reported having been working as a therapist for 47 years longer than he had been alive. The value for years practicing for this participant was replaced by the average value for the 16 other respondents with the same age. An additional 62 response sets were removed for data sets that did not contain valid responses to both of the data validity questions (i.e. "Please select true for this answer" and "Please select 3 for this answer to help ensure accurate responses"), yielding 691 complete response sets.
Order of Survey Effects and Therapists versus Non-Therapists

These responses were examined for order effects as follows. A One-Way ANOVA was conducted to examine whether there were any significant overall differences between groups with the Humor Styles Questionnaire placed at the beginning (n = 215), middle (n=245), or end (n=231) of the study. The results of this One-Way ANOVA did not suggest any significant differences on Social Dominance Orientation, General Sense of Humor (SHQ6), Social Desirability, Aggressive Humor, Gender, Ethnicity, or Age based whether the Humor Styles Questionnaire was placed at the beginning, middle, or end of the study. There was a small significant overall difference between the groups on the measures of Tolerance for Ambiguity (F = 3.2, p = .041), Affiliative Humor (F = 3.7, p = .03), Self Defeating Humor (F = 3.68, p = .3), and Self Enhancing Humor (F = 4.76, p = .01). These differences were also explored with various follow up analyses, and it was determined that in the group with tests for humor styles and tolerance placed furthest apart there was a decrease in the relationship between these variables. The other two groups, in which the test for humor styles was placed close to the test for Tolerance for Ambiguity, showed an increase in the relationship among the two variables, regardless of the order or presentation. These results suggest important possibilities for further research on the state dependant nature of the tests and the effects of responding to questions about humor styles or Tolerance for Ambiguity alone as an intervention effecting levels of the other, and are explored in the discussion section. For purposes of this study, however, to avoid any question of results bias as a result of these group difference, test order was included before social desirability in step one of regressions for relevant hypotheses.

Independent samples t tests were also employed to determine if any significant difference existed on responses to the Humor Styles Questionnaire (HSQ), as a result of placing it before or after the Tolerance for Ambiguity measure (MSTAT-I). For the group of individuals who
completed the HSQ after the MSTAT-I, Affiliative Humor (M = 44.3, SD = 7.3) was not significantly different than for those individuals who completed the HSQ before the MSTAT-I (M = 43.8, SD =), \( t(689) = .83 \), \( p = .68 \) (two tailed). Similarly with the other three humor styles, Self-defeating Humor Style was not significantly different for individuals who completed the HSQ measure after the MSTAT-I (M = 27.2, SD = 8.2) than those who completed it before (M = 28.0, SD = 7.6), \( t(689) = -1.2 \), \( p = .42 \) (two tailed), Aggressive Humor Style was not significantly different for individuals who completed the HSQ measure after the MSTAT-I (M = 27.2, SD = 7.1) than those who completed it before (M = 26.2, SD = 6.9), \( t(689) = 1.7 \), \( p = .92 \) (two tailed), and Self-Self-enhancing Humor Style was not significantly different for individuals who completed the HSQ measure after the MSTAT-I (M = 39.3, SD = 7.7) than those who completed it before (M = 39.3, SD = 7.3), \( t(689) = .04 \), \( p = .4 \) (two tailed). As a result of these analyses, data from the various ordered groups were incorporated into a single set, which was included in the above sample description.

Because the sample contained such a large subset sharing a particular quality, namely identifying as therapists of some kind, the relationships between Tolerance for Ambiguity and other dependant variables used in this study's primary hypotheses were examined to determine whether or not there were significant differences in the relationships when comparing those who identified themselves as therapists and those who did not. Necessary adjustments were made given the correlations were between criterion variables correlated with a common predictor, and the following formula (Ferguson, 1959; Meyer, Marsiske, & Willis, 1993) was used:

\[
t = \frac{(r_{12} - r_{13})(N - 3)(1 + r_{23})^{1/2}}{\{2[1 - (r_{12})^2 - (r_{13})^2 - (r_{23})^2 + 2r_{12}r_{13}r_{23}]\}^{1/2}}
\]

\[
df = N - 3
\]
The correlations between Tolerance for Ambiguity and Affiliative Humor Style, Self-Defeating Humor Style, Self-Enhancing Humor Style, Aggressive Humor Style, and Sense of Humor were not found to be significantly different among the group identifying as therapists compared with the group not identifying as therapists. Thus, the sample was retained as a whole, and the remainder of analyses were run.

**Internal Consistency of Measures, Skewness, and Kurtosis**

All measures were assessed for internal consistency. Individual Chronbach alphas for each measure along with values for inter-correlations among measures are summarized in Table 4-1. Cronbach's alphas were determined to be adequate for the current study, and ranged between .70 and .90 for all scales except the SHQ-6, similar to previous studies using the same measures. Chronbach Alphas for SHQ-6 were .66, somewhat lower than those reported during its validation (Svebak, 1996) but still sufficient for purposes of this study. Nevertheless, follow up analyses were run on inter-item covariance to determine if internal consistency of the SHQ-6 could be improved by removing any of the items. With only six total scale items, it was found that removing any item decreased the overall reliability of the scale, therefore all items of the SHQ-6 scale were retained. Correlations between the SHQ-6 and HSQ scales for Affiliative, Self-enhancing, Aggressive, and Self-defeating humor styles were similar to those reported by Martin and colleagues (2003). None of the correlations among measures were greater than .80, a generally accepted standard that two variables are significantly collinear (Lewis-Beck, 1980). Data were further checked for multivariate normality through assessment of skewness and kurtosis. All non-nonminal variables’ values for skewness and kurtosis fell between -2 and 2. Thus analyses by multiple regression remained appropriate.
Analyses

Primary Hypothesis Tests

Hypothesis 1 predicted that higher SHQ-6 scores (higher levels of sense of humor) would predict higher MSTAT-I scores (higher levels of Tolerance for Ambiguity). To ascertain the association related to hypothesis 1, a regression analysis was employed with MSTAT-I score as the criterion variable. Test order was entered in step 1 and Social Desirability was entered in step 2, in order to control for their effects throughout the remainder of the steps. SHQ-6 scores were entered in step 3. The overall regression was significant, $F(3, 687) = 32.73, p < .001$, explaining a moderate amount of the variance ($R^2 = .125$, adj $R^2 = .121$) (Cohen, 1988). The $R^2$ and adjusted $R^2$ in this regression were almost identical, suggesting that the adjustment in these cases was very small due to the fairly large sample size. Tests of standardized partial regression coefficients revealed that higher levels of Sense of Humor (SHQ-6) were significantly associated with higher levels of Tolerance for Ambiguity ($\beta = .30; p < .001$). Lower scores on Social Desirability were also significantly related with higher scores on Tolerance for Ambiguity ($\beta = -.15; p < .001$). Test-order was not significantly related to Tolerance for Ambiguity in this regression ($\beta = .07; p = .06$). These results support the predictions of Hypothesis 1 (Table 4-2).

Hypothesis 2 suggested that a model that includes HSQ-Affiliative, HSQ-Enhancing, HSQ-Aggressive and HSQ-Defeating (i.e. accounts for individual differences in all four humor styles), as well as SHQ-6 (general sense of humor) would be a better predictor of MSTAT-I scores (Tolerance for Ambiguity) than SHQ-6 scores alone. For hypothesis 2, a stepwise multiple regression analysis was used with MSTAT-I score as the criterion variable. Test order was entered in step 1 and Social Desirability was entered in step 2 in order to control for their effects throughout the remainder of the steps. SHQ-6 was entered as a predictor variable in step three, and the four HSQ subscale scores for each humor style were added as predictor variables.
in step four. The results are summarized in Table 4-3. The difference in variance accounted for \((\Delta R^2 = .05)\) in the second model (step 4, \(R^2 = .18\)), which included the four humor styles, as compared to the first model (step 3, \(R^2 = .13\)) that only included sense of humor as measured by the SHQ-6, was significant \((F = 71.23, \ p < .001)\). This suggests that adding humor styles adds significant predictive power in explaining variance in Tolerance for Ambiguity after SHQ-6 scores have already been entered, thus supporting hypothesis 2.

Hypothesis 3 predicted that scores on all four humor styles would be related to Tolerance for Ambiguity, namely: HSQ-Affiliative would have a strong positive correlation with MSTAT-I scores, HSQ-Enhancing would have a strong positive correlation with MSTAT-I scores, HSQ-Aggressive would have a weak negative correlation with MSTAT-I scores (higher levels of Aggressive humor would be related to lower levels of Tolerance for Ambiguity), and HSQ-Defeating would have weak positive correlation with MSTAT-I scores. Four separate regressions were run to test this hypothesis, entering MSTAT-I scores as the criterion variable, test order and social desirability in steps 1 and 2 to control for their effects in later steps, and each humor style score as a predictor variable in step of four different models. The significance of Beta-weights were then examined to test the associations suggested in hypothesis 3. Tests of standardized coefficients revealed that HSQ-Affiliative had strong positive correlation with MSTAT-I scores \((\beta = .25, \ p < .001, \text{ two-tailed})\) and HSQ-Enhancing had a strong positive correlation with MSTAT-I scores \((\beta = .31, \ p < .001, \text{ two-tailed})\), supporting hypothesis 3. HSQ-Defeating was not found to have a significant relationship if MSTAT-I scores after controlling for test-order and social desirability \((\beta = -.04, \ p = .27, \text{ two-tailed})\). Neither did HSQ-Aggressive have a significant association with MSTAT-I in the present sample after controlling for test order and social desirability \((\beta = .00, \ p = .9)\). Thus, hypothesis 3 was partially supported (Table 4-4).
Hypothesis 4 predicted that HSQ-Affiliative would be the best single predictor of MSTAT-I scores. The correlation coefficient obtained for Affiliative humor style was compared to the correlation coefficients for Self-enhancing humor style, Aggressive humor style, Self-defeating humor style, and sense of humor using a $t$ test for the difference between correlation coefficients with correlated samples. Necessary adjustments were made given the correlations were between criterion variables correlated with a common predictor, and the following formula (Ferguson, 1959; Meyer, Marsiske, & Willis, 1993) was used:

$$t = \frac{(r_{12} - r_{13})(N - 3)(1 + r_{23})^{1/2}}{\sqrt{[2(1 - r_{12})^2 - (r_{13})^2 - (r_{23})^2 + 2r_{12}r_{13}r_{23}]^{1/2}}}$$

$$df = N - 3$$

The correlation between Tolerance for Ambiguity and Affiliative humor ($r = .25, p < .01$) was found to be significantly greater ($p < .01$) than the correlation between Tolerance for Ambiguity and Self-defeating humor ($r = -.07, p = .08$, two tailed) and significantly greater than the correlation between Tolerance for Ambiguity and Aggressive humor style ($r = -.05, p = .23$, two tailed). However, the correlation between Tolerance for Ambiguity and Self-enhancing humor style ($r = .33, p < .01$) was significantly greater than the correlation between Tolerance for Ambiguity and Tolerance for Ambiguity and Affiliative humor ($r = .25, p < .01$), as was the relationship between Tolerance for Ambiguity and general sense of humor as measured by the SHQ-6 ($r = .32, p < .01$). The correlations between Tolerance for Ambiguity with Self-enhancing humor and Tolerance for Ambiguity with SHQ-6 were not found to be significantly different. Thus, hypothesis four was not supported. It was determined in the present study that either Self-enhancing humor or general sense of humor was the single best predictor of Tolerance for Ambiguity.
Additional Hypothesis Tests

Hypothesis 5 predicted a moderate positive relationship between the potentially injurious humor styles and Social Dominance Orientation, specifically, that there would be a moderate positive relationship between HSQ-Aggressive score and SDO score, and that there would be a moderate positive relationship between HSQ-Defeating score and SDO score. To test this hypothesis two separate regression analyses were used, entering SDO scores as the criterion variable. Test order was entered in step 1 and social desirability in step 2 in order to control for their effects throughout the remainder of the steps. Then, either Aggressive humor style HSQ scores or Self-defeating humor style HSQ scores were entered as a predictor variable in step 3. After controlling for test order and social desirability, Self-defeating humor was found to have a moderate positive relationship ($\beta=.09$, $p < .05$, two-tailed) with Social Dominance Orientation, and Aggressive humor style was found to have a somewhat stronger positive relationship ($\beta=.23$, $p < .001$, two-tailed) with Social Dominance Orientation. Thus hypothesis 5 was supported (Table 4-5).

To test hypothesis 6, the variables were first standardized to reduce multicollinearity between the interaction term and the main effects when testing for moderator effects. Then, interaction terms were created for both Aggressive Humor Style x Social Dominance Orientation and Self-defeating Humor Style x Social Dominance Orientation. Next, two separate regressions were used to examine whether Social dominance orientation moderates the relationship between potentially detrimental or injurious humor styles and Tolerance for Ambiguity, specifically: a) whether controlling for SDO score would both increase the strength and change the direction of the relationship between HSQ Aggressive humor style score and MSTAT-I score, and b) whether controlling for SDO score would increase the strength of the relationship between HSQ Self-defeating humor style scores and MSTAT-I score. Social dominance orientation had a significant
moderator effect on the relationship between Aggressive Humor Style and Tolerance for Ambiguity, but not on the relationship between Self-defeating Humor Style and Tolerance for Ambiguity. Thus, hypothesis 6 was partially confirmed (see Table 4-6). As indicated by the total $R^2$, adding the Aggressive x Social Dominance interaction term increased the variance explained in MSTAT-I scores by 1%.

Hypothesis 7 predicted that previous findings regarding the relationship between sense of humor and all four humor styles would be replicated using this study's broader unrestricted population. Specifically, SHQ-6 score was expected to have a strong positive correlation with HSQ sub scale score for Affiliative humor style and Self-enhancing humor style, and SHQ-6 score was expected to have a weak positive correlation with HSQ sub scale score for Aggressive humor style and Self-defeating humor style. In the current study SHQ-6 score did indeed have a strong positive correlation with HSQ sub-scale score for Affiliative humor style ($r=.53$, $p < .01$) and Self-enhancing humor style ($r=.46$, $p < .01$). SHQ-6 score was also found to have a weak positive correlation with HSQ sub-scale score for Aggressive humor style ($r=.09$, $p < .05$) and Self-defeating humor style ($r=.11$, $p < .05$). These results are consistent with those found in previous studies using other samples, and confirm hypothesis 7 (Table 4-1).

Hypothesis 8 predicted that psychotherapists and other mental health professionals with orientations based primarily on constructivist assumptions, such as constructivist and Gestalt, will show higher levels of Tolerance for Ambiguity than those with orientations based on rationalist assumptions such as cognitive behavioral and rational emotive. An analysis of variance showed that the effect of theoretical orientation on Tolerance for Ambiguity was significant, $F(4, 428) = 4.87$, $p < .001$. Post hoc analysis using the Tukey post hoc criterion for significance indicated that the mean Tolerance for Ambiguity was significantly higher among
those identifying as Constructivist (M = 116.46, SD = 13.56) than among those identifying as Cognitive Behavioral (M = 104.74, SD = 17.24; p < .01), Rational Emotive (M = 96.10, SD = 12.15; p < .01), or Other/Integrative (which included psychodynamic, humanistic/person-centered, existential, and interpersonal; M = 106.84, SD = 15.74; p < .05). There was no significant difference in levels of Tolerance for Ambiguity between those identifying as Constructivist compared with those identifying as Gestalt (M = 112, SD = 14.51). Those with a Gestalt orientation were found to be significantly higher in Tolerance for Ambiguity that those with a Rational Emotive orientation (p < .05). No other significant differences were observed in Tolerance for Ambiguity based on theoretical orientation in the post-hoc analyses. These results are also presented graphically in Figure 4-1. Thus, hypothesis 8 was largely confirmed. Possible implications of these and other results are examined in more detail in the following section.
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<tr>
<th></th>
<th>Min.</th>
<th>Max.</th>
<th>M</th>
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<th>6</th>
<th>7</th>
<th>8</th>
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<td>.55**</td>
<td>.17**</td>
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<td>.22**</td>
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<td>7</td>
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<td>.53**</td>
<td>.11*</td>
<td>.46**</td>
<td>.09*</td>
<td>.10**</td>
<td>.66</td>
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<td>.26**</td>
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MSTAT-I = Tolerance for Ambiguity; Affiliative = Affiliative Humor Style; Self-defeating = Self-defeating Humor Style, Self-enhancing = Self-enhancing Humor Style; Aggressive = Aggressive Humor Style; SHQ6 = Sense of Humor.

Cronbach's alpha coefficients appear in italics along the diagonal.

Note: N= 691. * correlation is significant at the 0.05 level (2-tailed). ** correlation is significant at the 0.01 level (2-tailed).
Table 4-2. Summary of Multiple Regression Analysis for the Prediction of MSTAT-I Tolerance for Ambiguity Scores by Sense of Humor (SHQ-6).

<table>
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<th>β</th>
<th>SEb</th>
<th>t</th>
<th>Total R²</th>
<th>Adj. R²</th>
<th>ΔR²</th>
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<td>.79</td>
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<td>.00</td>
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<td>.03</td>
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<td>687</td>
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<td>.01</td>
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<td>.23</td>
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Note: Overall regression results, F(3, 686) = 32.88, p < .001, R² = .13. * p < .05, ** p < .01, *** p < .001.
Table 4-3. Comparison of Regression model predicting Tolerance for Ambiguity using SHQ-6 versus a model using both SHQ-6 and four different Humor Styles.

<table>
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<th>Total R²</th>
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Note: * p < .05, ** p < .01, *** p < .001.
Table 4-4. Regression models examining relationships between four humor styles and Tolerance for Ambiguity.

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<tr>
<th>Step and Variable(s)</th>
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<th>SEb</th>
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<td>.03</td>
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<td>.00</td>
<td>.09</td>
<td>.11</td>
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</tbody>
</table>

Note: * p < .05, ** p < .01, *** p < .001.
Table 4-5. Table of Regression Analysis of Relationships between the Potentially Injurious Humor Styles (Self-defeating and Aggressive) and Social Dominance Orientation.

<table>
<thead>
<tr>
<th>Step and Variable(s)</th>
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<th>β</th>
<th>SEb</th>
<th>t</th>
<th>Total R²</th>
<th>Adj. R²</th>
<th>ΔR²</th>
<th>ΔF</th>
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<td></td>
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<tr>
<td>(All Models Step 2)</td>
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<td>.02</td>
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<td>Social Desirability</td>
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<td>.01</td>
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<tr>
<td>Model 2 Step 3</td>
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<td>.05</td>
<td>36.15***</td>
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<td>Aggressive Humor Style</td>
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<td>-6.01***</td>
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</tbody>
</table>

Note: Overall regression results, Model 1 F(3, 686) = 2.37, p = .07, R² = .01; Model 2 F(3, 686) = 12.58, p < .001, R² = .05.
* p < .05, ** p < .01, *** p < .001.
Table 4-6. Regression Examining the Moderating Effect of Social Dominance Orientation on the Relationship between Tolerance for Ambiguity and (Model 1) Self-defeating and (Model 2) Aggressive Humor Styles.

<table>
<thead>
<tr>
<th>Step and Variable(s)</th>
<th>B</th>
<th>β</th>
<th>SEb</th>
<th>t</th>
<th>Total R²</th>
<th>Adj. R²</th>
<th>ΔR²</th>
<th>ΔF</th>
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<td>.01</td>
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<td>Self-defeating x Social Dominance</td>
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<tr>
<td>Model 2 Step 2</td>
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<td></td>
<td>.02</td>
<td>.01</td>
<td>.01</td>
<td>3.92*</td>
<td>687</td>
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<tr>
<td>Aggressive x Social Dominance</td>
<td>.02</td>
<td>.08</td>
<td>.01</td>
<td>2.00*</td>
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</tbody>
</table>

Note: Overall regression results, Model 1 F(3, 687) = 4.50, p < .05, R² = .02; Model 2 F(3, 687) = 3.70, p < .05, R² = .02. * p < .05, ** p < .01, *** p < .001.
Figure 4-1. Mean Tolerance for Ambiguity by Theoretical Orientation
CHAPTER 5
DISCUSSION

This section includes a discussion of the current study and its results divided into three parts. First, a summary discussion of the hypotheses and findings of the study is presented. Second, a more detailed explanation of this study's findings is given and the results of this study are placed within the context of existing literature on humor, humor styles, and Tolerance for Ambiguity. Finally, limitations and implications of the current study are explored, along with suggestions for further research.

Summary of Primary Results within the Context of Existing Literature

Hypothesis 1, which predicted that higher SHQ-6 score (higher levels of sense of humor) will predict higher MSTAT-I scores (higher levels of Tolerance for Ambiguity), was supported. Higher levels of Sense of Humor (SHQ-6) were significantly associated with higher levels of Tolerance for Ambiguity, even after controlling for social desirability. This begins to support the primary hypothesis of this study: that there is indeed a relationship between Tolerance for Ambiguity and sense of humor. A review of the existing literature indicates this relationship may exist because the nature of humor parallels the nature of ambiguity. Other studies have shown the importance of incongruity as a cross-cultural factor in an overwhelming majority of jokes (Castell & Goldstein, 1977). Koestler's concept of bisociation is one of the most prominent early formulations of an incongruity based theory of humor (Martin, 2007). Bisociation is when a single thing "is made to vibrate simultaneously on two different wavelengths" (Koestler, 1964, p. 35). Apter (1982) uses the term synergy in a similar way, describing the mental process of holding two different or even contradictory perspectives in mind at the same time (or in quickly alternative oscillation). This dual-vibration or oscillation can actually be quite enjoyable (Koestler, 1964), further suggesting how a great deal of humor might be understood through this
lens of transcending apparent ambiguity. There is a remarkable level of similarity between descriptions of ambiguity, something that may "be perceived as having multiple and incompatible interpretations" (McLain, 1993, p. 184), and descriptions of bisociation in humor, "in which a situation, person, event, or idea is simultaneously perceived from the perspective of two self-consistent but normally incompatible or disparate frames of reference" (Martin, 2007, p. 85). Morreall (1991) also suggests such a link between Tolerance for Ambiguity and humor, writing that humor, "fosters a family of traits and activities, collectively referred to as mental flexibility, that includes a tolerance for novelty, ambiguity, and change" (p. 359). Barden (2007) also concluded that Tolerance for Ambiguity and humor are inextricably linked conceptually.

Results of testing Hypothesis 1 in the present study support this theoretical position, and add to empirical evidence indicating that humor variables are in some way related to Tolerance for Ambiguity (Ruch, Busse et al., 1996; Ruch & Hehl, 1983). Nevertheless, it is important to remember for this and other hypotheses, that because this research is correlational in nature, it is uncertain which variable precedes the other, or if both are determined by some third factor.

Hypothesis 2, which predicted that a model which includes HSQ-Affiliative, HSQ-Enhancing, HSQ-Aggressive and HSQ-Defeating (i.e. accounts for individual differences in all four humor styles) as well as SHQ-6 (general sense of humor) would be a better predictor of MSTAT-I scores (Tolerance for Ambiguity) than SHQ-6 scores alone, was supported. It was found that adding humor styles added significant predictive power in explaining variance in Tolerance for Ambiguity even after SHQ-6 scores have already been entered. This supports the position, increasingly popular in the humor literature, that rather than being understood as a single dimensional trait, humor and a 'sense of humor may be better conceptualized as a collection of related traits. A number of previous studies have supported the multidimensional
nature of humor (Andrews, 1943; Cattell & Luborsky, 1947; Eysenck, 1942a, 1943; Wilson, 1979), similar to Wittgenstein's (1953/1967) notion of family resemblance.

Hypothesis 3, which suggested that scores on all four humor styles would be related to Tolerance for Ambiguity in particular ways was partially supported. It was found as predicted that Affiliative Humor Styles had a strong positive correlation with Tolerance for Ambiguity scores. It was also found, as predicted, that Self-enhancing humor style had a strong positive correlation with Tolerance for Ambiguity scores. Contrary to predictions that there would be a weak positive correlation Self-defeating Humor Styles was not found to have a significant relationship with Tolerance for Ambiguity scores after controlling for test-order and social desirability. Neither did Aggressive Humor Style have the predicted weak negative correlation with Tolerance for Ambiguity scores, instead no significant association between Aggressive Humor Styles and Tolerance for Ambiguity was found in the present sample after controlling for test order and social desirability. These results overall that healthy psychological function (in this case, being related to higher levels of Tolerance for Ambiguity) is associated with distinctive uses or styles of humor more so than others. If this is true, then what is important for predicting Tolerance for Ambiguity is not simply the generic presence of humor but rather the presence or preference for particular kinds of humor. Drawing on a range of theoretical and clinical literature devoted to considering beneficial (adaptive) versus detrimental (maladaptive) forms of humor (Allport, 1961; Freud, 1928/1950; Kubie, 1971; Maslow, 1954; O'Connell, 1960; Strean, 1994; Vaillant, 1977; Ziv, 1984), the results of the present study support the theoretical and empirical work of Martin and colleagues (2003), including the conceptualization that divides the four possible humor styles related to most of the everyday uses of humor into two basic categories: humor that is more-or-less benign and humor that is less accepting and potentially detrimental to
a person or group. The present study provides evidence that the presence of the forms of humor labeled healthy or benign (Affiliative and Self-enhancing) are related to Tolerance for Ambiguity. However, contrary to predictions, the presence or absence of the potentially detrimental forms of humor (Aggressive and Self-defeating) do not appear to be significantly associated in either direction with levels of Tolerance for Ambiguity.

Hypothesis 4, which predicted that Affiliative Humor Style would be the best single predictor of Tolerance for Ambiguity, was not supported. Instead, it was determined Self-enhancing humor was a better predictor of Tolerance for Ambiguity than Affiliative humor style. General sense of humor, as measured by the SHQ-6 was also a better predictor of Tolerance for Ambiguity than Affiliative humor style, and although slightly less than Self-enhancing humor, the correlation was not found to be significantly different in the current study. In the context of existing literature, these results may be explained by understanding that Self-enhancing humor involves the tendency to maintain a broadly humorous outlook on life in general. Compared to Affiliative humor, which is generally aimed at enhancing interpersonal cohesiveness (Martin et al., 2003) and involves positive actions like saying funny things, telling jokes, and engage in spontaneous wit to help amuse others (Lefcourt, 2001), Self-enhancing humor has a much stronger intrapersonal focus. Those high in this trait are frequently amused by the incongruities of life and are able to maintain this humor even when faced with difficulties (Martin et al., 1993). They are likely to endorse items like "Even when I'm by myself, I'm often amused by the absurdities of life" and, even if feeling sad or upset, do not usually completely lose their sense of humor (Martin et al., 2003). In this sense, it is closely allied to the concept of coping humor (Martin, 1996), perspective-taking humor (Lefcourt et al., 1995), and humor as an emotional regulator (Dixon, 1980; Martin et al., 1993 Dance, 1993). This form of humor is the closest to
Freud's notion of humor as the highest of the defense mechanisms because it allows a protection from unwanted emotions without denying the reality of the situation (Freud, 1928/1950). Given that this form of humor emphasizes the "regulation of negative emotion through humorous perspective-taking" (Martin et al., 2003, p. 54), the same ability to shift perspectives prominent in those with higher Tolerance for Ambiguity without the need to engage in the more extraverted demands of Affiliative humor, it makes sense that higher levels of Self-enhancing humor would be especially able to predict higher levels of Tolerance for Ambiguity. The SHQ-6, or Revised Sense of Humor Questionnaire (Svebak, 1996) used in this study to measure general sense of humor is a revision of The Sense of Humor Questionnaire (Svebak, 1974). Poor Cronbach alpha levels have generally be reported for one of the subscales on the original Sense of Humor Questionnaire, leading Svebak (1996) to revise it, removing one subscale, and leaving items from two others. On the original scale, the M-dimension is "related to the cognitive decoding of humorous messages in general" (Svebak, 1974, p. 3), and the L-dimension is related to individual like or dislike of "humorous roles and comic situations" (Svebak, 1974, p. 2). Both of these dimensions tap into appreciation of humor and sensitivity to humorous meta-messages, making it understandable that this measure might be an excellent predictor of Tolerance for Ambiguity.

Summary of Additional Results within the Context of Existing Literature

Hypothesis 5, which predicted a moderate positive relationship between the potentially injurious humor styles and Social Dominance Orientation, was supported. Specifically, it was found that, after controlling for test order and social desirability, there was a moderate positive relationship between Self-defeating humor style and Social Dominance Orientation, as well as a moderate positive relationship between Aggressive humor style and Social Dominance Orientation. These results can be understood by examining the literature devoted to considering
beneficial (adaptive) versus detrimental (maladaptive) forms of humor (Allport, 1961; Freud, 1928/1950; Kubie, 1971; Maslow, 1954; O'Connell, 1960; Strean, 1994; Vaillant, 1977; Ziv, 1984). Based on these themes, Martin and colleagues (2003) identified two forms of humor that are are potentially detrimental to a person or group: Aggressive humor style and the Self-defeating humor style. That both of these styles involve humor styles that degrade or attack one's self, group, or others (Martin, 1996, 2007) may explain the results of this study, which found a relationship between Aggressive and Self-defeating humor styles (both potentially detrimental or injurious to one person or group for the benefit of another person or group), and an individuals' view of the equal or unequal relationship among people and groups: Social Dominance Orientation. Social dominance orientation reflects the preference for hierarchical rather than egalitarian relations. While this often means the desire that one's own group dominate and be superior to other groups, it also includes the desire to ensure or believe that certain groups are superior to others, regardless of one's membership in either the in- or out-group (Pratto et al., 1994). Indeed, previous research has also suggested the possibility of a inverse relationship between Self-Esteem, as measured with the Rosenberg Self-Esteem Scale (Bochner, 1965) and social dominance, measured using the Social Dominance Orientation Scale (Pratto et al., 1994), as strong as -.29 (p < .01). Based on this theory it makes sense that the current study found a moderate positive relationship between Aggressive humor style and Social Dominance Orientation, as well as a moderate positive relationship between Self-defeating humor style and Social Dominance Orientation.

Hypothesis 6, which predicted that Social Dominance Orientation would moderate the relationship between potentially detrimental or injurious humor styles and Tolerance for Ambiguity, was only partially and very weakly supported. Social dominance orientation had a
significant moderator effect on the relationship between Aggressive Humor Style and Tolerance for ambiguity, but not on the relationship between Self-defeating Humor Style and Tolerance for Ambiguity. However, adding the Aggressive x Social Dominance interaction term only increased the variance explained in MSTAT-I scores by 1%. This suggests that it is not possible to parse out from the relationship between the potentially injurious humor styles and Tolerance for Ambiguity large elements of Social Dominance Orientation. This indicates that the relationship between Aggressive humor style and Tolerance for Ambiguity, as well as the relationship between Self-defeating humor style and Tolerance for Ambiguity, is minimally to not at all affected by changes in a person's preference for hierarchical rather than egalitarian relations.

Hypothesis 7, which predicted that previous findings (Martin et al., 2003) regarding the relationship between sense of humor and all four humor styles would be replicated using this study's broader unrestricted population was supported. Specifically, SHQ-6 score was found to have a strong positive correlation with HSQ sub scale score for Affiliative humor style and Self-enhancing humor style, and SHQ-6 score was found to have a weak positive correlation with HSQ sub scale score for Aggressive humor style and Self-defeating humor style. That these results are consistent with those found in previous studies using more restricted samples demonstrates that these relationships hold for a broad range of adults as well as college undergraduates and seniors (Martin et al., 2003). That these results were obtained using online recruitment and collection methods (Dillman, 2000) supports previous research indicating that the relationships among psychological variables do not differ between Internet users and the population (Best et al., 2001; Pew-Internet-&-American-Life-Project, 2007) and extends it to the inclusion of humor related variables.
Hypothesis 8, which predicted that constructivist and Gestalt therapists, with orientations based primarily on constructivist assumptions, would show higher levels of tolerance for ambiguity than those with orientations based on rationalist assumptions, such as rational emotive and cognitive behavioral, was supported. Specifically, the mean tolerance for ambiguity was significantly higher among those identifying as Constructivist than it was among those identifying as Cognitive Behavioral, Rational Emotive or Other/Integrative. There was no significant difference in levels of Tolerance for Ambiguity between those identifying as Constructivist compared with those identifying as Gestalt. Those with a Gestalt orientation were found to be significantly higher in Tolerance for Ambiguity that those with a Rational Emotive orientation, buttressing the identification of Gestalt Therapy as sharing constructivist assumptions. Lyddon (1990) had called for empirical scrutiny. Ellis (1992) underscored the importance of this while also protesting, "[Lyddon's] allegations about CBT practices are questionable, and he ignores the fact that RET is not merely realistic and empirical in disputing clients' irrational beliefs but is in several respects one of the most constructivist of the psychotherapies" (p. 449). The present results support the distinction between rationalist and constructivist orientations and Lyddon's (1990) hypotheses about the relationship between second-order variables and constructivist versus rational orientations. The results of data from those identifying as Rational Emotive in the present study suggest they are significantly lower in Tolerance for Ambiguity than both Constructivist and Gestalt therapists, which also appears to be counter evidence again Albert Ellis's claim that Rational Emotive therapy is highly constructivist.

**Possible Implications for Therapy and Conflict Resolution**

The ability to deal with ambiguity has previously been found to be an important component of an individual's ability to interact with others and succeed in a complex, ever-changing world
(Granello, 2001). However, while Tolerance for Ambiguity is an important predictive variable (Furnham & Ribchester, 1995), the fact that Tolerance for Ambiguity refers to a covert disposition, or broad pattern of thinking, makes it impossible to observe directly (Budner, 1962).

The present study presents evidence that humor may be a promising set of variables with a relationship to Tolerance for Ambiguity and more overt behavioral manifestations – making humor more amenable to both observation and direct intervention. It was previously believed that humor is related to Tolerance for Ambiguity, and was perhaps an indication of an individual's paradoxical recognition that something is both equal to and not equal to something else (Bateson, 1953). However, there had been very little previous research investigating the existence or nature of this relationship between Tolerance for Ambiguity and humor empirically. The present study suggests that beyond being related to ambiguity in organizations (Hatch & Erhlich, p. 524) humor is also related to Tolerance for Ambiguity in individuals.

This has important implications for both therapy and conflict resolution (Keller, 1984). Indeed, the same patterns of black-and-white thinking that constitute intolerance for ambiguity play a critical role in relationships at various levels – both interpersonal and international. This suggests the importance of variables such as humor and humor styles, which appear to be related to individual differences in tolerance/intolerance for ambiguity, for reducing conflict escalation through polarization (Budner, 1962; Frenkel-Brunswik, 1949a; Furnham & Ribchester, 1995; Mistler, 2002, 2003; Ramsbotham et al., 2005), as well as a number of important psychological variables such as self-actualization (Foxman, 1976), managerial effectiveness (Roskin & Margerison, 1983), and dealing well with change (Myers et al., 1997). That present results appear to support the distinction between rationalist and constructivist orientations (Mahoney, 1988, 1991; Mahoney & Gabriel, 1987) and hypotheses (Lyddon, 1990) about the relationship
between second-order variables and constructivist versus rational orientations, also has important implications for both the practice of therapy and the training of therapists. Results suggest that those identifying as rational emotive in the present study do not share the higher tolerance for ambiguity of other constructivist orientations. This has important implications for either the theoretical claim that Rational Emotive therapy is highly constructive, or the in-the-field practice of training Rational Emotive therapists consistently with the theory.

If humor is positively related to Tolerance for Ambiguity, as the results of this study suggest, it may also be negatively related other variables negatively related to Tolerance for Ambiguity, such as anxiety and mood disorders (Andersen & Schwartz, 1992; Myers et al., 1997), authoritarianism (Rokeach, 1960), avoidance (Curley et al., 1996), rigidity and close-mindedness (Dixon et al., 1986), perfectionism (Wittenberg & Norcross, 2001), avoidance (Curley et al., 1996), and being ethnically prejudiced, uncreative, anxious, extra punitive, and aggressive (Bochner, 1965).

A relationship between humor and individual differences in tolerance and intolerance for ambiguity suggests that 1) perhaps attention to humor and humor styles can be used in both therapy and conflict resolution to identify Tolerance for Ambiguity and thus related variables like readiness for change (see Budd & Rollnick, 1996; Prochaska et al., 1992; Prochaska & Norcross, 2001), and 2) if, building on the present findings, a causal relationship between humor and Tolerance for Ambiguity can be found, it may be possible to intentionally increase Tolerance for Ambiguity through the use of specific kinds of humor. Indeed, some forms of therapy already use techniques of humor such as reversal, timing, and exaggeration to help achieve their effect (Perls et al., 1994; Van De Riet et al., 1980). Humor, like some forms of therapy, is also closely related to sensitivity to second-order messages – meaning messages about messages (Lyddon,
The relationship between humor and ambiguity tolerance suggested by the current results, may indicated that humor could play a critical role in therapy (Farrelly & Brandsma, 1974). However, while the present study has gathered important data about the nature of the relationship between Tolerance for Ambiguity and humor variables, future experimental designs are needed investigate the causal nature of any of the relationships. Possibilities for this and other future research along with limitations of the present study are examined in the following section.

Limitations and Future Research

This study offers possible insight into one important factor that may be responsible for the lack of more convincing evidence supporting humor's efficacy in a number of previous studies, namely the failure of most measures to distinguish between various styles of humor. Rather than being understood as a single dimensional trait, humor and a 'sense of humor' may be better conceptualized as a collection of related traits. The results of the current study lend support to previous evidence supporting the multidimensional nature of humor (Andrews, 1943; Cattell & Luborsky, 1947; Eysenck, 1942a, 1943; Wilson, 1979). This conceptual organization is similar to Wittgenstein's (1953/1967) notion of family resemblance, in which all items share various features with one another, but no single feature can be found that all items share. Thus, further humor research may prove even more fruitful if focused not simply on measuring humor, but on the relationship between other variables and specific humor styles. If the relationship between humor and Tolerance for Ambiguity is partially explained by the bisociation model, which is predicated on a common element of meta-pattern awareness, research investigating the relationship between humor, Tolerance for Ambiguity, and other variables that are likely to require meta-pattern awareness (e.g. measures of analogical reasoning) may prove fruitful.
Other interesting results suggestive of further research are those indicating moderate positive relationships between both Aggressive and Self-defeating humor and social dominance orientation. Social dominance orientation reflects the preference for hierarchical rather than egalitarian relations. While this often means the desire that one's own group dominate and be superior to other groups, it also includes the desire to ensure or believe that certain groups are superior to others, regardless of one's membership in either the in- or out-group (Pratto et al., 1994). Previous research has suggested the possibility of an inverse relationship between Self-Esteem, as measured with the Rosenberg Self-Esteem Scale (Bochner, 1965), and social dominance, measured using the Social Dominance Orientation Scale (Pratto et al., 1994), as strong as -.29 (p < .01). The results of the present study, indicating moderate positive relationships between both Aggressive and Self-defeating humor and social dominance orientation, suggest that, with further experimental research, humor related variables may offer important points of intervention for reducing social dominance. It may be fruitful to investigate whether teaching Affiliative humor has an influence on the reduction of hierarchical relations. Similarly, it may be worthwhile to investigate whether teaching egalitarian relations can reduce the use of Aggressive and Self-defeating humor, especially, for example with younger school children.

It is interesting that the presented study suggests Self-enhancing humor is a better predictor of Tolerance for Ambiguity than Affiliative humor style. This suggests an initial direction for a line of research around clinical and conflict resolution implications of humor, as discussed above. This may begin by developing and measuring the efficacy of programs designed to increase Self-enhancing humor. It is also notable that general sense of humor, as measured by the SHQ-6 was also a better predictor of Tolerance for Ambiguity than Affiliative
humor style, and although slightly less than Self-enhancing humor, the correlation was not found to be significantly different in the current study. To this end, further investigation of precisely what is measured by the SHQ-6 and ways to increase these factors (e.g. things such as meta-message sensitivity) may be especially important. A larger sample replicating the current research design, in some facets, may also be helpful at understanding differences between the utility of SHQ-6 scores versus HSQ-Self-enhancing scores.

That therapists with Constructivist and Gestalt orientations show significantly higher levels of Tolerance for Ambiguity than other orientation supports the distinction between rationalist and constructivist orientations and Lyddon's (1990) hypotheses about the relationship between second-order change and constructivist based orientations. Further research investigating therapeutic outcome which is more sensitive to second-order and long-term change than many existing measures may be fruitful in examining this distinction further.

The finding that social dominance orientation had a very small moderator effect on the relationship between Aggressive Humor Style and Tolerance for Ambiguity, but not on the relationship between Self-defeating Humor Style and Tolerance for Ambiguity, further suggests the difficulty of separating out some element of social dominance orientation from constructs for the potentially injurious humor styles. The results are hopeful as they suggest the possibility of using changes in the presence of absence of all four humor styles as gateways into Tolerance for Ambiguity.

An additional area of interest suggested by these findings may also be related to methods of statistical analysis. The results of the current study indicate the importance of the meta-level and second-order sensitivity and lend support to theories that stress the importance of the human ability to detect, appreciate, and make decisions based on the higher level patterns understood.
from data subject to interpretive multiplicity. While regression models and others analyses based on linear and even curvilinear models tend towards disambiguation, they are often less accurate in the prediction of outcome variables from independent variables and less able to store information about second-order patterns than are artificial neural network models (Bansal, Kauffman, & Weitz, 1993; Comrie, 1997; Manel, Dias, & Ormerod, 1999; Okoroh, Ilozor, & Gombera, 2007; Sargent, 2001; White, 1988; Wray, Palmer, & Bejou, 1994). The present results suggest at least one potential reason for this may be a theoretical commonality between the way in which Tolerance for Ambiguity and humor require an appreciation of meta-level information by human brains not always expressible in the syntactic domains of either side of a particular interpretive multiplicity. The way in which artificial neural networks capture meta-level information (Kosko & Burgess, 1998; Rumelhart, McClelland, & University of California, 1986; Salchenberger, Cinar, & Lash, 1992; Tam & Kiang, 1992) is also not easily expressed in the domain of models based on the more limited, though less ambiguously interpretable, linear models such as regression (Cohen et al., 2003; Ferguson, 1959; Howell, 2007; Lewis-Beck, 1980). In other words, neural networks may represent a more constructivist-friendly approach to prediction than the more rationalist models based on regression. This may prove an interesting area for further examination, especially as related to psychological variables with suspected higher-order relationships.

Some very interesting questions for future research also arose from the multiple test-order design of the current study, in which some participants were presented with the measure for humor styles right after the measures for ambiguity tolerance (group 1), some right before the measure of ambiguity tolerance (group 3), and some at the end of the study with several other measures in between (group 2). Groups 1 and 3 were very similar in terms of distributions,
variability and relationships among the variables, suggesting that the order of the tests was not a factor. Although group 2 did not differ on overall characteristics, it was found to differ significantly on the relationships among variables (i.e. they were less significant) even after controlling for social desirability. Further research is needed to interpret the meaning of these preliminary results. However, experimental designs that focus on such questions may be able to uncover the degree to which the measures of ambiguity tolerance and humor styles used in the present study tap into trait versus state dependent aspects of the respective constructs. To what degree does simply asking questions that excite the person to think about either questions of ambiguity or humor actually change a person's receptivity to the other, if only for a select period of time? For example, we might imagine that asking someone about humor styles or telling them a joke makes them more tolerance of ambiguity, though this effect may only last a few seconds or minutes. Thus, studies that try to elicit and measure short-term effects of humor related variables on Tolerance for Ambiguity, as well as the opposite (does thinking about ambiguity make one more receptive to humor?), seem especially interesting ways to extend the present findings.

Finally, the use of online recruitment and data collection methods in the current study to examine relationships among various humor measures is consistent with previous non-internet findings (Martin et al., 2003). This also supports previous research conclusions that the relationships among psychological variables do not differ between Internet users and the population (Best et al., 2001; Pew-Internet-&-American-Life-Project, 2007) and extends such research to explicitly include data on humor related variables. This suggests the promise of Internet research methods (Dillman, 2000) for psychology and specifically humor researchers in the future.
The current study, following the bisociation model which posits interpretive multiplicity is related to humor, investigated the relationship between humor and Tolerance for Ambiguity. It was found that higher levels of sense of humor were significantly associated with higher levels of Tolerance for Ambiguity, even after controlling for social desirability, which lends support to the bisociation model of humor (Apter, 1982; Koestler, 1964, p. 35) and other existing theoretical literature that predicts this relationship may exist because the nature of humor parallels the nature of ambiguity. It was also found that adding humor styles added significant predictive power in explaining variance in Tolerance for Ambiguity even after general sense of humor scores have already been entered. This supports the position, increasingly popular in the humor literature, that rather than being understood as a single dimensional trait, humor and a 'sense of humor' may be better conceptualized as a collection of related traits.

Results suggest that Affiliative and Self-enhancing humor styles both had a strong positive correlation with Tolerance for Ambiguity scores. Neither of the "potentially injurious" humor styles – Self-defeating and Aggressive – were found to have significant association with Tolerance for Ambiguity after controlling for test order and social desirability. These results suggest that Tolerance for Ambiguity is positively associated with the use of "beneficent" styles of humor. Contrary to predictions, the presence or absence of the potentially detrimental forms of humor (Aggressive and Self-defeating) do not appear to be significantly associated in either direction with levels of Tolerance for Ambiguity. It was found, however, that after controlling for test order and social desirability, Self-defeating humor had a moderate positive relationship with social dominance orientation and Aggressive humor style was found to have a somewhat stronger positive relationship with social dominance orientation. Results also suggest that the relationship between Aggressive humor style and Tolerance for Ambiguity, as well as the
relationship between Self-defeating humor style and Tolerance for Ambiguity, is only very minimally affected by changes in a person's preference for hierarchical rather than egalitarian relations.

It was also shown that those identifying as Constructivist and Gestalt, both orientations based primarily on constructivist assumptions, in general have higher levels of Tolerance for Ambiguity than those with orientations based on rationalist assumptions, such as rational emotive and cognitive behavioral. This supports the distinction between rationalist and constructivist orientations and the relationship between second-order thought, Tolerance for Ambiguity, and constructivist orientations.

Finally, previous findings (Martin et al., 2003) regarding the relationship between sense of humor and all four humor styles would be replicated using this study's broader unrestricted online population, demonstrating that these relationships hold for a broad range of adults and supporting previous research indicating that the relationships among psychological variables do not differ between Internet users and the general population (Best et al., 2001; Pew-Internet-&-American-Life-Project, 2007) to the inclusion of humor related variables.

More than one-hundred years ago, Sigmund Freud observed that humor, jokes, and their psychological implications have "not received nearly as much philosophical consideration as they deserve in view of the part they play in our mental life" (1905/1989, p. 6), a fact he sought to remedy through his book on jokes and their relationship to the unconscious. Freud's words are still true today, though recently a growing number of researchers have focused on investigating humor, forming national and international organizations, and publishing journals dedicated to the serious investigation of humor related variables. It is hoped that the present study contributes to the field by extending the literature on the relationship between Tolerance for Ambiguity and
humor related variables, as well as suggesting interesting and important directions for future research and clinical application.
### APPENDIX A

#### HUMOR STYLES QUESTIONNAIRE

<table>
<thead>
<tr>
<th></th>
<th>1</th>
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<th>5</th>
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<tbody>
<tr>
<td></td>
<td>Totally Disagree</td>
<td>Strongly Disagree</td>
<td>Moderately Disagree</td>
<td>Neither agree nor disagree</td>
<td>Moderately agree</td>
<td>Strongly agree</td>
<td>Totally agree</td>
</tr>
</tbody>
</table>

1. I usually don't laugh or joke around much with other people.* (Affiliative)
2. If I am feeling depressed, I can usually cheer myself up with humor. (Self-enhancing)
3. If someone makes a mistake, I will often tease them about it. (Aggressive)
4. I let people laugh at me or make fun at my expense more than I should. (Self-defeating)
5. I don't have to work very hard at making other people laugh – I seem to be a naturally humorous person. (Affiliative)
6. Even when I'm by myself, I'm often amused by the absurdities of life. (Self-enhancing)
7. People are never offended or hurt by my sense of humor.* (Aggressive)
8. I will often get carried away in putting myself down if it makes my family or friends laugh. (Self-defeating)
9. I rarely make other people laugh by telling funny stories about myself.* (Affiliative)
10. If I am feeling upset or unhappy I usually try to think of something funny about the situation to make myself feel better. (Self-enhancing)
11. When telling jokes or saying funny things, I am usually not very concerned about how other people are taking it. (Aggressive)
12. I often try to make people like or accept me more by saying something funny about my own weaknesses, blunders, or faults. (Self-defeating)
13. I laugh and joke a lot with my closest friends. (Affiliative)
14. My humorous outlook on life keeps me from getting overly upset or depressed about things. (Self-enhancing)
15. I do not like it when people use humor as a way of criticizing or putting someone down.* (Aggressive)
16. I don't often say funny things to put myself down.* (Self-defeating)
17. I usually don't like to tell jokes or amuse people.* (Affiliative)
18. If I'm by myself and I'm feeling unhappy, I make an effort to think of something funny to cheer myself up. (Self-enhancing)
19. Sometimes I think of something that is so funny that I can't stop myself from saying it, even if it is not appropriate for the situation. (Aggressive)
20. I often go overboard in putting myself down when I am making jokes or trying to be funny. (Self-defeating)
21. I enjoy making people laugh. (Affiliative)
22. If I am feeling sad or upset, I usually lose my sense of humor.* (Self-enhancing)
23. I never participate in laughing at others even if all my friends are doing it.* (Aggressive)
24. When I am with friends or family, I often seem to be the one that other people make fun of or joke about. (Self-defeating)
25. I don't often joke around with my friends.* (Affiliative)
26. It is my experience that thinking about some amusing aspect of a situation is often a very effective way of coping with problems. (Self-enhancing)
27. If I don't like someone, I often use humor or teasing to put them down. (Aggressive)
28. If I am having problems or feeling unhappy, I often cover it up by joking around, so that even my closest friends don't know how I really feel. (*Self-defeating*)
29. I usually can't think of witty things to say when I'm with other people.* (*Affiliative*)
30. I don’t need to be with other people to feel amused – I can usually find things to laugh about even when I'm by myself. (*Self-enhancing*)
31. Even if something is really funny to me, I will not laugh or joke about it if someone will be offended.* (*Aggressive*)
32. Letting others laugh at me is my way of keeping my friends and family in good spirits. (*Self-defeating*)

* Items marked with an asterisk are reverse keyed.
APPENDIX B
MULTIPLE STIMULUS TYPES AMBIGUITY TOLERANCE

Strongly   Neither disagree   Strongly
Disagree   nor agree           agree

1. I don’t tolerate ambiguous situations well.*
2. I find it difficult to respond when faced with an unexpected event.*
3. I don’t think new situations are any more threatening than familiar situations.
4. I’m drawn to situations, which can be interpreted in more than one way.
5. I would rather avoid solving a problem that must be viewed from several different perspectives.*
6. I try to avoid situations which are ambiguous.*
7. I am good at managing unpredictable situations.
8. I prefer familiar situations to new ones.*
9. Problems which cannot be considered from just one point of view are a little threatening.*
10. I avoid situations which are too complicated for me to easily understand.*
11. I am tolerant of ambiguous situations.
12. I enjoy tackling problems which are complex enough to be ambiguous.
13. I try to avoid problems which don’t seem to have only one “best” solution.*
15. I generally prefer novelty over familiarity.
16. I dislike ambiguous situations.*
17. Some problems are so complex just trying to understand them is fun.
18. I have little trouble coping with unexpected events.
19. I pursue problem situations which are so complex some people call them “mind boggling”.
20. I find it hard to make a choice when the outcome is uncertain.*
21. I enjoy an occasional surprise.
22. I prefer a situation in which there is some ambiguity.

* Items marked with an asterisk are reverse keyed.
APPENDIX C
THE SOCIAL DOMINANCE ORIENTATION SCALE

ABBREVIATED VERSION

Which of the following objects or statements do you have a positive or negative feeling towards? Beside each object or statement, mark a number from ‘1’ to ‘7’ which represents the degree of your positive or negative feeling.

1 = Very negative
2 = Negative
3 = Slightly negative
4 = Neither positive nor negative
5 = Slightly positive
6 = Positive
7 = Very positive

(1) Some groups of people are simply inferior to other groups.
(2) It’s OK if some groups have more of a chance in life than others.
(3) To get ahead in life, it is sometimes necessary to step on other groups.
(4) Inferior groups should stay in their place.
(5) Group equality should be our ideal.*
(6) We should do what we can to equalize conditions for different groups.*
(7) Increased social equality.*
(8) We would have fewer problems if we treated people more equally.*

* Items marked with an asterisk are reverse keyed.
APPENDIX D
REVISED SENSE OF HUMOR QUESTIONNAIRE

1. Do you easily recognize a hint like a twinkle or a slight change in emphasis as a mark of humorous intent? *
   
   1 2 3 4
   Very Easily
   Very Sluggishly

2. Would it be easy for you to find something comical, witty, or humorous in most situations if you really tried?*
   
   1 2 3 4
   Very Easy
   Very Difficult

3. Would you say that you have much cause for amusement during an ordinary day?*
   
   1 2 3 4
   Very Much
   Very Little

4. Persons who are always out to be funny are really irresponsible types not to be relied upon.
   
   1 2 3 4
   Strongly Agree
   Strongly Disagree

5. Humorists irritate me because they so blatantly revel in getting others to laugh.
   
   1 2 3 4
   Strongly Agree
   Strongly Disagree

6. It is my impression that those who try to be funny really do it to hide their lack of self-confidence.
   
   1 2 3 4
   Yes Indeed
   Not at All

* Items marked with an asterisk are reverse keyed.
APPENDIX E
MARLOWE-CROWNE SOCIAL DESIRABILITY SCALE
SHORT FORM

Please indicate either “true” or “false” to describe your degree of agreement with each item.

(1) It is sometimes hard for me to go on with my work if I am not encouraged.*
(2) I sometimes feel resentful when I don’t get my way.*
(3) On a few occasions, I have given up doing something because I thought too little of my ability.*
(4) There have been times when I felt like rebelling against people in authority even though I knew they were right.*
(5) No matter who I’m talking to, I’m always a good listener.
(6) There have been occasions when I took advantage of someone.*
(7) I’m always willing to admit it when I make a mistake.
(8) I sometimes try to get even rather than forgive and forget.*
(9) I am always courteous, even to people who are disagreeable.
(10) I have never been irked when people expressed ideas very different from my own.
(11) There have been times when I was quite jealous of the good fortune of others.*
(12) I am sometimes irritated by people who ask favors of me.*
(13) I have never deliberately said something that hurt someone’s feelings.

* Items marked with an asterisk are reverse keyed.
APPENDIX F
DEMOGRAPHIC INFORMATION

Please tell us a little about yourself. This information will be used only to describe the sample as a group.

1. Gender: Male Female

2. Age: ___ (continuous whole numbers)


4. Country you live in: US, Canada, United Kingdom, Other Europe, Other Middle-East, Other Asia, Other Africa, Other Not-listed.

5. Name of your highest degree: None, High School or GED, BA/BS, MA/MS, MSW, PsyD, PhD, MD, JD, Other

6. The year you obtained your highest degree:

7. _____ Under $4,999
   _____ Between $5,000 and $14,999
   _____ Between $15,000 and $24,999
   _____ Between $25,000 and $34,999
   _____ Between $35,000 and $49,999
   _____ Between $50,000 and $74,999
   _____ Between $75,000 and $99,999
   _____ Between $100,000 and $149,999
   _____ Between $150,000 and $999,999
   _____ More than $1,000,000

8. If you are a counselor, therapist, student, or professional in a mental health related field, please indicate your dominant orientation (or select, N/A):

   1 N/A – Not a therapist
   2 Psychodynamic
   3 Humanistic/Person-centered
   4 Cognitive Behavioral
   5 Rational Emotive
   6 Constructivist
   7 Interpersonal
   8 Existential
   9 Gestalt
   10 Integrative
   11 Other Not-Listed
LIST OF REFERENCES


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BIOGRAPHICAL SKETCH

Brian Mistler was born in St. Louis, Missouri, and later moved with his family to Florida. Brian received his B.S. in philosophy and computer science and a B.A. in humanities from Stetson University, with honors. In 2002, as a Rotary Ambassadorial Scholar, he completed a master's in international conflict resolution at the University of Bradford Department of Peace Studies in West Yorkshire, U.K.

Brian joined the Department of Psychology at the University of Florida as a Counseling Psychology graduate student in 2003, and trained at the Gestalt Center of Gainesville from 2003-2008. In July 2008, he began his pre-doctoral internship at Virginia Commonwealth University Counseling Center, in Richmond, Virginia. In August of 2009 Brian joined the staff of the Counseling and Wellness Center at Hobart and William Smith, a private liberal arts college in Geneva, New York.