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Multidimensional tolerance of ambiguity: Construct validity, academic success, and workplace outcomes

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**Multidimensional tolerance of ambiguity:
Construct validity, academic success, and workplace outcomes**

by

Michael C. Tynan

A dissertation submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of
DOCTOR OF PHILOSOPHY

Major: Psychology

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The student author, whose presentation of the scholarship herein was approved by the program of study committee, is solely responsible for the content of this dissertation. The Graduate College will ensure this dissertation is globally accessible and will not permit alterations after a degree is conferred.

Iowa State University

Ames, Iowa

2020

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ABSTRACT

Ambiguity exists in a number of everyday situations, particularly when encountering complex social or epistemic situations in the context of education or work. Tolerance of ambiguity is expected to predict emotional reactions to complex problems, including avoidance behaviors that are associated with difficulty in achieving a professional or academic goal. While the study of tolerance of ambiguity has been extensive, widely used global measures of tolerance of ambiguity appear to produce scores inconsistent with their proposed structures. The recent development of the Multidimensional Attitudes Toward Ambiguity scale (MAAS) presents an alternative to global, one-factor measures of the construct, and it appears to reflect the need for tolerance of ambiguity measures to encompass more than one broad pattern of emotional reactivity. Despite the apparent strengths of the MAAS, the place of tolerance of ambiguity within the network of related constructs and the utility of the MAAS in predicting outcomes related to common sources of ambiguity are unclear. The goals of the present studies are 1) to clarify the place of tolerance of ambiguity within the nomological network, 2) to replicate the proposed structure of the MAAS, 3) to explore relations between tolerance of ambiguity and academic success outcomes, and 4) to explore tolerance of ambiguity's possible relations with workplace outcomes.

Study 1 estimated the relation between tolerance of ambiguity and the Big Five personality traits using meta-analysis. Tolerance of ambiguity and openness to experience were found to be strongly related but not identical. Study 2 examined the structure of scores on the MAAS, compared tolerance of ambiguity scores to those of related constructs, and explored the relations between such "closed mindedness" variables and academic success. Scores on the MAAS fit a bifactor structure better than alternative models, but this structure did not reach clear

good fit. Tolerance of ambiguity was found to be significantly correlated with dogmatism, need for closure, and facets of openness to experience. However, tolerance of ambiguity explained additional variance in both college grades and intentions to drop out of college after accounting for these variables. Study 3 utilized a sample of employed adults to explore the ability of the MAAS to predict positive and negative workplace outcomes. Tolerance of ambiguity was expected to be positively related to job performance, job satisfaction, and organizational citizenship behaviors. Tolerance of ambiguity was also expected to be negatively related to job stress, job withdrawal, and counterproductive workplace behaviors. All hypothesized relations were expected to be stronger when greater perceived job ambiguity was reported. Tolerance of ambiguity was found to be related to higher job satisfaction. When perceived job ambiguity was high, tolerance of ambiguity was also found to be related to lower job performance, more counterproductive workplace behaviors, and less job withdrawal. The results of the present research suggest that the MAAS currently has predictive utility despite its psychometric shortcomings. Revision of the MAAS is recommended to further explore the ability of tolerance of ambiguity to explain fit between individuals and organizations.

Keywords: tolerance of ambiguity, academic success, job performance, construct validity

CHAPTER 1. OVERVIEW

Tolerance of ambiguity is an individual difference variable, reflecting patterns of emotional reactions to information or experiences that are complex, confusing, or unfamiliar (Furnham & Marks, 2013). Originally introduced to explore possible mechanisms of prejudice, tolerance of ambiguity reflects the manner in which individuals respond to situations or stimuli that are characterized by conflicting or unclear information. Individuals with a low level of tolerance of ambiguity are thought to be more likely to force a categorical “black-and-white” cognitive framework on the ambiguous stimulus, react with anger or anxiety, or avoid the stimulus altogether (Bhushan & Amal, 1986; Grenier, Barrette, & Ladoceur, 2005). In the broadest sense, tolerance of ambiguity is relevant for any situation in which there is “too little, too much, or seemingly contradictory information” (Norton, 1975; p. 607). As such, low levels of tolerance of ambiguity are likely to be a hindrance to the formation of social relationships, performance in ambiguous or complex settings, and acquiring new and complex ideas and skills. Being introduced to a new person, new information, or a frequently shifting environment necessarily involves a period of uncertainty. Those who experience discomfort in the face of this uncertainty are thought to withdraw from challenging situations or avoid situations perceived as similarly ambiguous in the future. If withdrawal or avoidance behaviors are not taken, this discomfort is also expected to hinder learning or social connection, as new information may be distorted through dichotomization or stereotyping to resolve ambiguity in the short-term (DeRoma, Martin, & Kessler, 2003; Furnham, 1994).

This relation between tolerance of ambiguity, negative emotions, and avoidant behavior ought to be of interest to researchers interested in both academic success and job performance

because these environments are often characterized by ambiguity. Some situations in the typical college student's experience may be especially ambiguous, for example, experiences during the first year of study. Beginning college involves a considerable number of unknown and unfamiliar situations — new location, new instructors, conflict management with roommates, a larger and more diverse social circle, cultural differences, independent scheduling of work and classes, etc. — and intolerance of ambiguity may be related to emotional and social difficulties experienced in such situations and to college adjustment in general. Adjustment difficulties, in turn, have demonstrated relations with academic performance (see Credé & Niehorster, 2012). Tolerance of ambiguity is expected to be associated with higher grades in college for at least one other reason. Students who do not see uncertain or complicated information as a threat are more likely to sustain their efforts in class to learn more complicated material or to approach a conceptual problem from multiple angles (von Stumm & Ackerman, 2013). In advanced college courses, students are expected to not only learn basic factual material, but apply it to new situations, provide new examples, and argue for or against interpretations of the facts. Many instructors organize courses explicitly as such, as a progression through Bloom's taxonomy of educational objectives (see Anderson & Krathwohl, 2001).

For example, in an advanced history class, students may be asked to write an essay drawing comparisons between revolutionary movements of the 20th century and revolutionary movements of the 21st century. In more advanced classes, it is likely that fewer guidelines would be given than in introductory courses to narrow down an answer to the prompt, leaving a number of key questions ambiguous: What specific revolutions are worth comparing? Do revolutionary movements being compared need to be in close proximity to one another, either temporally or geographically? Should the focus be on the predicates, processes, or outcomes of the

revolutions? Does a political theory developed from a certain movement apply to a more recent movement? An instructor may leave these and other questions deliberately vague in order to challenge students and give them the space to show their creativity, intelligence, and skills as historians. Students who are uncomfortable with the lack of direction in the essay prompt may be likely to spend less effort planning their response to the prompt, less time writing, and less effort editing, all of which would likely lead to a lower grade. The reduction in effort and time spent on the assignment in this case may be partially an avoidant emotional response to the threat of an unclear or complex question, increasing the likelihood of failure. This hypothetical prompt and many similar academic experiences are ambiguous by nature, due to there being more than one answer to a question, more than one way to arrive at a defensible answer, the question or answer being unclear, the course material being more complex than basic knowledge gathering, and success requiring more than rote memorization.

Similarly, in many work settings, individual employees are required to accomplish job tasks that involve ambiguous instructions or work processes. As work in the United States moves away from manufacturing and industrial sectors, toward the service, technology, and knowledge sectors, a number of elements of work have become more ambiguous. For example, there are increasing opportunities and necessities to work partially or fully remotely. The percentage of Americans working fully or partially from home has doubled from 2005 to 2015 (Greenbaum, 2019), and a number of factors make rates of remote work much greater: being self-employed, higher education level, age, and working full-time (Bureau of Labor Statistics, 2019). The spread of COVID-19 this year forced quick transition to remote work, and certain positions are expected to remain remote after institutional safety protocols are lifted. With the option to work at home, a number of elements of work become unclear due to lack of direct supervision or immediate

feedback from coworkers, including how to prioritize tasks, how and when it is appropriate to seek help directly from a colleague or supervisor, and how supervisors will evaluate a completed task.

Some jobs may involve more ambiguous experiences in addition to these elements of work. For example, jobs may be especially ambiguous if they require interaction with a large number of clients or customers for a short period of time, such as in a sales position where employees must find solutions to varied customer requests, some being contradictory, hostile, or unreasonable (Johlke & Iyer, 2013). Alternatively, there may be infrequent, but highly professionally impactful instances of ambiguous situations such as travelling to another country for work or meeting with representatives of another company to collaborate or merge. Other jobs which require high levels of expertise or a specialized set of skills may depend on a broad set of experience from which to draw the solution to a novel problem.

Tolerance of ambiguity appears to be relevant to the particularly complex or unclear elements of everyday life, as described in education or work settings, but a number of psychologically important elements of the construct remain unknown. As an individual difference variable, is tolerance of ambiguity sufficiently different from well-established traits like the Big Five? Does tolerance of ambiguity measure a construct distinct from these personality traits and other conceptually related individual difference variables? Does tolerance of ambiguity explain variance in performance outcomes that are theoretically related to ambiguous situations? Finally, does tolerance of ambiguity influence the relation between objective job ambiguity and important affective and attitudinal outcomes such as work stress and job satisfaction?

This dissertation consists of three studies designed to address these questions. Study 1 addresses the first question of tolerance of ambiguity's distinction from Big Five personality traits by conducting a meta-analysis of relations between tolerance of ambiguity measures and the Big Five. This analysis will clarify whether tolerance of ambiguity exists as a separate construct from well-established personality traits. Study 2 uses a student sample to explore the latent structure of a multidimensional tolerance of ambiguity measure (Lauriola, Foschi, Mosca, & Weller, 2016) and its relation to other conceptually similar variables: openness to experience facets, dogmatism, and need for cognitive closure. By comparing tolerance of ambiguity to these conceptually similar variables, the construct may be further explored as separate or overlapping with individual difference variables more specific than the Big Five. This student sample will also be used to explore the unique relations between tolerance of ambiguity, GPA, and intentions to continue college. Tolerance of ambiguity will be compared to conceptually similar variables with the expectation of explaining incremental variance in academic success. Study 3 will utilize a sample of employed adults to explore the relations between tolerance of ambiguity, uncertainty tolerance, work stress, job satisfaction, and job performance, with the intention of examining if tolerance of ambiguity interacts with job ambiguity to predict work stress, job satisfaction, and job performance. This study will explain tolerance of ambiguity's role as a potentially important component of jobs involving complexity, uncertainty, high autonomy, or unavoidable large-scale social components. Tolerance of ambiguity is expected to aid the process of completing tasks that are difficult in these ways by protecting individuals against counterproductive emotional distress or avoidance behaviors. As a whole, this dissertation aims to explore tolerance of ambiguity as a potentially impactful individual difference variable for academic and professional adaptability and well-being.

CHAPTER 2. LITERATURE REVIEW

Ambiguity exists in a situation in which there is more than one possible outcome, each possible outcome includes some element of uncertainty, and information thought to be relevant to judging the probability of the possible outcomes is missing (Camerer & Weber, 1992; Snow, 2010). Camerer & Weber (1992) delineate this definition further by outlining ambiguity's neighboring categories: "certainty" describes a judgment that an outcome will definitely occur; "risk" is a judgment in which any of a number of outcomes could occur, but their respective probabilities are known; "ambiguity" is a judgment made when either the outcomes or their probabilities are not known. For example, predicting the physical dimensions of the top card of a standard deck of cards (i.e. 2.5 inches wide, 3.5 inches long) is a judgment of certainty; predicting the suit of the top card is a judgment of risk (i.e. each suit is 25% probable); but predicting the top card of a rigged deck is a judgment of ambiguity. Further complexity can, of course, be added when considering that the desirability of different outcomes may also be unclear. For example, a salesperson may want to both attract new customers and retain old customers but be uncertain about the needs of the customers, which goal is more profitable, the best strategy to pursue for either goal, and how their manager will evaluate the success or failure of either goal.

Tolerance of Ambiguity

Tolerance of ambiguity was originally developed as an individual difference variable, capturing patterns in emotional reactions to complex cognitive information or social uncertainty (Frenkel-Brunswick, 1949; Furnham & Marks, 2013). Individuals who are highly intolerant of ambiguity are thought to create strict socio-cognitive categories, and subsequently cling to

stereotypes and “distorting clichés” that are more cognitively or emotionally manageable than uncertain or contradictory information inferred from the environment (Frenkel-Brunswick, 1949). Behavioral indicators of ambiguity intolerance include preference for stereotype-confirming information, inability to allow for the presence of contradictory characteristics in the same person, early adherence to an answer to a perceived problem, and preference for familiar information or stimuli (Frenkel-Brunswick, 1951; Furnham & Marks, 2013). Intolerance for ambiguity therefore is a summative description of a two-step process: first perceiving ambiguous information in the environment, and second reacting to that ambiguity negatively. The reaction to ambiguous stimuli can be cognitive, by way of perceiving the stimulus categorically; emotional, typically through anxiety or anger; or behavioral, by way of denying or avoiding the stimulus (Bhushan & Amal, 1986; Grenier et al., 2005).

Ambiguity as Threat

Negative reaction to ambiguity centers on ambiguity being perceived as a threat. Those low on tolerance of ambiguity are more likely to perceive ambiguous stimuli as threatening (Chen & Lobivond, 2016). Ambiguity primarily presents a threat to goal enactment, as unclear information or expectations make the execution of a short-term plan more difficult. Inability to predict the outcome of behavior also presents a threat to needs of autonomy and competence. In general, stress reactions occur when low perceived control cooccurs with high demand situations (Pandey, Quick, Rossi, Nelson, & Martin, 2010). Ambiguity presents a challenge or hindrance to goal enactment in the generally high demand context of academic and professional settings by decreasing perceived control. The experience of decreased control in such settings may be more or less threatening depending on dispositional factors, including tolerance of ambiguity. Other factors, such as low self-efficacy, perceived lack of resources common to generalized anxiety,

general negative affectivity, or negativity dominance (see Rozen & Royzman, 2001) may increase the likelihood of an ambiguous situation being perceived as harmful or threatening.

While the original development of the tolerance of ambiguity concept centered on its inverse, namely *intolerance* of ambiguity, perception of ambiguity as threat, and co-occurrence with prejudice, early measures of tolerance of ambiguity sought to capture its positive definition: the “tendency to perceive ambiguous situations as desirable” (Budner, 1962; Furnham & Marks, 2013). Tolerance of ambiguity in this sense is comparable to sensation-seeking, where ambiguity presents an enjoyable challenge or pleasurable experience that is sought out and approached. This operationalization of tolerance of ambiguity as a *de facto* preference for ambiguity is problematic, inasmuch as tolerance of an aversive stimulus should generally not be equated with a preference for that same aversive stimulus. I elaborate on the difference between tolerance and preference in the next section.

Tolerance of Ambiguity as Experiencing Stress

Intolerance of ambiguity, in the abstract, is most likely an adaptive defense mechanism, and negative interpretations of ambiguous stimuli are appropriate when a serious threat to survival is perceived (Neta, Cantelon, Haga, Mahoney, Taylor, & Davis, 2017). However, this adaptive defense mechanism, like others, may be applied to situations in which serious harm or survival is not relevant. Tolerance of ambiguity presents a dispositional buffer against a type of stress encountered by everyday situations. Existing frameworks of stress, such as the Cognitive Appraisal Model (Lazarus, 1966; Lazarus & Launier, 1978), account for experiences and potential individual reactions when ambiguity experiences are framed as stressors.

The Cognitive Appraisal Model differs from other models of stress through focus on threat. Threat consists of the “[anticipation of] a confrontation with a harmful condition of some

sort” (p. 25, Lazarus, 1966). Threatening cues are then appraised in two cognitive processes. Primary appraisal consists of judgments surrounding the magnitude, temporality, and “degree of ambiguity” inherent to the harm-producing threat, compared to the available coping resources of the individual (p. 25, Lazarus, 1966). It is therefore possible that tolerance of ambiguity describes differences in the primary appraisal process. When ambiguity is encountered, highly ambiguity-tolerant individuals may perceive it as much less threatening than highly ambiguity-intolerant individuals. Ambiguity may be appraised, for example, as less impactful, less permanent, or less complicated than it appears to others.

Secondary appraisal consists of judgments of the individual’s interaction with the environment with regard to motivation, resources, and, most importantly, the ability to *cope* with the perceived threat. Coping strategies result from this secondary appraisal mechanism, and ultimately the behavior adopted by an individual under threat results from the intervening coping processes activated during secondary appraisal (p. 26).

For example, the following different secondary appraisals are possible when faced with an upcoming job interview perceived as threatening (i.e. rejection is perceived to be the most likely outcome), and different behaviors can be inferred from these appraisals (Lazarus & Launier, 1978, pp. 306-307): 1. The candidate believes they don’t have the ability to perform well in the interview at all, and the situation is completely hopeless. This candidate may decide to interview having not practiced or skip the interview entirely. 2. The candidate believes in their ability to perform well in the interview and sets out to practice and reduce anxiety. Despite feeling threat, this candidate shifts the appraisal from threat to challenge and makes plans to increase the chances of success. 3. The candidate decides, to make up for their likely poor interview, they will reach out to a friend who knows the hiring manager and ask for an informal

recommendation. Despite feeling threat, this candidate shifts from personal coping resources to enlisting the help of another. 4. The candidate believes this interview will go poorly, but there are alternative job opportunities available. This candidate would judge the level of harm of the threat to be mild and would initiate few preparatory behaviors. 5. The candidate believes regardless of their interview performance, they will be rejected because of discrimination. This candidate and candidate 1 may perceive the situation to be similarly harmful, but candidate 5 would likely react with anger instead of sadness or hopelessness. This reaction of anger would result in more active coping behavior (e.g. seeking legal representation or joining social justice groups). Overall, the secondary coping process is important in two ways: by reappraising or recontextualizing the primary appraisal of threat and by shaping likely coping behavior (Lazarus & Launier, 1978, p. 307). Differences in the emotional reactions and behaviors of these hypothetical candidates highlight the stark differences in the possibilities of secondary appraisal to enable approach or avoidance of a perceived threat.

Emotional reactions of a person, when faced with a stressor, may be separated into four stages: anticipation, provocation, unfolding, and outcome (Lazarus, 1991). At any point in the emotional reaction process, coping can occur. Coping involves cognitive or behavioral efforts to manage demands appraised as greater than current personal resources available (Lazarus, 1991; Lazarus & Folkman, 1984, 1987). Personality factors are instrumental in the coping process in two ways. First, they may influence how a given situation is appraised during the primary stage. As an example, if a person is introverted and disagreeable, a situation in which loss of social approval is possible will not be perceived as threatening (p. 210, Lazarus, 1966). Second, certain forms of coping depend on the dispositions and habits of an individual, that is, some personal

capacities like impulse control do not influence the primary appraisal of a threat but clearly limit possible coping strategies (p. 211).

Tolerance of ambiguity is expected to be one such capacity in the coping process deployed when ambiguity is expected to bring about a negative affective state. “Tolerance,” is the key word in this conceptualization, as tolerance is specific to coping, defined as a “person’s cognitive and behavioral efforts to manage (reduce, minimize, or *tolerate*) the internal and external demands of the person-environment transaction that is appraised as taxing or exceeding the person’s resources” (emphasis added, Folkman, Lazarus, Gruen, & DeLongis, 1986). Coping, as allowed by capacity for tolerance of ambiguity, may be easier for some individuals than others, and tolerance of ambiguity may describe a specific type of dispositional trend towards coping with uncertainty, change, or complexity.

To use the previous example of a job interview being perceived as threatening, consider ambiguity inherent in the interview being salient. Given ambiguous elements like a vague description of the available position or a lack of information from the hiring company concerning duties or organizational goals, candidates may appraise the interview process as threatening (i.e. rejection is perceived to be likely) and react differently depending on secondary appraisal processes partially influenced by differing levels of tolerance of ambiguity: 1. The candidate may be severely intolerant of any unclear duties or confusing descriptions of the role. This candidate reinforces that ambiguity is threatening and may withdraw from the interview. 2. The candidate perceives the ambiguity as an opportunity to demonstrate their engagement and diligence by asking clarifying questions. This candidate is repelled at first by the ambiguity, but they shift this anxiety into preparatory actions and a plan to resolve ambiguity during the interview. 3. The candidate decides that the interview will be manageable if they reach out to a current employee

of the company to clarify the duties of the available position. This candidate has elected to cope with anxiety by enlisting external help rather than using internal coping strategies. 4. The candidate perceives the ambiguous information about the job as threatening but reassures themselves that other similar positions are available with a clearer application process. The primary appraisal of ambiguity as threat is lessened by secondary appraisal of the ambiguous position as one of many comparable positions. 5. The candidate believes the job posting and company information are deliberately vague as a way of deterring “outsider” candidates. The candidate resolves to apply to spite the company and prove their superiority to perceived cronies. This candidate may have similar levels of intolerance of ambiguity to candidate 1, but candidate 5’s emotional reaction of anger makes continuance in the application process more likely than withdrawal or resignation to rejection. 6. The candidate would prefer that the interview process not be ambiguous, but they are confident that their resumé is stronger than other applicants. This candidate may have high levels of tolerance of ambiguity which allows them to discount the portions of the application that would otherwise be appraised as threatening. To summarize, differing levels of tolerance of ambiguity may be associated with different cognitive patterns in either the primary or secondary appraisal process, resulting in different behavioral outcomes.

Affective Events Theory

Tolerance of ambiguity as a reflection of habitual reactions to stressors also lends itself to framing within Affective Events Theory (AET). Affective Events Theory centers on the structure, causes, and consequences of emotional experiences at work (Weiss & Cropanzano, 1996). AET departs from concurrent literature’s focus on effects of features of the environment by instead describing the affective responses of individuals to events. These events may be imagined (i.e. a perceived insult, unintended by the target) or recalled later. AET emphasizes

time as a key determinant in the severity and direction of affect at work (Weiss & Cropanzano, 1996). Finally, AET incorporates the structure of both work as an object of emotional reactions (e.g. potential for differing emotional reactions to supervisors, pay, coworkers, etc.) and affect itself being multidimensional, having different effects on behavior. Affective reactions are influenced by both endogenous and exogenous factors, and in the context of AET, work events are treated as having greater impact on affect than other exogenous factors, by making certain affective events more or less frequent over time (Weiss & Cropanzano, 1996).

An attempt to taxonomize certain work events as plausible affective events within AET has yielded common categories of work events relevant to tolerance of ambiguity. Ohly & Schmitt (2015) found “ambiguity” to be a common category of affective work events. Employees describe, for example, lack of a business strategy, unclear tasks assigned to them, and inability to receive clear feedback from coworkers. These ambiguous affective events are related to the experience of affective states: high-activation positive (enthusiasm), low-activation positive (rest), high-activation negative (anger), high-activation negative (worried), and low-activation negative (exhausted; Ohly & Schmitt, 2015). It is expected that the experience of ambiguity affects these emotional states across all levels of tolerance of ambiguity; however, employees low on tolerance of ambiguity react more strongly negatively to such events. Other categories possibly relevant to employees’ tolerance of ambiguity include “hindrance in goal attainment,” characterized by time restraints, too many projects at once, or unsolvable work problems; and “conflicts and communication problems,” wherein inability to communicate expectations, tasks, or to maintain a professional relationship tend to create negative emotional reactions (Ohly & Schmitt, 2015).

Neighboring Constructs

At a theoretical level, tolerance of ambiguity is conceptually connected to a number of individual difference variables. The primary goal of Study 2 and a supplementary goal of Study 3 will be to delineate tolerance of ambiguity as a separate construct from the following constructs that occupy somewhat similar positions in the nomological network. While it may be clear from a theoretical standpoint why the following constructs are similar to one another but distinct in their orientation, cognitive mechanisms, and motivational components, the operationalization of these constructs in the form of self-report inventories may fail to capture meaningful differences. Kruglanski (2004) outlines several of the following constructs in a review of research conducted on “closed-mindedness,” contrasting the history of these constructs as narrow, stable motivational patterns with a new framework of momentary evocation of general need for certainty through closure. Responses to measures of tolerance of ambiguity and closely conceptually related constructs may reflect a general motivation reflective of “closed mindedness” rather than differences proposed by theorists.

Uncertainty Tolerance

Uncertainty tolerance is an individual difference variable referring to an individual’s set of beliefs about unknown information within a situation and situations with unknown outcomes (Rosen et al., 2014). Uncertainty tolerance fits within some models of anxiety, particularly generalized anxiety disorder (GAD). People who are comfortable with neither uncertainty nor arousal will be anxious first at the presence of uncertainty, then anxious in response to perceiving their arousal, resulting in short-term coping and worrying characteristic of GAD (Freeston, Rhéaume, Letarte, Dugas, & Ladouceur, 1994).

Conceptual reviews have pointed out the overlap between tolerance of ambiguity and tolerance of uncertainty (Hillen, Gutheil, Strout, Smets, & Han, 2017; Rosen, Ivanova, & Knäuper, 2014). The difference between tolerance of ambiguity and uncertainty tolerance is primarily a difference in time frame (Furnham & Marks, 2013; Grenier et al., 2005; Hillen et al., 2017; Rosen et al., 2014). Tolerance of ambiguity is a reaction to a novel situation in the present, whereas uncertainty tolerance refers to unknown situations in the future. For example, consider a person taking a bus to work and seeing a stranger on the bus appearing to mutter angrily to themselves for several minutes. The ambiguity in this situation would include the source of the stranger's anger, their state of mind, when they will reach their bus stop, and other factors generally summarized in their likelihood of acting aggressively toward other passengers. Intolerance of ambiguity would partially explain a short-term anxious reaction to the stranger and motivation to avoid them. Uncertainty intolerance would partially explain feelings of dread when imagining encountering a person acting similarly in the future, due to the inability of any person to anticipate and react to all factors that result in one instance of encountering a potentially aggressive stranger. This difference in time frame partially explains why ambiguity is generally referred to in the cognitive and social psychological literature, whereas uncertainty is referred to typically in the clinical literature (Furnham & Marks, 2013). However, this difference in time frame may not be theoretically justified and instead may be a byproduct of interdisciplinary differences (Hillen et al., 2017). Empirical evidence of the difference in time frame is also meager and mainly based on clinical observations of anxious patients (Grenier et al., 2005). Tolerance of ambiguity and uncertainty tolerance appear to be moderately correlated, $r = .42$, (Buhr & Dugas, 2006); $r = .59$ (Lauriola et al., 2016), but additional concurrent tests of ambiguity and uncertainty tolerance are needed to clarify this potential conceptual difference.

Need for Cognitive Closure

Need for cognitive closure (NFC) describes the motivation to arrive at definite knowledge on an issue (Kruglanski & Webster, 1996). This motivation encompasses the “desire for a firm answer to a question and an aversion toward ambiguity,” (Kruglanski & Webster, 1996, p. 264). Individuals high on need for cognitive closure prefer structure, simplicity, and are intolerant or avoidant of counterarguments, leading to the desire to reach firm decisions quickly (Roets, Kruglanski, Kossowska, Pierro, & Hong, 2015). Over time, those high in need for cognitive closure are resistant to contrary opinions or information, and others tend to describe them as recalcitrantly closed-minded (Roets et al., 2015). As such, there is expected to be considerable overlap between NFC and intolerance of ambiguity.

Need for cognitive closure is framed as a higher-order construct, with explicit reference to “discomfort with ambiguity” as a lower order facet (Webster & Kruglanski, 1994). The key proposed difference between NFC and related concepts like tolerance of ambiguity is its basis being motivational rather than cognitive or emotional (Kruglanski, 2004; Roets et al., 2015). A number of key differences between need for closure and tolerance of ambiguity are proposed by this motivational distinction: tolerance of ambiguity is expected to be a product of specific developmental processes, relatively rigid, and content-specific to the extent that it co-occurs with prejudice; whereas NFC is proposed to have multiple different antecedents, be relatively changeable, and have no specific content attached to its activation (Kruglanski & Webster, 1996). Empirically, need for cognitive closure relates only moderately with conceptually related variables including tolerance of ambiguity (Frenkel-Brunswick, 1949; Roets et al., 2015). However, the moderate correlation between NFC and tolerance of ambiguity may accurately describe tolerance of ambiguity’s position as a lower-order facet of NFC within a hierarchical

relation, further tests of construct validity are needed to establish this relation across different tolerance of ambiguity measures that are not nested within an NFC scale (Clark & Watson, 2019).

Dogmatism

Dogmatism describes crystallized, but unjustified certainty in an attitude (Altemeyer, 2002). Highly dogmatic individuals hold strong, fixed beliefs and compartmentalize new information into a “closed-belief system,” whereas nondogmatic individuals have an open conceptual framework in which new information is integrated into a more cognitively flexible system (Crowson, DeBacker, & Davis, 2008). Dogmatic individuals tend to deny inconsistencies within their belief system, maintain a future orientation that fits already established beliefs, and defer to authority (Kruglanski, 2004). Early work on dogmatism framed the construct as capturing, partially, the need to protect the self against “threatening aspects of reality” (Rokeach, 1960). Dogmatism serves as protection from contradiction or uncertainty by its characteristic rigidity and denial of dissenting influences, making it highly likely that dogmatic individuals also endorse intolerance of ambiguity. Intolerance of ambiguity and dogmatism both encompass perceptions of threat in new information, but the behavioral reaction to that threat may be different for both dogmatic (e.g. expression of anger at a disagreeing person) and non-dogmatic individuals (e.g. passive or anxious avoidance of “taking a side”).

Openness to Experience

Tolerance of ambiguity is clearly related to openness to experience, as both traits contrast preference for familiarity or novelty, and tolerance of ambiguity’s focus on emotional reactivity may suggest it is a motivational component of the openness trait (Bardi, Guerra, & Ramdeny, 2009; McCrae, 1996). Openness and tolerance of ambiguity appear to be moderately correlated, r

= .24 - .42 (Bardi et al., 2009; Caliguiri & Tarique, 2012; Strauss, Connerly, & Ammermann, 2003).

Facets of openness to experience are expected to be correlated with tolerance of ambiguity. Particularly, the adventurousness, intellect, and liberalism facets capture attitudes relevant to positive or negative reactions to novel or unknown situations. Items like “I am attached to conventional ways” (adventurousness/actions), “I am not interested in abstract ideas” (intellect/ideas), and “I believe laws should be strictly enforced” (liberalism/values) capture elements of intolerance of ambiguity; while positively scored items like “I prefer variety to routine” (adventurousness/actions), “I like to solve complex problems” (intellect/ideas), and “I believe that there is no absolute right and wrong” (liberalism/values) indicate a positive experience with ambiguous information and experience (Goldberg et al., 2006). These theoretical connections are supported by empirical findings. The general trait of openness is correlated strongly with tolerance for ambiguity, disattenuated $r = .65$ (Judge et al., 1999). Tolerance of ambiguity is moderately to strongly correlated with two-facet measures of openness to experience – *openness* as appreciation of sensory complexity, $r = .34$, and *intellect* as appreciation of intellectual complexity, $r = .60$ (Jach & Smillie, 2019). Meta-analytic estimates show a moderate correlation between intolerance of ambiguity and openness facets like political conservatism, $r = .32$ (van Hiel, Onraet, Crowson, & Roets, 2016), and intellect, $\rho = -.34$ (von Stumm & Ackerman, 2013). At present, there appear to be no studies comparing full six-facet models of openness to experience with tolerance of ambiguity.

Structure of Tolerance of Ambiguity

Most measures of tolerance of ambiguity are unidimensional or assume a higher-order general tolerance of ambiguity factor. Budner’s (1962) 16-item scale, the Ambiguity Tolerance

scale (AT-20, MacDonald, 1970), the Multiple Stimulus Types Ambiguity Tolerance scale (MSTAT-1, McLain, 1993), and the Rasch Model AT-20 (Lange & Houran, 1999) assume a one-factor structure capturing a bipolar tolerance vs. intolerance of ambiguity. Furnham (1994) conducted a concurrent structural analysis of four tolerance of ambiguity scales: Budner (1962), the Rosen & Rydell 16-item scale (1966), Walk's A scale (O'Connor, 1952), and the Measure of Ambiguity Tolerance (MAT 50, Norton, 1975). Factor analyses revealed that the purportedly unidimensional scales all tended to produce scores that were not unidimensional (Furnham, 1994). The complexity of tolerance of ambiguity, as a construct summarizing emotional, cognitive, and social information processing, perhaps makes the misidentification of scales proposed to be unidimensional unsurprising. These analyses suggest validity issues with unidimensional tolerance of ambiguity measures and the need for rigor in avoiding the jingle fallacy in the course of further scale development (see Block, 2000). In fact, inconsistencies within the literature have been a concern since tolerance of ambiguity research's inception, and the failure to correlate unidimensional ambiguity scales to theoretically relevant behaviors spurred researchers to consider the existence of "a number of distinct or relative independent dimensions of intolerance of ambiguity rather than just one unique generalized factor" (Kenney & Ginsberg, 1958, p. 304; Lauriola et al., 2016).

As most tolerance of ambiguity measures are unidimensional, and there is evidence suggesting this structure is inappropriate for measuring the breadth of the construct, the development of the Multidimensional Attitudes Toward Ambiguity Measure (MAAS) is promising for higher fidelity tolerance of ambiguity measurement. The MAAS assesses three facets of tolerance of ambiguity (Moral Absolutism/Splitting, Discomfort with Ambiguity, Need for Complexity and Novelty), assuming a bifactor structure wherein the general factor captures

ambiguity aversion (Lauriola et al., 2016). Moral Absolutism/Splitting (MA/S) describes the tendency to see problems in the world in “black-and-white” categorical terms. Need for Complexity and Novelty (NC) describes an epistemic approach orientation toward new experiences. Discomfort with Ambiguity (DA) describes the experience of unpleasant feelings in ambiguous social situations. These dimensions capture discrete psychological components – cognitive (MA/S), epistemic (NC), and emotional (DA) – rather than broadly valenced emotional reactivity. Positive findings for the bifactor solution suggest that the multidimensional scale captures these distinct facets of tolerance of ambiguity, while not supposing a hierarchical structure. Given the limitations of unidimensional tolerance of ambiguity measures, the MAAS presents a novel approach to tolerance of ambiguity theory building, but given its recency, its relations with related constructs have not yet been explored in detail. While this multidimensional structure represents improvement over unidimensional scales, the content of the MAAS does not diverge from previous tolerance of ambiguity scales. This homogeneity of content creates potential gaps in understanding mechanisms of the construct. Through the lens of affective events theory, the MAAS describes attitudes rather than affective reactions. Though the DA subscale involves emotional processes, these processes are not directly validated with the experience of reactive emotions such as anger, discouragement, or irritability. Couching discomfort mainly in the language of feeling “anxious” leaves out a number of other affective reactions, including positive reactions, such as ambiguity spurring a person to approach the ambiguous stimulus or to enjoy the process of resolving ambiguity. The MAAS may therefore only measure one of many possible attitudes or emotions possible during secondary appraisal of threatening ambiguity (see Lazarus & Launier, 1978).

Clarifying the structure of tolerance of ambiguity as a construct is a worthwhile component of a larger goal. Measures of tolerance of ambiguity have not convincingly outperformed measures related constructs, and the misidentification of unidimensional structures to a majority of tolerance of ambiguity measures has likely complicated efforts to support incremental validity of the construct. Tolerance of ambiguity measures may also lack content relevant to the target latent construct, particularly non-anxiety affective components. In its current state, tolerance of ambiguity may fail to outperform neighboring constructs due to structure or content failures, but the continuance of tolerance of ambiguity research depends on addressing these components of construct validity and modifying measures accordingly.

Academic Performance and Tolerance of Ambiguity

Tolerance of ambiguity is expected to be relevant in academic settings for two broad reasons. First, ambiguity is an essential component of the content of many college courses; that is, students engage with problems and tasks in several academic fields, particularly in the liberal arts, that are ambiguous by nature. Success in fields such as creative writing, philosophy, or social sciences is thought to require divergent thinking, not relying on pre-established categorizations of information or techniques. Those intolerant of ambiguity, when presented with a novel or complex assignment, may attempt to apply inappropriately constraining concepts to a creative project, devote less time or attention to the project, or avoid working on the project altogether. However, ambiguity-tolerant students may be more patient with novel problems, adapt better to scaffolded concepts, or be better able to apply different learning strategies to appropriate material.

Second, ambiguity is also often present in the manner in which many college classes are structured, taught, and assessed. That is, not all courses are necessarily characterized by clear

schedules, outlines of lecture topics, specific grading criteria, lecture materials presented in advance, set dates for exams and quizzes, exam questions having a single correct answer, and adherence to such details outlined in a syllabus (DeRoma et al., 2003). Students with a low tolerance of ambiguity are likely to have strongly negative affective and evaluative reactions to classes that are high on ambiguity, and these negative reactions may, in turn, have a negative effect on class performance. This performance reduction may occur because negative emotional reactions (e.g., stress, anxiety) impede memory (DeRoma et al, 2003). Negative cognitive and evaluative reactions are also likely to reduce motivation. As such, tolerance of ambiguity may have a valuable place alongside research emphasizing the experience of student test anxiety and broader student fear as a function of individual differences and classroom climate (Bledsoe & Baskin, 2014; Chapell et al., 2005; Ergene, 2003; Giest, 2010). Moreover, negative emotional reactions to the ambiguous elements of college life, particularly experienced during the first year, are expected to be negatively related to college adjustment, intentions to continue college, and proactive behaviors related to higher grades (e.g. class attendance).

Empirically, the correlation between academic success and tolerance of ambiguity remains somewhat unclear. Seemingly contradictory findings exist in the literature. For example, negative correlations with GPA have been found for both *tolerance* of ambiguity ($r = -.11$, Bluedorn, 2015; $r = -.16$, Senfeld, 1995) and *intolerance* of ambiguity ($r = -.40$ Kornilova, 2014; $r = -.32$; Davis & Sherman, 1987). These differences may be a manifestation of academic disciplinary differences, tolerance of ambiguity measurement differences, sampling error, or anomalous findings centered on a near-zero correlation (Furnham, 1994; Lauriola et al., 2016). One meta-analysis of tolerance of ambiguity and academic performance is very modestly

powered ($k = 2$, $N = 224$), and the 95% confidence interval for the random effects model encompasses a wide range including zero, $CI = [-.46, .17]$ (von Stumm & Ackerman, 2013).

Tolerance of Ambiguity in the Workplace

Almost every job includes tasks characterized by some level of ambiguity. Common sources of job ambiguity can include uncertainty about how to complete job tasks, how to structure time, and how work performance will be assessed by supervisors (Breugh & Colihan, 1994). Additional sources of ambiguity may be customers (how to interact with customers, react to their demands, present information about products and services), bosses (how to ask for help, what a boss's expectations are), ethical guidelines, "work-life balance" or family demands, expectations of coworkers, or non-supervisory managers (Singh & Rhoads, 1991; Johlke & Iyer, 2013). Other situational elements of work may also add to these sources of ambiguity. The general level of ambiguity of a job is a function of both the necessary tasks of the job, the environment in which those tasks must be completed, and the processes by which tasks are completed. For example, an unambiguous task of a salesperson may be to meet a monthly sales quota. A number of ambiguous situations may be encountered in the course of completing this task, related to different ambiguity sources. A salesperson may be unsure of how to attract enough clients, how to ask for assistance from coworkers or a supervisor, and whether the quota represents a minimum threshold or a mark of excellence in their supervisor's evaluation.

Some jobs are characterized by much more ambiguity than others. For example, one high-ambiguity element of work necessary for some employees in large companies is the ability to work with people outside one's home country. In a cross-cultural study, supervisor ratings of employees' ability to effectively work with people from other countries was moderately correlated to tolerance of ambiguity (Caliguiri & Tarique, 2012). Similarly, in a meta-analytic

review of expatriate job performance, tolerance of ambiguity was a notable correlate of job performance ratings, $\rho = .35$ (Mol, Born, Willemsen, & van der Molen, 2005). Comfort with the unknown elements of working outside one's home country appears to be an element of an ideal overseas employee. Training or selecting such an employee is more important from a company's perspective, as the expected difference in profit and cost between a poor and excellent expatriate employee is greater than a poor and excellent domestic employee (Mol et al., 2005). As such, tolerance of ambiguity may be important enough to affect performance within certain high-ambiguity jobs such as those that require international travel.

Tolerance of ambiguity presents a possible mechanism by which individuals tend to approach or avoid experiences at work as a function of those experiences' ambiguity and individuals' emotional reactions to them (Locke, 1970; Yu, 2013). Industrial and organizational psychologists have argued that tolerance for ambiguity is beneficial for managing stress, adapting to changing conditions at work, and responding to feedback (Bennett, Herold, & Ashford, 1990; Caliguiri & Tarique, 2012; Judge, Thorensen, Pucik, & Welbourne, 1999). A meta-analysis conducted by Frone (1990) found tolerance of ambiguity moderates the relation between ambiguity experienced at work and strain. In general, employees who are intolerant of ambiguity are more susceptible to stress and more sensitive to critical feedback (Furnham & Ribchester, 1995).

Although most jobs include ambiguous elements and some jobs are characterized by more ambiguity than others, tolerance of ambiguity may not be practically relevant for all employees. For example, researchers and employers should not expect tolerance of ambiguity to predict differences in satisfaction or performance for jobs with very simple tasks, less autonomy, or little room for individual creativity. The relevance of tolerance of ambiguity in the workplace

may be understood through the following frameworks, and the interaction between tolerance of ambiguity and job ambiguity may be determined empirically if informed by similar conceptual bases.

Job satisfaction is an affective reaction to and a cognitive appraisal of the workplace, and job satisfaction is influenced by a number of factors. The Job Characteristics Model (JCM) proposes that the characteristics of a job (skill variety, task identity, task significance, autonomy, and feedback) directly influence individual employees' psychological states, which in turn influence job outcomes like satisfaction (Hackman & Oldham, 1975; Fried & Ferris, 1987). Job satisfaction is also affected by personality and individual differences. The relation between job characteristics and satisfaction is moderated by individual level differences in, for example, an employee's need for personal growth through the job (Loher, Noe, Moeller, & Fitzpatrick, 1985). Dispositional positive affect and personality traits such as neuroticism and conscientiousness also relate directly to job satisfaction (Bruk-Lee, Khoury, Nixon, Goh, & Spector, 2009; Connolly & Viswesvaran, 2000). The level of a job's ambiguity and individual employees' tolerance of ambiguity do not seem to fit within the JCM, the Big Five personality structure, or other existing frameworks of understanding effects of employee disposition on job satisfaction. However, one key determinant of job satisfaction is person-environment fit, which may clarify the relevance of tolerance of ambiguity's effect on job satisfaction.

Person-environment fit – the compatibility between individuals and organizations in terms of personality, values, goals, and attitudes – has been linked to important workplace outcomes including performance, work attitudes, turnover intentions, stress, and prosocial behaviors (Kristof, 1996). Research concerning person-environment fit has found that there tends to be a moderate level of personality homogeneity within organizations, such that the people who

continue work in a given organization meet an acceptable level of shared values and characteristics as perceived by managers and coworkers so as to avoid job loss (Schneider, 1987; Schneider, Smith, Taylor, & Fleenor, 1998). Individuals engage in self-selection processes to the extent possible by external circumstances (e.g. economy, location, opportunity), and individuals in organizations actively perceive, evaluate, and change their environments to some degree (Lazarus & Launier, 1978, p. 295).

Person-environment fit encompasses a number of motivational factors. People at work have a drive to maintain consistency and may use their subjective sense of fit to make sense of attitudes toward work or vice versa (e.g. “I do not fit at my job, therefore I do not like my job” or “I do not like my job, therefore I must not fit at my job,” Yu, 2009; 2013). Broadly, individual differences are expected to influence how different experiences at work are perceived, e.g. as threatening, benign, difficult, or manageable (George & Brief, 2004), and congruence between person and job elements is believed to reduce the frequency of negative appraisals, negative emotionality, and dissatisfaction at work. These elements of the person and the workplace necessarily interact with one another, and it is established within social psychology broadly that people change situations as well as situations change people. The interaction of negative emotionality on workplace experiences is described in general as employees interpreting and experiencing events as threatening, leading to a higher likelihood of being dissatisfied at work, and seeking out alternative tasks that reduce dissatisfaction (George & Brief, 2004). This tendency to create negative work environments often results in lower favorability ratings from managers and coworkers, leading to lower job security (George, 1992; George & Brief, 2004). One manifestation of the ways in which employees and organizations may fit or conflict with each other is the level of ambiguity inherent in a job and individual employees’ tolerance of that

ambiguity. A conflict between job ambiguity and individual tolerance of ambiguity is expected to result in workplace stress and dissatisfaction with the job, especially when the objective or perceived level of job ambiguity is greater than an individual's tolerance of ambiguity.

This emotional reactivity to perceived or objective mismatch between person and environment also affects job performance. Job performance is influenced mainly by three factors: declarative knowledge, procedural knowledge, and motivation (Campbell, 1990; Campbell et al., 1993). Assuming employees are approximately equally proficient in their knowledge and skills, differences in performance may arise as a function of differences in motivational components: level of effort, persistence of effort, and the choice to perform. When faced with job stressors and job dissatisfaction, employees are expected to reduce performance indicators characteristic of high motivation: working extra hours, taking on additional tasks, or working under adverse conditions (Campbell, 2012). A mismatch between job ambiguity and tolerance of ambiguity may also inhibit the acquisition of further declarative knowledge or skills, further inhibiting performance if high levels of job dissatisfaction are experienced. Employees address job dissatisfaction in a number of ways meant to change aspects perceived as causing dissatisfaction, but the main hypothesized outcomes related to tolerance of ambiguity are job avoidance and withdrawal (Furnham, 1992, pp. 206-208; Locke, 1976). Especially for jobs that are inherently ambiguous in one of the ways discussed, employees who are intolerant of ambiguity are expected to engage in withdrawal behaviors and absenteeism (see Hanish & Hulin, 1991; Yu, 2013) to ameliorate feelings of dissatisfaction caused by negative emotional reactions to this particular lack of person-environment fit.

This idea that a match of a person and organization's levels of certainty and routine affects job satisfaction and performance is not new by any means. Morse (1975) designed an

experiment to fit new applicants for clerical positions with their personality. Applicants who endorsed high tolerance of ambiguity, among other individual difference variables, were assigned to low certainty jobs, and applicants who were intolerant of ambiguity were assigned to high-certainty jobs. Eight months later, these congruent applicants rated their own competence higher than applicants who were not matched with congruent positions, via default hiring practices (Morse, 1975). The fit between organizational-level job ambiguity and individual-level tolerance of ambiguity is therefore expected to be a manifestation of person-environment fit germane to job satisfaction and job performance. Mismatch between objective ambiguity and tolerance of ambiguity is expected to affect performance via negative effects on job satisfaction and job stress.

Job Ambiguity

The current research aims to take a broad approach to job ambiguity. Considerable attention has been paid to one specific form of job ambiguity: role ambiguity. Role ambiguity describes an individual's perceived uncertainty surrounding what expectations about their role, job objectives, or responsibilities are within an organization, and it is moderately associated with depression, stress, and job dissatisfaction according to meta-analytic estimates (Abramis, 1994; Crawford, 2001; Schmidt, Roesler, Kusserow, & Rau, 2014). However, ambiguity takes many different forms at work. Researchers caution against using role ambiguity measures that do not consider multiple dimensions of ambiguity, and "role ambiguity" as a construct may be more accurately interpreted as multidimensional if considered as "job ambiguity" instead (Breugh & Colihan, 1994; King & King, 1990; Örtqvist & Wincent, 2006; Sakires, Doherty, & Misener, 2009; Tubre & Collins, 2000). Job ambiguity is expected to be related to stress and job

dissatisfaction in similar ways to findings concerning “role ambiguity,” in that employees who report high levels of job ambiguity experience more stress and less satisfaction with work.

Ambiguity can arise in organizations for a number of common reasons (Jex, 1998). Organizations may be lax in updating their resources and written job descriptions, making expectations and procedures unclear particularly for new employees. Some roles may be more difficult to define than others, especially in management positions, or the job’s desired outcome (e.g. increased sales, morale, reduced turnover) may be clearer to measure than the processes by which that outcome is achieved. The culture of a job may also change by means internal to the organization or from cultural shifts. For example, teachers are expected to be responsible for students’ mastery of subjects, but the societal shift toward “character education” has compounded past expectations of the educational profession with expectations to form students’ values and characteristics. A shift in expectations like this may make a number of elements of a job especially ambiguous. In the education example, what values should be taught? How? What changes if character interventions do not appear to be effective?

All these aspects of job ambiguity are expected to reduce satisfaction and performance, in part due to reduced self-efficacy (Warr, 2007). If employees cannot rely on procedures and expectations of their coworkers and supervisors to a reasonable degree, this uncertainty leads to an expectation that they cannot act in a way that will affect their job-related goals or simple completion of tasks, leading to psychological distress (Örtqvist & Wincent, 2006), lower organizational commitment (Fisher & Gitelson, 1983), and lowered performance, potentially due to riskier, impulsive decision making (Starcke & Brand, 2016).

Finding objective measures of job ambiguity presents a challenge. However, “category flexibility” is an assumed correlate of tolerance of ambiguity used in O*NET categorizations of

occupations. Category flexibility is defined as “the ability to generate or use different sets of rules for combining or grouping things in different ways” (National Center for O*NET Development). Occupations requiring high category flexibility are primarily in scientific fields (e.g. chemical engineers, neurologists), whereas low-category-flexibility occupations involve simpler tasks and less ambiguous duties (e.g. telemarketers, crossing guards; National Center for O*NET Development). Category flexibility may be a useful approximation of a job’s objective complexity, and one requisite skill needed to succeed in such an occupation. High job complexity allows for more frequent and extreme ambiguous workplace situations.

The Present Research

Given the conceptual critiques of tolerance of ambiguity, insofar as it is closely related to a number of other variables in the nomological network that all potentially reflect a similar pattern of emotional reactivity, and the possibility that this level of overlap is due to tolerance of ambiguity scales lacking appropriate breadth, this series of studies will explore the MAAS as a novel approach to measuring tolerance of ambiguity while clarifying its relation to similar constructs, academic outcomes, and job characteristics. The following chapters will detail the methods, results, and discussions of three studies.

CHAPTER 3. STUDY 1

Study 1 consists of an investigation of the relations between tolerance of ambiguity and the Big Five personality traits using meta-analysis. Meta-analytic techniques have been utilized to explore similar questions of construct validity (Clark & Watson, 2019). Given the theoretical similarity of tolerance of ambiguity to other individual difference variables, particularly openness to experience, Study 1 aimed to explore whether tolerance of ambiguity may share substantial variance with common global individual difference constructs.

Hypothesis

Meta-analytic estimates of tolerance of ambiguity's relations to the Big Five personality traits will be strongest for openness to experience.

Method

Literature search

Abstracts and title searches of PsycINFO, Dissertations Abstracts, and Google Scholar were conducted using "tolerance of ambiguity" and "Big Five" as search terms. For thorough inclusion of studies that did not include the full Big Five, additional abstract searches were conducted using "tolerance of ambiguity" and "neuroticism," "conscientiousness," "openness," "agreeableness," and "extraversion" separately. Works that cited Lauriola et al. (2016) were also examined for the possibility of meta-analyzing the MAAS separately from other tolerance of ambiguity scales. Studies were screened by the principle investigator through January 2020. Overall, after titles and abstracts were screened for potentially relevant study characteristics, 62 potential data sources were screened for inclusion and exclusion criteria.

Inclusion and exclusion criteria

Studies were included if Pearson's correlation coefficients of the relations of tolerance of ambiguity and targeted individual differences variables were reported directly or if such correlations could be computed from other available statistics. Studies were excluded if only significant correlation coefficients are reported, as including these studies will result in overestimated effect sizes. Sample characteristics such as mean age, gender ratio, percentage identified as white, and descriptions of the sample occupation, area of study, or country of origin were included in coding, but not used for exclusion. The scale used, reliability, and source (e.g. self-report, other-reported, behavioral) were coded for both tolerance of ambiguity and personality trait measures. Studies included in the meta-analysis are marked with an asterisk in the reference section. Data from 22 studies encompassing 25 unique samples and 8,102 individuals were included in the analysis.

Coding procedure

Studies were coded solely by the principle investigator. Each effect size included in this analysis was described using these 15 categories: a) the size of the correlation, b) the sample size, c) the reliability of the Big Five trait measure, d) the reliability of the tolerance of ambiguity measure, e) the Big Five trait scale used, f) the tolerance of ambiguity scale used, g) the direction of the tolerance of ambiguity measure (tolerance or intolerance), h) the name of the Big Five trait correlate, i) the author(s) of the publication, j) the source of the publication (journal, dissertation, thesis), k) the year of publication, l) the percent of the sample identified as female, m) the percent of the sample identified as white, n) the mean age of the sample, and o) described sample characteristics (e.g. "American business school graduate students").

Analyses

The Hunter & Schmidt (2004) meta-analytic method was used to estimate population effect sizes between tolerance of ambiguity and the Big Five personality traits, using a random-effects model. Random effects models estimate the amount of effect size heterogeneity after correcting for sampling and measurement error and guard against potential overestimation of effect sizes and overstatement of precision (Hunter & Schmidt, 2000). Artifact distributions were constructed from the reliability information given in included studies to correct for the attenuation of effect sizes due to measurement error. Meta-analytic estimates were calculated using the *psychmeta* package for R version 3.6.3 (Dalhke & Wiernik, 2018).

Results

Results of the meta-analysis of all Big Five traits and tolerance of ambiguity measures are presented in Table 2. The hypothesis that tolerance of ambiguity is most strongly correlated with openness to experience was supported by this analysis, $r_{obs} = .36$, $\rho = .47$, CR 80% = .18 to .54. While this estimate indicated a strong relation between tolerance of ambiguity and openness to experience, the standard deviation of the corrected correlation suggested notable heterogeneity of effect sizes and influence of moderators, $SD_{\rho} = .17$.

Publication Bias

To consider whether effect sizes differed by publication status of the source from which they were recorded (journal articles, unpublished dissertations, or unpublished theses), separate meta-analytic estimates were calculated based on publication source. Separate meta-analytic results, based on publication in peer reviewed journals and publication from all other sources (unpublished), are presented in Table 3. Unpublished studies reported notably larger effects than published studies for both conscientiousness and emotional stability's relations to tolerance of

ambiguity. Egger's test of funnel plot asymmetry was used to estimate the extent to which this meta-analysis excluded small studies with weak effects for each relation (Eggers, Smith, Schneider, & Minder, 1997). This test was conducted using the *dmetar* R package (Harrer, Cuijpers, Furukawa, & Ebert, 2019). Evidence of publication bias for effect sizes including conscientiousness was not found, as the intercept is negative but not significantly different from zero, $a = 3.41, p = .13$. Similarly, evidence for publication bias was not found for tolerance of ambiguity's relations with agreeableness, $a = -1.65, p = .31$; emotional stability, $a = .20, p = .91$; $a = -1.83, p = .13$; extraversion, $a = -1.83, p = .13$, or openness, $a = -3.66, p = .10$.

Heterogeneity statistics

Follow up analyses were conducted to estimate the extent to which heterogeneity of effect sizes may be influencing meta-analytic estimates. Percent of total variance accounted for by artifacts including sampling error tend to be underestimations of the influence of artifacts on the observed variance (Schmidt, 2010; Schmidt & Hunter, 2015, p. 15, 425). However, the square root of this percentage may be interpreted as the correlation between the observed effect size and statistical artifacts in the sample. For the relations between tolerance of ambiguity and Big Five traits, the observed correlation and artifactual perturbations were correlated moderately: conscientiousness, $r = .39$; agreeableness, $r = .53$; emotional stability, $r = .33$; extraversion, $r = .53$; openness, $r = .44$. For the main trait of interest, openness, the correlation between r and sampling error was moderately strong, $r = .37$, and the correlation between r and other artifacts was weak, $r = .23$. This notable relation between effect size and artifactual perturbations could be due to a number of factors, including measurement error in tolerance of ambiguity, measurement error in openness, and range restriction. It is likely that unreliability in measuring both openness

and tolerance of ambiguity affected these meta-analytic estimates, as internal consistency estimates of both measures tend to be low.

Discussion

Study 1 provided a meta-analytic exploration of tolerance of ambiguity as distinct from Big Five personality traits. Given the conceptual similarity between tolerance of ambiguity and openness to experience, it was predicted that the estimation of population effect size would be strongest between tolerance of ambiguity and openness to experience. Results of the meta-analysis supported this prediction, but the standard deviation of the true score correlation for this effect suggested the influence of modelled or unmodelled moderators. Studies included in this meta-analysis utilized many different tolerance of ambiguity scales, to the extent that focusing on studies using one scale against others was not viable. This heterogeneity of scales may have produced heterogeneity in effect sizes with Big Five personality traits.

These results are consistent with previous findings regarding the relation between tolerance of ambiguity and global openness (Bardi et al., 2009; Caliguiri & Tarique, 2012; Jach & Smillie, 2019; Strauss, Connerly, & Ammermann, 2003). The support of such results with meta-analysis implies two possible theoretical paths of tolerance of ambiguity moving forward.

1) Tolerance of ambiguity may be a composite of openness to experience, emotional stability, and extraversion. Though narrow constructs related to Big Five traits may be measured directly, they may also be approximated using linear combinations of Big Five traits (Credé, Harms, Blacksmith, & Wood, 2016). For example, Credé and colleagues (2016) demonstrated that “leadership potential” may be measured directly or by combining scores across the Big Five (most strongly weighing extraversion and emotional stability). Tolerance of ambiguity may be such a composite construct, and future research should compare its direct measurement to linear

combinations of Big Five traits, most likely weighing openness, extraversion, and emotional stability relatively strongly. 2) Tolerance of ambiguity may be incorporated into the existing structure of openness to experience as a lower-order facet. The relation between tolerance of ambiguity and openness is similar to meta-analytic estimates of relations between two different measures of global openness (see Pace & Brannick, 2010). This overlap could indicate that tolerance of ambiguity captures information similar to lower-order facets of openness. Of course, convergence with another construct does not imply similar predictive utility, even for two constructs purported to be identical (Pace & Brannick, 2010). It has been established that two strongly correlated variables can exhibit different relations with a criterion variable (McCornack, 1956). Questions of differential predictive utility between openness and tolerance of ambiguity will be addressed in Studies 2 and 3.

CHAPTER 4. STUDY 2

This study attempted to verify the structure of the MAAS proposed by its developers. The MAAS facets and general ambiguity tolerance factor were subsequently compared to neighboring “closed mindedness” constructs in prediction of college grades and intentions to drop out of college. Tolerance of ambiguity is expected to be related to higher grades and fewer dropout intentions.

Hypotheses

Hypothesis 1. Attitude toward ambiguity structure. The Multidimensional Attitude Toward Ambiguity scale’s bifactor, three-facet structure (Lauriola et al., 2016) will display better fit than a three-facet structure without a general factor and higher-order general factor model with three lower-order facets.

Hypothesis 2. Tolerance of ambiguity associated with higher grades. Participants with a higher tolerance of ambiguity will also have higher GPAs than participants who are intolerant of ambiguity.

Hypothesis 3. Ambiguity intolerance associated with greater intentions to drop out. Participants who are intolerant of ambiguity will endorse intentions to drop out of college at a higher rate than ambiguity tolerant participants.

Method

Participants

Approval for research involving human subjects was acquired before starting data collection (see Appendix C). Monte Carlo simulations were conducted to determine an adequate sample size for detecting item loadings and correlations among latent factors in the Multidimensional Attitude Toward Ambiguity scale (MAAS) through a confirmatory factor

analysis. Using Muthén and Muthén's (2002) syntax, different models were simulated based on possible sample sizes of 400, 500, and 600, correlations among factors being equal to those found by Lauriola et al. (2016), the average loading of items onto three factors being .6, and the average item loadings onto the general factor being .45. Results are presented in Table 1.

Assuming correlations among latent factors are equal to those found by MAAS developers, a sample size of more than 400 would achieve adequate power ($\beta > .9$). To approach more complete coverage of the true effects size as estimated by 95% confidence intervals by the Monte Carlo replications, the target sample size was 600. Participants were limited to college students over the age of 18 at a large Midwestern university. The survey was administered via Qualtrics as an online study for which participants received 1 course credit. Data were collected from 595 respondents. 7 participants left over 70% of the survey blank and were excluded. 25 participants were excluded for failing more than 2 attention checks. The overall rate of missing data after listwise exclusion was .04%. The remaining missing data was excluded or imputed at the scale level for 8 participants: minimum 1.2% missing and maximum 9.58% missing. Mean imputations were conducted for 5 of these participants. The NFC scale was left more than 30% blank for the remaining participants and was therefore excluded from analysis. The final sample size was 563. The sample was primarily female (71.8%), white (86.3%), and in the first year of study (52.7%). Participants' ages ranged from 18 to 38, mean being 19.58.

Measures

The Multidimensional Attitude Toward Ambiguity Scale

Attitudes toward ambiguity was assessed via the 30-item MAAS self-report scale (Lauriola et al., 2016). The scale includes three dimensions. Discomfort with Ambiguity includes items such as "It bothers me when I don't know how other people react to me" and "If I don't get

the punch line of a joke, I don't feel right until I understand it." Scores on the subscale were found to be adequately reliable by the original authors in a sample of Italian-speaking participants, $\omega = .78$, and a sample of English-speaking participants, $\omega = .83$. Moral Absolutism/Splitting includes items such as "There are two kinds of people: the 'good' and the 'bad'" and "There's a right way and a wrong way to do almost everything." Scores on the subscale were found to be adequately reliable in the same Italian-speaking sample, $\omega = .80$, and the same English-speaking sample, $\omega = .88$. Need for Complexity and Novelty consists of items such as "I'm drawn to situations which can be interpreted in more than one way." And "It is more fun to tackle a complicated problem than to solve a simple one." Scores on the subscale were found to be adequately reliable in the Italian-speaking sample, $\omega = .71$, and the sample of English-speaking participants, $\omega = .78$. Participants rate their agreement with such statements using a 7-point Likert-type scale, ranging from *I strongly disagree* (1) to *I strongly agree* (7). Results are reported using both general scores on the measure and facet scores for the three subscales.

Need for Cognitive Closure

Need for cognitive closure was assessed using the 15-item version of the revised Need for Cognitive Closure scale (Roets & Van Hiel, 2011). The scale captures need for cognitive closure as a one-dimensional construct, and it uses items intended to capture five lower order facets: order, predictability, ambiguity, close-mindedness, and decisiveness. The scale includes items such as "When I have made a decision, I feel relieved." And "I dislike it when a person's statement could mean many different things." Roets & Van Hiel (2011) report scores on the scale correlate highly with the original 41-item version, $r = .95$, and are adequately internally

consistent, $\alpha = .87$. The items of the scale were rated on a 6-point Likert-type scale, ranging from *completely disagree* (1) to *completely agree* (6).

Openness to Experience

Six facets of openness to experience were assessed using the international personality item pool (IPIP) version of the revised NEO personality inventory (NEO-PI-R; see Costa & McCrae, 2008). The openness scale includes the following facets. Imagination (O1) includes items such as “I spend time reflecting on things” and “I seldom get lost in thought” (*reversed*). Scores on this scale were found to be adequately internally consistent by the developers, $\alpha = .83$ (Goldberg et al., 2008). Artistic Interests (O2) includes items like “I see beauty in things that others might not notice” and “I do not like art” (*reversed*). Scores on this scale were also found to be adequately internally consistent, $\alpha = .84$. Emotionality (O3) is assessed with items like “I experience my emotions intensely” and “I rarely notice my emotional reactions” (*reversed*). Scores on the emotionality scale were also found to be adequately internally consistent, $\alpha = .81$. Adventurousness (O4) consists of items like “I prefer variety to routine” and “I prefer to stick with things that I know” (*reversed*). Scores on this scale meet more lenient thresholds of internal consistency but are not as reliable as the other openness facet measures, $\alpha = .77$. Intellect (O5) is assessed with items like “I can handle a lot of information” and “I have difficulty understanding abstract ideas” (*reversed*). Goldberg and colleagues (2006) found scores on this this scale to be adequately internally consistent, $\alpha = .86$. Liberalism (O6) includes items like “I believe that there is no absolute right or wrong.” and “I believe laws should be strictly enforced” (*reversed*). Scores on the liberalism scale were found to be adequately internally consistent, $\alpha = .86$.

Participants rated items on a 5-point Likert scale ranging from *very inaccurate* (1) to *very accurate* (5).

Dogmatism

Dogmatic thinking was assessed using the 22-item DOG scale (Altemeyer, 2002). Dogmatism items such as “My opinions are right and will stand the test of time” and “People who disagree with me may well turn out to be right (*reversed*)” are rated on a 5-point Likert scale ranging from *strongly disagree* (1) to *strongly agree* (5). Crowson and colleagues (2008) found the DOG scale to be internally consistent, $\alpha = .90$, unidimensional, and distinct from a number of other conceptually similar variables such as need for cognitive closure, need for structure, and need for cognition.

Intentions to drop out

Participants were asked the extent to which they are likely to drop out of college using an adapted version of a short intentions to persist in school scale (Hardre & Reeve, 2003). These items are “I sometimes consider dropping out of college,” “I sometime feel unsure about continuing my studies year after year,” and “I intend to drop out of college.” Items were rated on a 7-point Likert-type scale ranging from *not at all* (1) to *very much so* (7). Hardre and Reeve found the three-item scale to be more internally consistent than a widely used two-item measure, $\alpha = .79$, while maintaining a high correlation with the same scale, $r = .97$.

Participants were also asked to report their GPA, ACT or SAT scores, and high school GPA. Meta-analytic estimates indicate self-reports of GPA are highly correlated with GPAs obtained from college records, $r_{obs} = .90$, and similarly strong relations are found between standardized test scores obtained from self-reports and records, $r_{obs} = .82$ (Kuncel, Credé, &

Thomas, 2005). Demographic information assessment included age, year in school, ethnicity, and gender.

Ambiguity-Specific Positive and Negative Affect

Items from the Positive and Negative Affect Schedule (Watson & Clark, 1994) were adapted to capture affective responses to ambiguous situations in college. Participants were asked to indicate their level of agreement, using a 5-point scale ranging from *strongly disagree* (1) to *strongly agree* (5), to the following prompts: 1) “If I am given unclear instructions by my professor, I feel...” 2) “If I am unsure of how to complete my assignments, I feel...” 3) “If I am unsure of how my work will be graded by my professor, I feel...” 4) “If I am assigned to work on a class project with a group of people I do not know well, I feel...” 5) “If my professor gives me vague feedback on my work, I feel...” by completing each prompt with the following emotional reactions: 1) *discouraged* 2) *nervous* 3) *angry* 4) *irritable* 5) *determined* 6) *distressed* 7) *inspired*. Academic ambiguity positive affectivity consisted of endorsement of *determined* and *inspired* after each prompt. Academic ambiguity negative affectivity consisted of endorsement of *discouraged*, *nervous*, *angry*, *irritable*, and *distressed* after the same prompts. Academic ambiguity-specific positive affectivity and negative affectivity were found to be adequately internally consistent, $\alpha = .83$, $\alpha = .89$, respectively.

Attention check items

Random or careless responses, even in low proportion to the total number of responses (e.g. 10%), can distort data such that effects are attenuated, inflated, or change direction (Credé, 2010). Three attention check items were included to screen for random responding. All three were instructional manipulation checks, for example “If you believe you are paying attention to

this survey, please select ‘disagree.’” Passing an attention check was scored as simply selecting the instructed response item.

Procedure

Participants completed the survey online outside a lab setting. Attention checks were included as data screening tools. If a participant failed two of three attention checks, they were excluded from analysis. Surveys were also screened for missingness. If a participant answered fewer than 80% of the items, they were excluded from the analysis. Items missing within scales were replaced with scale means for each participant with missing data, if more than 70% of the scale had been completed.

Analyses

Confirmatory factor analyses were conducted on the MAAS in an attempt to replicate the bifactor, three-facet solution found by its developers (Lauriola et al., 2016). Facets of the scale, general tolerance of ambiguity scores, openness to experience facets, and need for cognitive closure were analyzed using hierarchical regression to determine incremental validity of tolerance of ambiguity to explain variance in college GPA and dropout intentions in separate respective models. Correlations between all measures and descriptive statistics were calculated.

Results

Hypothesis 1

The Multidimensional Attitude Toward Ambiguity scale’s bifactor, three-facet structure (Lauriola et al., 2016) will display better fit than a three-facet structure without a general factor and higher-order general factor model with three lower-order facets.

Confirmatory factor analyses were conducted using R statistical software (Version 3.6.3) and the *lavaan* package (Rosseel, 2012). Models were estimated using robust maximum

likelihood (MLR) and based on 563 observations. Chi-square values and global fit indices are reported, though global fit indices are used for model interpretation, as chi-square values test a null hypothesis of perfect fit, and this hypothesis was expected to be rejected across all models (Kline, 2016). Hu & Bentler's (1999) recommendations of interpreting fit were used, i.e. $RMSEA < .05$, $SRMR < .09$, $CFI/TLI > .95$. Fit indices of all models are presented in Table 4. The three-factor model defined the discomfort with ambiguity, moral absolutism, and need for complexity factors as described by Lauriola and colleagues (2016), excluding a general factor, and correlations between factors were not constrained. This model did not fit the data well ($\chi^2 = 482.83$, $df = 186$, $p < .001$, $CFI = .89$, $RMSEA = .06$). The hierarchical model in which the three lower order factors load on a higher-order general factor did not fit the data better than the three-factor model ($\chi^2 = 482.82$, $df = 186$, $p < .001$, $CFI = .89$, $RMSEA = .06$).

The bifactor model, which displayed the best fit in the original sample (Lauriola et al., 2016), fit the data better than alternative models and approached acceptable thresholds of global fit ($\chi^2 = 381.90$, $df = 168$, $p < .001$, $CFI = .93$, $RMSEA = .05$). Because the hierarchical model and three-factor model are identical in fit and mathematically nested in the bifactor model (see Credé & Harms, 2015), differences in fit between these models were calculated using a sequential chi-square difference test (Anderson & Gerbing, 1988). The bifactor model fit the data better than the hierarchical model and the three-factor model by this standard ($\Delta\chi^2 = 142.14$, $\Delta df = 18$, $p < .001$). Hypothesis 1 was therefore supported, but it should be noted that no proposed model met cutoff criteria for acceptable fit: CFI and $TLI > .95$, $RMSEA < .05$ (Hu & Bentler, 1999). Loadings on the general factor also varied considerably, ranging from .04 ("A person is either 100% patriotic or they aren't") to 4.16 ("Some problems are so complex that just trying to understand them is fun"), average squared loading = 3.31. Fit of the model may have been

improved by removing certain constraints. For example, examination of standardized residuals indicated the item “I tend to like obscure or hidden symbolism” may have caused poor fit of the bifactor model. Modification indices suggested that the fit would be most improved by adding a correlated residual between “I don’t feel comfortable with people until I can find out something about them” and “I am just a little uncomfortable with people unless I feel that I can understand their behavior.”

Hypothesis 2

Participants with a higher tolerance of ambiguity will also have higher GPAs than participants who are intolerant of ambiguity.

Correlations and descriptive statistics for Study 2 variables are presented in Table 5. The MAAS tolerance of ambiguity facets and general factor displayed moderately strong zero-order correlations with a number of variables. The MAAS general factor was most strongly related to need for cognitive closure, $r = .27$, and the intellect facet of openness, $r = .20$. The general factor also displayed positive weak correlations with both academic ambiguity-specific positive affect, $r = .19$, and negative affect, $r = .11$. The discomfort with ambiguity MAAS facet correlated most strongly with academic ambiguity-specific negative affect, $r = .35$, emotionality, $r = .20$, and adventurousness, $r = -.20$, and dogmatism, $r = -.19$. The need for complexity MAAS facet correlated strongly with the intellect facet of openness, $r = .61$. The only MAAS factor that correlated significantly with the hypothesized outcome of GPA was moral absolutism, $r = -.20$.

Hierarchical multiple regression results predicting GPA are presented in Table 6. Data were screened for assumptions of linearity, normality and homoscedasticity. 10 participants were excluded on the basis of extreme Mahalanobis distance (calculated at $\alpha = .001$), Cook’s distance, and leverage values. The Breusch-Pagan test indicated the assumption of homoscedasticity was

met, $\chi^2(15, 551) = 21.69, p = .12.$, but the Shapiro-Wilk test indicated residuals were not normally distributed, $W = .96, p < .001$. Need for closure, dogmatism, openness to experience facets, and demographic variables were included in step 1 of a hierarchical regression model predicting GPA. This model explained significant variance in GPA, $F(12, 502) = 3.96, p < .001, R^2_{adj} = .06$. The second step of the model, including tolerance of ambiguity facets, explained additional variance in GPA over control variables and neighboring constructs, $F(3, 499) = 8.02, p < .001, \Delta R^2_{adj} = .04$. Participants who reported more moral absolutism, $\beta = -.20, t(499) = -3.90, p < .001$, reported lower grades. Participants who reported more need for complexity, $\beta = -.13, t(499) = -2.14, p = .03$, also reported lower grades. Discomfort with ambiguity was not a significant predictor of grades, $\beta = .07, t(499) = 1.28, p = .20$. Assumptions and data screening procedures were repeated using the general MAAS factor instead of the three facets in the model. 13 participants were excluded from analysis for extreme Mahalanobis distance (calculated at $\alpha = .001$), Cook's distance, and leverage values. The Breusch-Pagan test indicated the assumption of homoscedasticity was not violated, $\chi^2(13, 548) = 18.51, p = .14$, but the residuals were not normally distributed, $W = .95, p < .001$. The second step of this model also explained additional variance in GPA after accounting for neighboring constructs and demographic variables, $F(1, 500) = 11.57, p < .001, \Delta R^2_{adj} = .03$.

Hypothesis 3

Participants who are intolerant of ambiguity will endorse intentions to drop out of college at a higher rate than ambiguity tolerant participants.

Correlations and descriptive statistics for Study 2 variables are presented in Table 5.

Discomfort with ambiguity correlated positively and weakly with intentions to drop out, $r = .14$.

The general factor, $r = .11$, and total scale, $r = .10$, displayed similar effects with dropout intentions.

Hierarchical multiple regression results predicting intentions to drop out of college are presented in Table 7. Data were screened for assumptions of linearity, normality and homoscedasticity. 13 participants were excluded on the basis of extreme Mahalanobis distance (calculated at $\alpha = .001$), Cook's distance, and leverage values. The Breusch-Pagan test indicated the assumption of homoscedasticity was met, $\chi^2(15, 549) = 17.12, p = .31$, but residuals were not normally distributed $W = .93, p < .001$. Need for closure, dogmatism, openness to experience facets, and demographic variables were included in step 1 of a hierarchical regression model predicting dropout intentions. This model explained significant variance in dropout intentions, $F(12, 508) = 2.08, p = .02, R^2_{adj} = .02$. The second step of the model, including tolerance of ambiguity facets, explained additional variance in dropout intentions over control variables and neighboring constructs, $F(3, 505) = 5.44, p < .001, \Delta R^2_{adj} = .03$. Higher discomfort with ambiguity was the only significant predictor of greater intentions to drop out of college in this second step, $\beta = .17, t(505) = 3.25, p = .001$. Similar to the previous analysis, data screening and assumption checks were repeated using the MAAS general factor in the model instead of the three MAAS facets. 12 participants were excluded from analysis for extreme Mahalanobis distance (calculated at $\alpha = .001$), Cook's distance, and leverage values. The Breusch-Pagan test indicated the assumption of homoscedasticity was not violated, $\chi^2(13, 550) = 17.27, p = .18$, but residuals were not normally distributed, $W = .93, p < .001$. The second step of this model also explained additional variance in dropout intentions after accounting for neighboring constructs and demographic characteristics, $F(1, 508) = 9.70, p = .001, \Delta R^2_{adj} = .02$.

Affective reactions to ambiguity items

Academic ambiguity-specific positive affect items and negative affect items were found to be adequately internally consistent, $\alpha = .83$ and $\alpha = .89$, respectively. Positive emotionality in reaction to ambiguity in academic situations was negatively related to negative emotionality in the same situations, $r = -.25$. Ambiguity positive affect was moderately correlated with the need for complexity MAAS facet, $r = .30$, and ambiguity negative affect was moderately correlated with the discomfort with ambiguity MAAS facet, $r = .35$.

Discussion

Structure and Validity of the MAAS

The bifactor model of the MAAS displayed better fit than alternative models. However, this model did not reach conventional levels of clear good fit. While 21 items were retained for the “final” version of the scale, the full 30-item scale may need to be reassessed in order to generalize across a large number of studies. At the factor level, the bifactor model sets correlations at zero between MAAS facets. Given the correlations between factors in Lauriola and colleagues' (2016) studies, Study 2, and Study 3, this constraint may not be appropriate, and correlations between factors should be modelled in future research.

Moreover, the general factor within the proposed bifactor model may not represent a meaningful “overall” tolerance of ambiguity. Bifactor models may produce general factors which form from information not central to the content of the scale, such as common method, item wording, or other artifacts. In the case of the MAAS, the general factor is perhaps a reflection of the similarity of scales from which the MAAS was derived. The low intercorrelations among factors in this study seem to indicate a general factor may not be an appropriate reflection of shared information contained in these factors. This general factor may instead be purely

artifactual, or the result of “unmodelled complexities” (Murray & Johnson, 2013). That is, a bifactor model includes more parameters, including the general factor, that may absorb unmodelled elements such as cross loadings or small residual correlations set to zero that would otherwise decrease global model fit (Beauducel & Wittmann, 2005; Murray & Johnson, 2013). Though comparison between models accounts for the number of parameters, these comparisons do not account for the covariance modelled being meaningful or artifactual, leading to potentially inflated global fit indices for models with more parameters (Murray & Johnson, 2013).

The items identified by inflated residuals and modification indices indicate a general problem with item wording. Items with seemingly unrelated abstract content such as tendency toward “obscure or hidden symbolism” may not fit with other MAAS items describing social or intellectual challenges. Shared information between items such as “I don’t feel comfortable with people until I can find out something about them” and “I am just a little uncomfortable with people unless I feel that I can understand their behavior” may reflect extremely similar item wording rather than shared information germane to a latent tolerance of ambiguity factor. Double negative items like “If I don’t get the punch line of a joke, I don’t feel right until I understand it” are expected to be especially difficult to endorse, given the difficulty of comprehension, leading to decreased utility of scores derived from such items.

Tolerance of Ambiguity’s Place in the Nomological Network

Correlations between Study 2 variables are presented in Table 5. MAAS facets were significantly correlated with facets of openness to experience. Most strongly, MAAS complexity is highly correlated with intellect, $r = .61$. No MAAS facet was correlated as strongly with global openness as facets of the openness scale, e.g. MAAS complexity and total openness, $r = .44$; adventurousness and total openness, $r = .57$. MAAS moral absolutism was significantly

moderately correlated with liberalism, $r = -.45$, and dogmatism, $r = .40$. MAAS discomfort with ambiguity was most strongly correlated with need for cognitive closure, $r = .44$. The MAAS general factor was not as strongly correlated as MAAS facets with neighboring constructs. General intolerance of ambiguity was most strongly associated with need for cognitive closure, $r = .27$ and intellect, $r = .20$. While these correlations indicate relatedness between tolerance of ambiguity and other close constructs, there is evidence that facets of tolerance of ambiguity display adequate predictive utility. The ability of tolerance of ambiguity to explain variance in academic outcomes after controlling for related constructs supports the construct's conceptual distinctiveness and practical merit.

Relations with Academic Success

I hypothesized that tolerance of ambiguity would predict additional variance, above neighboring constructs, in GPA and dropout intentions. Results of Study 2 partially support the incremental validity of MAAS facets predicting college GPA: higher moral absolutism was associated with lower grades, higher need for complexity was associated with lower grades (this is the opposite direction expected), but discomfort with ambiguity did not explain additional variance in grades. These results were maintained using the general MAAS factor rather than MAAS facets, as endorsement of general intolerance of ambiguity was associated with lower grades. These constructs explain small amounts of variance over one another, and it is expected that in future studies, much larger amounts of variance in grades would be account for by traditional predictors such as intelligence, conscientiousness, and study skills (Credé & Kuncel, 2008; Poropat, 2009; Roth et al., 2015).

I hypothesized that tolerance of ambiguity would also predict variance in dropout intentions after controlling for neighboring constructs. This hypothesis was partially supported,

as discomfort with ambiguity and the general MAAS factor separately explained additional variance in intentions to drop out of college. Intentions to drop out of college are of course multidetermined, and tolerance of ambiguity is again expected to be a relatively weak predictor in future studies including known predictors such as academic self-efficacy, social support, and study skills (Robbins et al., 2004). These findings represent a demonstration that tolerance of ambiguity can explain additional variance in criterions of interest when competing with conceptually similar variables.

CHAPTER 5. STUDY 3

Study 3 utilized a sample of employed adults to test possible relations between tolerance of ambiguity and success outcomes outside of an academic context. This sample required added complexity of hypotheses and analyses, as participants were more heterogenous than those in Study 2. Namely, predictions and analyses regarding tolerance of ambiguity controlled for levels of ambiguity in a given job. While job outcomes are also contextually different from student outcomes, findings from Study 2 were expected to generalize to this sample. Tolerance of ambiguity was expected to be beneficial across a diverse number of job outcomes and workplace climate criteria.

Hypotheses

Hypothesis 1a. Tolerance of ambiguity will be positively related to job satisfaction.

Participants who are tolerant of ambiguity will be more satisfied with their job than participants who are intolerant of ambiguity.

Hypothesis 1b. Perceived job ambiguity will moderate the relation between tolerance of ambiguity and job satisfaction, such that the relation between tolerance of ambiguity and job satisfaction will be stronger when perceived job ambiguity is high.

Hypothesis 2a. Tolerance of ambiguity will be positively related to job performance.

Participants who are tolerant of ambiguity will perform better at work than participants who are intolerant of ambiguity.

Hypothesis 2b. Perceived job ambiguity will moderate the relation between tolerance of ambiguity and job performance, such that the relation between tolerance of ambiguity and job performance will be stronger when perceived job ambiguity is high.

Hypothesis 3a. Tolerance of ambiguity will be negatively related to job stress.

Participants who are tolerant of ambiguity will be less stressed by their work in general than participants who are intolerant of ambiguity.

Hypothesis 3b. Perceived job ambiguity will moderate the relation between tolerance of ambiguity and stress, such that the relation between tolerance of ambiguity and job stress will be stronger when perceived job ambiguity is high.

Hypothesis 4a. Tolerance of ambiguity will be positively related to organizational citizenship behaviors. Participants who are tolerant of ambiguity will endorse more OCBs than participants who are intolerant of ambiguity.

Hypothesis 4b. Perceived job ambiguity will moderate the relation between tolerance of ambiguity and OCBs, such that the relation between tolerance of ambiguity and OCBs will be stronger when perceived job ambiguity is high.

Hypothesis 5a. Tolerance of ambiguity will be negatively related to counterproductive workplace behaviors. Participants who are tolerant of ambiguity will endorse fewer CWBs than participants who are intolerant of ambiguity.

Hypothesis 5b. Perceived job ambiguity will moderate the relation between tolerance of ambiguity and CWBs, such that the relation between tolerance of ambiguity and CWBs will be stronger when perceived job ambiguity is high.

Hypothesis 6a. Tolerance of ambiguity will be negatively related to job withdrawal. Participants who are tolerant of ambiguity will endorse fewer job withdrawal behaviors than participants who are intolerant of ambiguity.

Hypothesis 6b. Perceived job ambiguity will moderate the relation between tolerance of ambiguity and job withdrawal, such that the relation between tolerance of ambiguity and job

withdrawal will be stronger when perceived job ambiguity is high.

Method

Participants

Approval for research involving human subjects was acquired before starting data collection (see Appendix C). The target sample size for this study was 300. Participants were limited to employed adults over the age of 18 within the United States. The survey was administered via Study Response as an online study for which each participant received a \$5 electronic gift card. No direct identifying information was collected. Data from 293 responses were analyzed. 6 participants' responses were excluded for ineligibility, i.e. indicating they were either under 18 or unemployed. An additional 22 participants were excluded for leaving more than 20% of the survey blank. 13 additional participants were excluded for failing two or more attention checks. Scale means were imputed for ten remaining participants with missing data, average missingness = 1.51%. The final sample size was 252. The sample was primarily male (59.2%), white (90.3%), and working at their current job for an average of 12.17 years. Participants' ages ranged from 24 to 77, mean being 43.29. Participants reported jobs in all 16 O*NET career clusters, and their reported job titles and descriptions were matched to 139 different O*NET occupations.

Measures

The Multidimensional Attitude Toward Ambiguity Scale

Attitudes toward ambiguity was assessed with the same 30-item self-report MAAS as Study 2 (Lauriola et al., 2016). The measure's general score and discrete scores for the three subscales, Discomfort with Ambiguity, Moral Absolutism/Splitting, and Need for Complexity,

were analyzed and reported. It is important for interpretation to reiterate that the MAAS general factor indicates a general *intolerance* of ambiguity.

Uncertainty tolerance

The Intolerance of Uncertainty Scale-Short Form (IUS-12) is a 12-item scale used to assess aversion to possible future negative events (Carleton, Norton, & Asmundson, 2007). Items include “I should be able to organize everything in advance” and “The smallest doubt can stop me from acting.” Scores on the 12-item scale were found to be highly internally consistent, $\alpha = .91$, and strongly correlated with the original 27-item Intolerance of Uncertainty scale, $r = .96$ (Carleton et al., 2007). Items were rated on a 5-point Likert scale ranging from *not at all characteristic of me* (1) to *entirely characteristic of me* (5).

Occupation

Participants were asked to report their official job title, at least three keywords associated with their job (e.g. “manager,” “salesperson,” “automotive”), and a short open-ended description of their job duties. Two items assessed supervisory position status: “Do you supervise other employees at work?” and “How many employees do you supervise directly?” Additionally, participants selected one of 16 career clusters defined by O*NET (e.g. “finance,” “architecture and construction,” “hospitality and tourism”) that described their professional field most closely. These job titles and classifications were matched to the job titles listed in the O*NET database (see the coding sample, Appendix B). O*NET occupation codes were assigned using the following procedure. Participants’ reported job titles and short descriptions were searched within the career cluster they identified. If no match could be made, the full O*NET database was searched for a matching job title. If no matching job title was found, O*NET occupations were assigned based on approximation to the duties participants described. If participants reported

unclear or incomplete occupation information, they were matched within career clusters to a generalized O*NET category, designated with a job title ending in “all other.” Each occupation in the O*NET database is listed with a number of abilities, skills, and interests typical of a person with a certain occupation. Occupations and the associated “category flexibility” ratings (detailed presently) were assigned to each participant according to their assigned O*NET occupation code.

Job Ambiguity

Participants rated their job’s perceived level of ambiguity using the Job Ambiguity scale, which assesses ambiguous elements of work methods, performance criteria, and scheduling (Breugh & Colihan, 1994). Participants rated items such as “I know how to get my work done (what procedures to use),” “I know what my supervisor considers satisfactory work performance,” and “I know when I should be doing a particular aspect (part) of my job,” for each dimension respectively, on a 7-point Likert-type scale ranging from *disagree strongly* (1) to *agree strongly* (7). As all items are positively worded, scores were reversed to reflect *ambiguity* rather than *certainty* about one’s job.

Job ambiguity was also approximated using the “category flexibility” rating of each occupation derived from O*NET. Category flexibility describes “the ability to generate or use different sets of rules for combining or grouping things in different ways” (National Center for O*NET Development). Of the cognitive abilities described for all occupations, this rating most closely describes a potential ability related to tolerance of ambiguity in a job setting. The “level” rating for each occupation – the degree to which category flexibility is required to complete aspects of the occupation – was used. Category flexibility levels range from 21 (mine shuttle car operators) to 75 (biochemists and biophysicists; National Center for O*NET Development).

Analyses including job ambiguity were repeated for both self-reports of ambiguity and O*NET category flexibility scores, and results using both measures of job ambiguity are reported.

Job satisfaction

Job satisfaction was assessed using the Job In General (JIG) scale, in which participants rate how well a list of adjectives describe their work in broad terms (Gillespie et al., 2015). Participants were asked “Think of your job in general. All in all, what is it like most of the time? 1) Pleasant 2) Bad 3) Great...” Each adjective was rated on a 3-point scale: *Yes*, *No*, or ? to indicate “if you cannot decide.”. These responses were scored as *Yes* = 3, ? = 1, *No* = 0, with reverse scored items being *Yes* = 0, ? = 1, *No* = 3.

Job stress

Stress experienced at work was assessed using the 15-item Stress In General (SIG) scale (Stanton, Balzer, Smith, Parra, & Ironson, 2001). Participants rated the relevance of individual adjectives related to their job through the SIG. Adjectives such as “hectic” and “pressured” capture work *pressure*, and adjectives such as “overwhelming” and “nerve-wracking” capture work *threat*. Each item was scored on a 3-point scale: *Yes*, *No*, or ? to indicate “if you cannot decide.” These responses are scored as *Yes* = 3, ? = 1, *No* = 0, with reverse scored items being *Yes* = 0, ? = 1, *No* = 3.

Job withdrawal

Intentions to quit and engagement in behaviors related to quitting were assessed using a 5-item Job Withdrawal Scale (Hanisch & Hulin, 1991). Participants rated items like “thought about leaving the organization” or “talked to people about another job” according to how accurately they described their intentions, using a 5-point Likert scale ranging from *very inaccurate* (1) to *very accurate* (5).

Counterproductive workplace behaviors

A 10-item version of the Counterproductive Work Behavior Checklist was used to assess behaviors that are harmful to coworkers, workplace property, or company efficiency (Spector, Bauer, & Fox, 2010). Participants rated how often they engage in behaviors like “started an argument with someone at work” or “purposefully wasted your employer’s materials/supplies” on a 5-point Likert scale ranging from *never* (1) to *every day* (5).

Organizational citizenship behaviors

A 10-item version of the Organizational Citizenship Behavior Checklist was used to assess behaviors that generally helpful to coworkers and workplace climate (Spector, Bauer, & Fox, 2010). Participants rated how often they engage in behaviors like “helped a coworker learn new skills or shared job knowledge” or “volunteered for extra work assignments” on a 5-point Likert scale ranging from *never* (1) to *every day* (5).

Job performance

Subjective rating of job performance was assessed using participant ratings of 7 items related to “in-role behavior” from a broader job performance scale (Williams & Anderson, 1991). Participants rated their agreement with statements such as “I adequately complete my assigned duties” and “I fulfill responsibilities specified in my job description.” Each item was scored on a 5-point Likert scale ranging from *strongly disagree* (1) to *strongly agree* (5).

Ambiguity-Specific Positive and Negative Affect

Items from the Positive and Negative Affect Schedule (Watson & Clark, 1994) were adapted to capture affective responses to ambiguous situations at work. Participants were asked to indicate their level of agreement, using a 5-point scale ranging from *strongly disagree* (1) to *strongly agree* (5), to the following prompts: 1) “If I am given unclear instructions by my

supervisor, I feel...” 2) “If I am unsure of how to complete my assigned duties, I feel...” 3) “If I am unsure of how my work will be evaluated by my supervisor, I feel...” 4) “If I am assigned to work on a project with a group of people I do not know well, I feel...” 5) “If my supervisor gives me vague feedback on my work, I feel...” by completing each prompt with the following emotional reactions: 1) *discouraged* 2) *nervous* 3) *angry* 4) *irritable* 5) *determined* 6) *distressed* 7) *inspired*. Workplace ambiguity positive affectivity consisted of endorsement of *determined* and *inspired* after each prompt. Workplace ambiguity negative affectivity consisted of endorsement of *discouraged*, *nervous*, *angry*, *irritable*, and *distressed* after the same prompts.

Attention check items

Three attention check items were included to screen for random responding. All three are instructional manipulation checks, for example “If you believe you are paying attention to this survey, please select ‘every day.’” Passing an attention check was scored as simply selecting the instructed response item.

Demographic information was collected to assess age, tenure in current occupation, ethnicity, and gender.

Analyses

The same missingness and attention check procedures from Study 2 were employed to screen participants in Study 3. Multiple regression was conducted to determine the strength of first-order, i.e. effects including no interaction terms, and higher-order effects of job ambiguity and tolerance of ambiguity on the following job criteria: job satisfaction, job performance, stress, organizational citizenship behaviors, counterproductive workplace behaviors, and job withdrawal. Results were analyzed and reported using both self-reported job ambiguity and “category flexibility” ratings from O*NET as measure of job ambiguity.

Results

Correlations and descriptive statistics for Study 3 variables are presented in Table 8. Measures were found to be adequately internally consistent, $\alpha > .80$. The measures repeated from Study 2 were more internally consistent in the employed adult sample, e.g. MAAS discomfort Study 2 ($\alpha = .74$), Study 3 ($\alpha = .83$); MAAS general Study 2 ($\alpha = .75$), Study 3 ($\alpha = .92$).

Self-reported job ambiguity and O*NET ratings of category flexibility were negatively related, $r = -.21$. While expected to be the O*NET ability most related to tolerance of ambiguity, this ability may capture cognitive information separate from the experience of ambiguity in the completion of tasks or in navigating workplace social demands. Results differed notably depending on which operationalization of ambiguity was used to test hypotheses. This study also included multiple possible measures of intolerance of ambiguity: the MAAS, job ambiguity-specific negative affect, and uncertainty tolerance. Because the MAAS was the focus of the present research, the MAAS general factor will be interpreted as the primary measure of intolerance of ambiguity in this section. However, all results based on the MAAS general factor, uncertainty tolerance, and ambiguity-specific negative affect are presented in Tables 9 – 14.

Hypothesis 1a

Tolerance of ambiguity will be positively related to job satisfaction. Participants who are tolerant of ambiguity will be more satisfied with their job than participants who are intolerant of ambiguity.

Hypothesis 1b

Perceived job ambiguity will moderate the relation between tolerance of ambiguity and job satisfaction, such that the relation between tolerance of ambiguity and job satisfaction will be stronger when perceived job ambiguity is high.

Multiple regression results, with job satisfaction as the dependent variable, are presented in Table 9. Data were screened for assumptions of linearity, normality and homoscedasticity. These assumptions are not met, Shapiro-Wilk $W = .96, p < .001$; Breusch-Pagan $\chi^2(3, 252) = 14.77, p = .002$. The MAAS general factor, self-reports of ambiguity, and their interaction term were included in a regression model. This model explained significant variance in job satisfaction, $F(3, 248) = 37.72, p < .001, R^2_{adj} = .31$. A main effect of intolerance of ambiguity was found, such that ambiguity-intolerant employees reported lower job satisfaction $\beta = -.45, t(248) = -2.87, p = .004$. The interaction term between intolerance of ambiguity and job ambiguity was not associated with job satisfaction, $\beta = .06, t(248) = 1.87, p = .06$. The model including the interaction term did not explain significantly more variance in job satisfaction than a model containing only intolerance of ambiguity and job ambiguity, $F(1, 248) = 1.11, p = .06, \Delta R^2_{adj} = .01$. These results therefore supported Hypothesis 1a but not Hypothesis 1b.

These effects were not replicated when using category flexibility as a measure of job ambiguity. Intolerance of ambiguity was not significantly related to job satisfaction, $\beta = .47, t(236) = .95, p = .34$, and the inclusion of an interaction term did not explain additional variance in job satisfaction, $F(1, 236) = 1.24, p = .27, \Delta R^2_{adj} = .00$.

Hypothesis 2a

Tolerance of ambiguity will be positively related to job performance. Participants who are tolerant of ambiguity will perform better at work than participants who are intolerant of ambiguity.

Hypothesis 2b

Perceived job ambiguity will moderate the relation between tolerance of ambiguity and job performance, such that the relation between tolerance of ambiguity and job performance will be stronger when perceived job ambiguity is high.

Multiple regression results, with job performance as the dependent variable, are presented in Table 10. Data were screened for assumptions of linearity, normality and homoscedasticity. The Breusch-Pagan test indicated the assumption of homoscedasticity was met, $\chi^2(3, 252) = 5.63, p = .13$, but the Shapiro-Wilk test indicated residuals were not normally distributed, $W = .98, p = .002$. The MAAS general factor, self-reports of ambiguity, and their interaction term were included in a regression model. This model explained significant variance in job performance, $F(3, 248) = 107.80, p < .001, R^2_{adj} = .56$. Both intolerance of ambiguity and job ambiguity were associated with lower reported job performance, respectively $\beta = -.24, t(248) = -2.82, p = .01$; $\beta = 1.02, t(248) = 7.40, p < .001$. The interaction term was also significantly related to lower job performance, $\beta = -.05, t(248) = -1.99, p < .05$, see Figure 1. The inclusion of the interaction term significantly improved the model, $F(1, 248) = 3.97, p < .05, \Delta R^2_{adj} = .005$. These results supported Hypotheses 2a and Hypothesis 2b.

These results were not replicated when measuring job ambiguity with category flexibility ratings. Intolerance of ambiguity was not related to job performance, $\beta = -.53, t(236) = -1.06, p =$

.29. Inclusion of the interaction term did not improve the predictive power of the model, $F(1, 236) = 1.48, p = .22, \Delta R^2_{adj} = .00$.

Hypothesis 3a

Tolerance of ambiguity will be negatively related to job stress. Participants who are tolerant of ambiguity will be less stressed by their work in general than participants who are intolerant of ambiguity.

Hypothesis 3b

Perceived job ambiguity will moderate the relation between tolerance of ambiguity and stress, such that the relation between tolerance of ambiguity and job stress will be stronger when perceived job ambiguity is high.

Multiple regression results, with job stress as the dependent variable, are presented in Table 11. Data were screened for assumptions of linearity, normality and homoscedasticity. The Breusch-Pagan test indicated the assumption of homoscedasticity was violated, $\chi^2(3, 252) = 15.42, p = .001$. The Shapiro-Wilk test indicated the assumption of normality was also violated, $W = .98, p = .004$. The MAAS general factor, self-reports of ambiguity, and their interaction term were included in a regression model. This model explained significant variance in job stress, $F(3, 248) = 2.89, p = .04, R^2_{adj} = .02$. Neither intolerance of ambiguity, job ambiguity, nor their interaction term were significantly related to job stress. Including the interaction term did not significantly improve the model, $F(1, 248) = 2.06, p = .15, \Delta R^2_{adj} = .00$. Hypotheses 3a and 3b were not supported.

Null results did not change when job ambiguity was measured using category flexibility. Intolerance of ambiguity was not significantly related to job stress, $\beta = -.62, t(236) = -1.23, p =$

.22. Inclusion of the interaction term did not improve the model, $F(1, 236) = 1.51, p = .22, \Delta R^2_{\text{adj}} = .00$.

Hypothesis 4a

Tolerance of ambiguity will be positively related to organizational citizenship behaviors. Participants who are tolerant of ambiguity will endorse more OCBs than participants who are intolerant of ambiguity.

Hypothesis 4b

Perceived job ambiguity will moderate the relation between tolerance of ambiguity and OCBs, such that the relation between tolerance of ambiguity and OCBs will be stronger when perceived job ambiguity is high.

Multiple regression results, with OCBs as the dependent variable, are presented in Table 12. Data were screened for assumptions of linearity, normality and homoscedasticity. The assumptions of homoscedasticity, $\chi^2(3, 252) = 9.70, p = .02$, and normality, $W = .98, p = .01$, were violated. The MAAS general factor, self-reports of job ambiguity, and their interaction term were included in a regression model. This model explained significant variance in organizational citizenship behaviors, $F(3, 248) = 15.12, p < .001, R^2_{\text{adj}} = .14$. Neither intolerance of ambiguity nor job ambiguity were significantly related to engagement in OCBs. The interaction between intolerance of ambiguity and job ambiguity was not significant, and including the interaction term did not explain more variance in OCBs than a model without the interaction term, $F(1, 248) = 1.23, p = .10, \Delta R^2_{\text{adj}} = .00$. Hypothesis 4a and 4b were not supported.

Results were not affected by job ambiguity being measured using category flexibility.

Intolerance of ambiguity was not significantly related to OCBs, $\beta = -.38, t(236) = -.77, p = .44$.

Inclusion of the interaction term did not improve the model, $F(1, 236) = 1.25, p = .26, \Delta R^2_{\text{adj}} = .00$.

Hypothesis 5a

Tolerance of ambiguity will be negatively related to counterproductive workplace behaviors. Participants who are tolerant of ambiguity will endorse fewer CWBs than participants who are intolerant of ambiguity.

Hypothesis 5b

Perceived job ambiguity will moderate the relation between tolerance of ambiguity and CWBs, such that the relation between tolerance of ambiguity and CWBs will be stronger when perceived job ambiguity is high.

Multiple regression results, with CWBs as the dependent variable, are presented in Table 13. Data were screened for assumptions of linearity, normality and homoscedasticity. The Breusch-Pagan test indicated the assumption of homoscedasticity was not met, $\chi^2(3, 252) = 14.86, p = .002$. The Shapiro-Wilk test of normality indicated the residuals were not normally distributed, $W = .79, p < .001$. The MAAS general factor, self-reports of ambiguity, and their interaction term were included in a regression model. This model explained significant variance in job performance, $F(3, 248) = 8.65, p < .001, R^2_{\text{adj}} = .08$. Both intolerance of ambiguity and job ambiguity were associated with less engagement in counterproductive workplace behaviors, respectively $\beta = -.64, t(248) = -3.58, p < .001$; $\beta = -.89, t(248) = -4.46, p < .001$. The interaction between intolerance of ambiguity and job ambiguity was significantly related to more engagement in CWBs, $\beta = .14, t(248) = 3.60, p < .001$, see Figure 2. Inclusion of this interaction term explained significantly more variance in CWBs, $F(1, 248) = 12.96, p < .001, \Delta R^2_{\text{adj}} = .04$.

Hypothesis 5a was not supported. However, Hypothesis 5b was supported.

Hypothesis 5b was not supported when job ambiguity was measured by category flexibility, and Hypothesis 5a remained unsupported. Intolerance of ambiguity did not significantly predict CWBs, $\beta = -.11$, $t(236) = -.22$, $p = .83$, and the interaction terms did not improve the predictive power of the model, $F(1, 236) = .01$, $p = .92$, $\Delta R^2_{adj} = .00$.

Hypothesis 6a

Tolerance of ambiguity will be negatively related to job withdrawal. Participants who are tolerant of ambiguity will endorse fewer job withdrawal behaviors than participants who are intolerant of ambiguity.

Hypothesis 6b

Perceived job ambiguity will moderate the relation between tolerance of ambiguity and job withdrawal, such that the relation between tolerance of ambiguity and job withdrawal will be stronger when perceived job ambiguity is high.

Multiple regression results, with job withdrawal as the dependent variable, are presented in Table 14. Data were screened for assumptions of linearity, normality and homoscedasticity. The Breusch-Pagan test indicated the assumption of homoscedasticity was met, $\chi^2(3, 252) = 2.31$, $p = .51$. However, residuals were not normally distributed, $W = .84$, $p < .001$. The MAAS general factor, self-reports of ambiguity, and their interaction term were included in a regression model. This model explained significant variance in job performance, $F(3, 248) = 3.24$, $p = .02$, $R^2_{adj} = .03$. Intolerance of ambiguity was significantly related to less reported job withdrawal, $\beta = -.51$, $t(248) = -2.76$, $p = .01$. The interaction term was significantly predictive of more job withdrawal, $\beta = .09$, $t(248) = 2.09$, $p = .04$, see Figure 3. Including the interaction term significantly improved the model, $F(1, 248) = 4.38$, $p = .04$, $\Delta R^2_{adj} = .01$. The interaction effect

was in the opposite direction expected, however: ambiguity-intolerant employees reported lower job withdrawal when job ambiguity was low. Hypothesis 6a and 6b were therefore not supported.

Hypothesis 6a and 6b were not supported when job ambiguity was measured by category flexibility. Intolerance of ambiguity was not significantly related to job withdrawal, $\beta = -.39$, $t(236) = -.77$, $p = .44$, and the interaction terms did not improve the predictive power of the model, $F(1, 236) = .27$, $p = .57$, $\Delta R^2_{adj} = .01$.

Discussion

The primary goal of Study 3 was to explore tolerance of ambiguity's relations with workplace outcomes. I hypothesized that ambiguity-tolerant employees would report greater positive job outcomes (satisfaction, performance, and OCBs) and fewer negative job outcomes (stress, withdrawal, and CWBs), when job ambiguity was high. Not all outcomes were affected by differences in tolerance of ambiguity. No differences in job stress or OCBs were found between ambiguity-tolerant and ambiguity-intolerant employees. However, intolerance of ambiguity was found to be related to lower levels of job satisfaction. When accounting for levels of job ambiguity, intolerance of ambiguity was also found to be related to lower job performance, more engagement in CWBs, and fewer job withdrawal behaviors. In general, these results suggest that tolerance of ambiguity is not as much a benefit to personal and organizational outcomes as *intolerance* of ambiguity may be a hindrance.

The interaction effects found indicate that intolerance of ambiguity is damaging to personal and organizational outcomes when high levels of ambiguity are present at work. Ambiguity-tolerant and ambiguity-intolerant employees in low-ambiguity jobs report virtually no difference in job performance. However, when the job is especially ambiguous, as employees increase in intolerance of ambiguity, job performance declines. Notably, these are self-ratings of

job performance, which are expected to be upwardly biased. Different measures of job performance, such as supervisor ratings or objective measures, may display a stronger interaction effect. Additionally, ambiguity-tolerant and ambiguity-intolerant employees report no difference in counterproductive workplace behaviors when job ambiguity is at a moderate level. In low-ambiguity settings, ambiguity-intolerant employees report fewer CWBs than ambiguity-tolerant employees. However, in high-ambiguity settings, the opposite is found: ambiguity-intolerant engage in more CWBs than ambiguity-tolerant employees. This increase in CWBs has clear effects for organizations, as CWBs are associated with decreased job performance and workplace stability (Sackett, 2002). Finally, when job ambiguity was low, ambiguity-intolerant employees reported fewer intentions to quit their job than ambiguity-tolerant employees. When job ambiguity is high, virtually no difference was found in job withdrawal depending on tolerance of ambiguity. This interaction effect is in the opposite direction expected but may still be of interest to organizations and future researchers. Quitting a job may be a more impactful type of ambiguity, or a qualitatively different type of ambiguity, when judged against the ambiguity of current job tasks. This difference may result in counterintuitive effects involving job withdrawal.

Tolerance of Ambiguity's Relation to Uncertainty Tolerance

A secondary goal of Study 3 was to clarify the relation between tolerance of ambiguity and uncertainty tolerance. The theoretical difference between these two constructs is timeframe: tolerance of ambiguity being present-focused, and uncertainty tolerance being future-focused. While general intolerance of ambiguity and uncertainty tolerance are related, $r = .32$, and more specific facets of tolerance of ambiguity are more strongly associated with uncertainty tolerance, $r = .44$, these constructs do not appear to overlap as strongly as others found in Study 2. Future studies are required to test the incremental validity of tolerance of ambiguity in explaining

variance in criteria, when uncertainty tolerance and other neighboring constructs are tested concurrently.

CHAPTER 6. GENERAL DISCUSSION

The goals of the present studies were to 1) investigate the place of tolerance of ambiguity in the nomological network, 2) validate the structure of the MAAS, the most recently developed and structurally justified tolerance of ambiguity scale 3) explore tolerance of ambiguity as a correlate of academic success, and 4) explore tolerance of ambiguity as a predictor of success outcomes in the workplace, especially whether it becomes more important as job ambiguity increases. Across three studies, tolerance of ambiguity was found to be distinct from related constructs, related to higher grades in college, and related to negative job outcomes. Overall, the construct appears to be relevant to successful navigation of common demands within organizations. While the present measurement of tolerance of ambiguity has improved upon past iterations of the construct, the MAAS has psychometric limitations.

Study 1 demonstrated, using meta-analytic techniques, that tolerance of ambiguity is related to, but not isomorphic with, Big Five traits such as openness to experience. The relations between tolerance of ambiguity and openness in particular may be subject to moderation by variables not included in this meta-analytic review. Future research should examine the possible mechanisms of heterogeneity of effects concerning ambiguity tolerance and the Big Five. This study incorporated data from varied samples, using different measure of tolerance of ambiguity, different organizational settings, and different cultural contexts. The heterogeneity of effects is most likely due to varied measures of tolerance of ambiguity, which have competing content and unclear relations to one another.

Study 2 attempted to replicate the structure of the MAAS tolerance of ambiguity measure and explore its relations to academic outcomes. The bifactor model found by Lauriola and

colleagues (2016) fit the data better than alternative models but did not reach clear acceptable levels of fit. Intolerance of ambiguity was related, after controlling for demographic characteristics and similar concepts to tolerance of ambiguity, to both low grades and greater intentions to drop out of college.

Study 3 tested tolerance of ambiguity's relations to professional outcomes. It was expected that tolerance of ambiguity would not be relevant for all occupations, as not all occupations are equally ambiguous. However, for high-ambiguity jobs, intolerant employees would report fewer positive job outcomes and greater negative job outcomes. When jobs were more ambiguous, ambiguity-intolerant employees reported lower job performance, engaging in more CWBs, and reporting fewer withdrawal behaviors. These results demonstrate that employee tolerance of ambiguity becomes more relevant as workplace climates become more ambiguous. Previous null findings between tolerance of ambiguity and workplace outcomes may have resulted from omission of workplace ambiguity in this way.

Implications

The results of the present research indicate a number of theoretical considerations are reasonable for future study of tolerance of ambiguity. Results of Study 1 support the distinction of tolerance of ambiguity from Big Five traits. This distinction is reasonable given the scope of Big Five traits relative to the narrowness of tolerance of ambiguity. The distinction between tolerance of ambiguity and openness particularly is consistent with relations between other narrow constructs that are related to or possible composites of the Big Five (Credé et al., 2016). Differences in scope may also be bolstered by differences in content. Unless measured in long form, openness to experience typically captures tendency to engage with sensory novelty and intellectual complexity (e.g. Jach & Smillie, 2019). While tolerance of ambiguity includes

information overlapping with intellectual complexity components of openness, the construct is framed as reaction to a stimulus assumed to be challenging in ways not limited to intellectual or cognitive complexity. Tolerance of ambiguity's latent emotional component and framing of coping with anxiety draws conceptual difference from broader novelty seeking and cognitive challenge. The utility of this distinction is addressed outside of Study 1 and future research is needed to further support such utility.

Study 2 demonstrated that the structure of the MAAS is not necessarily adequate. While previous work has indicated that a unidimensional conceptualization of tolerance of ambiguity is not sufficient (Furnham, 1994; Lauriola et al., 2016), this iteration of a multidimensional concept lacks key information. The low correlations among facets of the scale suggest a lack of common core that could be plausibly captured by a general factor. While the bifactor model fits the data better than other structures, the general factor does not necessarily reflect a latent factor capturing broad intolerance of ambiguity. Despite structural problems, the findings that the MAAS predicted GPA and dropout intentions, after accounting for other constructs, suggest tolerance of ambiguity reflects information not captured in its close conceptual neighbors.

Findings of Study 3 were more supportive of a general factor. Stronger MAAS intercorrelations in the employed adult sample than the student sample may have been found due to the wider range of experiences sampled. Students of similar ages attending the same university, despite having different areas of study, may experience ambiguity and react to it in similar ways. The differences in temporality between college and work settings may also elicit different emotional reactions to uncertainty. That is, a frustratingly ambiguous assignment, class, or professor may only induce negative emotional reactions for a relatively short period of time (e.g. weeks or months), whereas similar frustration with coworkers, supervisors, and workplace

climate are perceived as longer-lasting, barring cases in which they are so stressful the employee quits.

On its face, the findings in Study 3 that tolerance of ambiguity was not related to job stress suggests that orientation of tolerance of ambiguity within a theoretical model of stress is not appropriate. However, this finding speaks more to the shortcomings of the MAAS than tolerance of ambiguity as a whole. Ambiguity-specific negative affect was significantly associated with more job stress. Likewise, ambiguity-specific positive affect was significantly associated with less stress experienced at work. This finding does not suggest that tolerance of ambiguity is unrelated to experiences of stress (most measures of tolerance of ambiguity include explicit reference to anxiety or nervousness), but that further conceptual validation is required to properly address ambiguity as a stressor and any dispositional buffer against such stress that may be measured. The Cognitive Appraisal Model (Lazarus, 1966; Lazarus & Launier, 1978) lends a useful framework in further development of tolerance of ambiguity, assuming ambiguity is a threat to goal enactment, particularly in structured environments with clear tasks. It is assumed in this research that tolerance of ambiguity operates during primary or secondary appraisal of ambiguity as threat, but results involving the MAAS and job stress limit inferences related to this theoretical approach.

Alternative conceptualizations of tolerance of ambiguity are possible given the results of the present research. The lack of findings between tolerance of ambiguity and positive workplace outcomes may be due to the assumption that intolerance of ambiguity is generally associated with negative outcomes. Intolerance of ambiguity may manifest as a positive trait in certain contexts when ambiguity is severe and must be resolved. In group contexts characterized by disorganization and lack of communication, intolerance of ambiguity in one person may manifest

as positive leadership behaviors and be rooted in desire for group success. Given the history of tolerance of ambiguity research, beginning with exploration of cognitive processes related to prejudice, positive contexts for intolerance of ambiguity have yet to be explored. Similarly, tolerance of ambiguity may be suited to ideal point models of measurement (see Cao, Drasgow, & Cho, 2014). Intermediate items of tolerance of ambiguity may result in better capture of the latent construct, as extreme tolerance or intolerance of ambiguity may not be likely, e.g. extreme tolerance would reflect severe listlessness and low drive, extreme intolerance would reflect severe emotional instability and stubbornness, and both extremes are assumed to be barriers to participation in organizations. By shifting from dominance models and a focus on intolerance of ambiguity's negative connotations, other facets of ambiguity are possible to consider. For example, perceived ambivalence is largely absent from current conceptualizations, i.e. "my supervisor is sometimes calm and sometimes quick to anger." Emotional reactions to perceived ambivalence may have different behavioral implications than broad uncertainty or complexity captured in current tolerance of ambiguity conceptualizations.

The results of the present research also have practical implications. Revision of the MAAS may benefit tolerance of ambiguity researchers. First, the MAAS seems to lack affective information. The discomfort with ambiguity facet is limited to broad anxiety in social situations, and revision of this facet, or the inclusion of another affective facet, to include both positively and negatively valenced affective items would provide information more robust to the diverse emotional and behavioral reactions to an ambiguous situation. Second, factors within scales may emerge purely due to item wording (Schriesheim & Eisenbach, 1995), and one weakness of the MAAS is its subscales containing distinctly different item wording, problematic phrasing, and being scored in one direction. Removal of double negative items, redundancies, and complex

phrasing is recommended. While being psychometrically problematic, the MAAS has been shown to predict outcomes of interest in two different organizational settings: academic and professional.

The results of the present studies may be of interest not only to researchers, but also to employees and managers in the selection process. The interaction effects found when accounting for job ambiguity contribute to the understanding of person-environment fit by demonstrating differences in negative organizational outcomes based on features of both individuals and workplace climate. Ensuring fit between organizational characteristics and employee's personal characteristics benefits both individuals and organizations (George, 1992; George & Brief, 2004; Hanish & Hulin, 1991; Kristof, 1996; Yu, 2013). Selection procedures for high-ambiguity jobs, such as those with greater employee autonomy, atypical settings, or shifting demands, may benefit from taking personal tolerance of ambiguity into account. This goal may be accomplished by a number of means: testing tolerance of ambiguity directly, giving clear job previews or descriptions so ambiguity intolerant applicants may self-select out of the hiring process, or redesigning job demands or procedures such that ambiguity is not perceived as especially dissatisfying to employees with moderate ambiguity intolerance.

Limitations and Future Directions

Uncertainty tolerance was omitted from Study 2 in error. Conclusions regarding uncertainty tolerance's place in the network of tolerance of ambiguity's neighboring constructs cannot be drawn from the present studies, and discussion of uncertainty tolerance is limited to bivariate analyses. Concurrent tests of the "closed mindedness" variables, including uncertainty tolerance, should be conducted in future studies to more fully address the theorized time frame

distinction of ambiguity (present) from uncertainty (future) and incremental validity in predicting academic success.

While results of Study 2 partially support Hypothesis 2, the place of tolerance of ambiguity in the nomological network requires further validation before such results may be generalized. For example, MAAS need for complexity is strongly correlated with the intellect facet of openness, and regression results including these two variables may risk multicollinearity and suppression of one or both variables (Friedman & Wall, 2005). Considering this positive correlation with intellect and a negative correlation with age (see Study 3), it is also possible that the MAAS is capturing elements of cognitive ability. For example, ambiguity may be perceived as less threatening or coping resources may be more readily available for individuals with greater working memory capacity. To address such a question, tolerance of ambiguity and more objective measures of intelligence would have to be administered simultaneously. Alternative methods of investigating construct validity, such as structural equation modeling may provide additional information in the possibility of tolerance of ambiguity occupying a place within a hierarchy of existing constructs. In addition, multi-trait multi-method analysis would address the question of tolerance of ambiguity facets sharing variance in a general latent construct or common method variance.

The results of Study 2 and 3 are partially limited by violation of assumptions of regression analysis. In both studies, residuals of the tested models were found to be non-normally distributed. In general, the assumption of homoscedasticity is more important to interpretation of linear regression than normality of residuals. The likelihood of Type 1 error is greater when residuals are homoscedastic and non-normal than heteroscedastic and normal, and the likelihood of Type 1 error for data with homoscedastic and non-normal residuals is functionally equivalent

to the Type 1 error probability of data with neither violation, when sample sizes are moderate to large (Yang, Tu, & Chen, 2019). The relatively large sample size in Study 2 may lessen the impact of normality violations, as homoscedasticity of residuals was found for these models. In some cases, linear regression assumptions may be met by excluding multivariate outliers. In Study 3, by nature of the outcomes being measured and the wide variance in responses from an adult employed sample, multivariate outliers could not be excluded on bases other than careless responding or missingness. While assumptions of multiple regression could be met for job satisfaction, job performance, and OCBs by excluding participants from analysis, the loss of power was not justified, and assumptions of the analyses for the other three outcomes could not be met with similar exclusions. Increased power or different analytic techniques in future studies may produce results less susceptible to Type 1 error.

The present studies are unable to predict change in outcomes for individuals and organizations over time. At time of measurement in these studies, the most ambiguity-intolerant individuals may have already self-selected out of certain high-ambiguity occupations or withdrawn from college. One fruitful future direction for similar explorations of tolerance of ambiguity is longitudinal study. Tracking students or employees from the beginning of their tenure at a certain institution, measuring tolerance of ambiguity at time 1, and conducting survival analysis would give more information regarding extreme cases in which highly ambiguity-intolerant individuals in high-ambiguity environments withdraw from an organization.

Conclusion

The current research incorporated several different goals in the examination of tolerance of ambiguity as a useful predictor of outcomes within academic and professional settings. The goal of demonstrating tolerance of ambiguity's distinction from neighboring constructs and

global personality traits was addressed using meta-analytic, correlational, and regression-based techniques. The Multidimensional Attitude Toward Ambiguity Scale (MAAS) was found to be structurally problematic but predictive of positive and negative outcomes in both college and employed adult samples. Tolerance of ambiguity was demonstrated to be more predictive of negative workplace outcomes when workplace ambiguity was taken into account. These findings advance the person-environment fit literature and suggest that tolerance of ambiguity is related to workplace stability in certain high-ambiguity settings. Future research should reassess the structure and content of the MAAS while exploring ambiguity intolerance as a motivational mechanism for both positive and negative behavior in organizations.

REFERENCES

Studies included in the Study 1 meta-analysis are marked with an asterisk.

- Abramis, D. J. (1994). Work role ambiguity, job satisfaction, and job performance: Meta-analyses and review. *Psychological Reports, 75*, 1411-1433.
- *Albrecht, A. G. (2005). *Untangling the laundry list. General mental ability, the Big Five, and context related variables as predictors for expatriate success*. [Unpublished master's thesis]. Leuphana Universität, Luneberg, Germany.
- *Allen, J. (2016). *Conceptualizing learning agility and investigating its nomological network*. [Unpublished doctoral dissertation]. Florida International University.
- Altemeyer, B. (2002). Dogmatic behavior among students: Testing a new measure of dogmatism. *The Journal of Social Psychology, 142*(6), 713-721.
- Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin, 103*, 411-423.
- Anderson, L. W., & Krathwohl, D. R. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. New York: Longman.
- *Ascalon, M. E. (2004). *Improving expatriate selection: Development of a situational judgement test to measure cross-cultural social intelligence*. [Unpublished doctoral dissertation]. University of Tulsa.
- *Bardi, A., Guerra, V. M., & Ramdeny, S. D. (2009). Openness and ambiguity intolerance: Their differential relations to well-being in the context of an academic life transition. *Personality and Individual Differences, 47*, 219-223.
- Beauducel, A., & Wittmann, W. W. (2005). Simulation study on fit indexes in CFA with slightly distorted simple structure. *Structural Equation Modeling, 12*, 41-75.
- Bennett, N., Herold, D., & Ashford, S. (1990). The effects of tolerance for ambiguity on feedback-seeking behavior. *Journal of Occupational Psychology, 63*, 706-718.
- Bhushan, L., & Amal, S. B. (1986). A situational test of intolerance of ambiguity. *Psychologia: An International Journal of Psychology in the Orient, 29*(4), 254-261.
- Bledsoe, T. S., & Baskin, J. J. (2014). Recognizing student fear: The elephant in the classroom. *College Teaching, 62*(1), 32-41. doi: 10.1080/87567555.2013.831022
- Block, J. (2000). Three tasks for personality psychology. In L. R. Bergman, R. B. Cairns, L. G. Nilsson, & L. Nystedt (Eds.), *Developmental science and the holistic approach* (p. 155-164). Lawrence Erlbaum Associates Publishers.

- Bluedorn, A. C. (2015). Polychronicity, individuals, and organizations, *Research in the Sociology of Work: Workplace Temporalities*, 17, 179-222.
- Breaugh, J. A., & Colihan, J. P. (1994). Measuring facets of job ambiguity: Construct validity evidence. *Journal of Applied Psychology*, 79(2), 191-202.
- *Brophy, D. R. (2001). Comparing the attributes, activities, and performance of divergent, convergent, and combination thinkers. *Creativity Research Journal*, 13(3-4), 439-455, doi: 10.1207/S15326934CRJ1334_20
- Bruk-Lee V., Khoury H. A., Nixon A. E., Goh, A., & Spector, P. E. (2009) Replicating and extending past personality/job satisfaction meta-analyses. *Human Performance*, 22(2), 156–189.
- Budner, S. (1962). Intolerance of ambiguity as a personality variable. *Journal of Personality*, 30, 29–50.
- Buhr, K., & Dugas, M. J. (2006). Investigating the construct validity of intolerance of uncertainty and its unique relationship with worry. *Journal of Anxiety Disorders*, 20, 222-236.
- Bureau of Labor Statistics (2019, June 19). *American time use survey* [Press release]. Retrieved from <https://www.bls.gov/news.release/pdf/atus.pdf>
- Camerer, C., & Weber, M. (1992). Recent developments in modeling preferences: uncertainty and ambiguity. *Journal of Risk and Uncertainty*, 5, 325–370.
- Campbell, J. P. (1990). Modeling the performance prediction problem in industrial and organizational psychology. In M. D. Dunnette & L. M. Hough (Eds.), *Handbook of industrial and organizational psychology* (2nd ed., Vol. 1, pp. 687–732). Palo Alto, CA: Consulting Psychologists Press.
- Campbell, J. P. (2012). Behavior, performance, and effectiveness in the 21st century. In S. W. J. Kozlowski (ed.), *The Oxford handbook of organizational psychology* (pp. 159-194). New York: Oxford University Press.
- Campbell, J. P., McCloy, R. A., Oppler, S. H., & Sager, C. E. (1993). A theory of performance. In N. Schmitt & W. C. Borman (Eds.), *Personnel selection in organizations* (pp. 35-70). San Francisco: Jossey-Bass.
- *Caliguiri, P., & Tarique, I. (2012). Dynamic cross-cultural competencies and global leadership effectiveness. *Journal of World Business*, 47, 612-622.
- Cao, M., Drasgow, F., & Cho, S. (2015). Developing ideal intermediate personality items for the ideal point model. *Organizational Research Methods*, 18(2), 252–275. doi: 10.1177/1094428114555993

- Carleton, R. N., Norton, M. A., Asmundson, G. J. (2007). Fearing the unknown: A short version of the intolerance of uncertainty scale. *Journal of Anxiety Disorders, 21*, 105-117.
- *Cernea, M. (2016). Global leadership effectiveness: A European perspective. [Unpublished doctoral dissertation]. The Chicago School of Professional Psychology.
- *Chan, D. (2004). Individual differences in tolerance for contradiction. *Human Performance, 17*(3), 297-324. doi: 10.1207/s15327043hup1703_3
- *Chan, S. (2005). *An examination of individuals' self-selection to organizations*. [Unpublished doctoral dissertation]. University of Texas, Arlington.
- Chapell, M. S., Blanding, Z. B., Silverstein, M. E., Takahashi, M., Newman, B., Gubi, A., & McCann, N. (2005). Test anxiety and academic performance in undergraduate and graduate students. *Journal of Educational Psychology, 97*, 268–274. doi:10.1037/0022-0663.97.2.268
- Clark, L. A., & Watson, D. (2019). Constructing validity: New developments in creating objective measuring instruments. *Psychological Assessment*. Advance online publication. <http://dx.doi.org/10.1037/pas0000626>
- Connolly, J. J., & Viswesvaran, C. (2000). The role of affectivity in job satisfaction: A meta-analysis. *Personality and Individual Differences, 29*(2), 265-281.
- Costa, P. T., & McCrae, R. R. (2008). The Revised NEO Personality Inventory (NEO-PI-R). In D. H. Saklofske (Ed.), *The SAGE handbook of personality theory and assessment. Vol. 2: Personality measurement and testing* (pp. 179–198). Thousand Oaks, CA: Sage.
- Crawford, J. S. (2001). *Comparative analysis of chronic versus acute stressors and their influence on distress consequences at work* (Unpublished doctoral dissertation). University of North Texas, Denton.
- Credé, M. (2010). Random responding as a threat to the validity of effect size estimates in correlational research. *Educational and Psychological Measurement, 70*(4), 596-612. doi: 10.1177/0013164410366686.
- Credé, M., & Harms, P. D. (2015). 25 years of higher-order confirmatory factor analysis in the organizational sciences: A critical review and development of reporting recommendations. *Journal of Organizational Behavior, 36*, 845-872.
- Credé, M., Harms, P., Blacksmith, N., & Wood, D. (2016). Assessing the utility of compound triat estimates of narrow personality traits. *Journal of Personality Assessment, 98*(5), 503-513. doi: 10.1080/00223891.2016.1170023
- Credé, M., & Kuncel, N. R. (2008). Study habits, skills, and attitudes: The third pillar supporting collegiate academic performance. *Perspective on Psychological Science, 3*(6), 425-453. doi: 10.1111/j.1745-6924.2008.00089.x

- Credé, M., & Niehorster, S. (2012). Adjustment to college as measured by the student adaptation to college questionnaire: A quantitative review of its structure and relationships with correlates and consequences. *Educational Psychology Review*, 24, 133-165.
- Crowson, H. M., DeBacker, T. K., & Davis, K. A. (2008). The DOG Scale: A valid measure of dogmatism? *Journal of Individual Differences*, 29(1), 17-24. doi: 10.1027/1614-0001.29.1.17
- Dahlke, J. A., & Wiernik, B. M. (2018). psychmeta: An R package for psychometric meta-analysis. *Applied Psychological Measurement*. doi: 10.1177/0146621618795933
- Davis, L. V., & Sherman, E. (1987). Intolerance of ambiguity and student performance in social work education. *Journal of Social Work Education*, 23(1), 16-23.
- DeRoma, V. M., Martin, K. M., & Kessler, M. L. (2003). The relationship between tolerance for ambiguity and need for course structure. *Journal of the Institute of Psychology*, 30, 104-109.
- *Dewaele, J. M., & Wei, L. (2013). Is multilingualism linked to a higher tolerance of ambiguity? *Bilingualism: Language and Cognition*, 16(1), 231-240. doi:10.1017/S1366728912000570
- Ergene, T. (2003). Effective interventions on test anxiety reduction: A meta-analysis. *School Psychology International*, 24, 313-328.
- Fisher, C. D., & Gitelson, R. (1983). A meta-analysis of the correlates of role conflict and ambiguity. *Journal of Applied Psychology*, 68(2), 320-333.
- Folkman, S., Lazarus, R. S., Gruen, R. J., & DeLongis, A. (1986). Appraisal, coping, health status, and psychological symptoms. *Journal of Personality and Social Psychology*, 50, 571-579.
- Freeston, M. H., Rhéaume, J., Letarte, H., Dugas, M. J., & Ladouceur, R. (1994). Why do people worry? *Personality and Individual Differences*, 17, 791-802.
- Frenkel-Brunswick, E. (1949). Tolerance towards ambiguity as a personality variable. *American Psychologist*, 3, 268.
- Frenkel-Brunswick, E. (1951). Personality theory and perception. In R. Blake, & E. Ramsey (Eds.), *Perception: An approach to personality*. New York: Ronald.
- Fried, Y., & Ferris, G. R. (1987). The validity of the job characteristics model: A review and meta-analysis. *Personnel Psychology*, 40, 287-322.
- Friedman, L., & Wall, M. (2005). Graphical views of suppression and multicollinearity in multiple linear regression. *The American Statistician*, 59(2), 127-136, doi: 10.1198/000313005X41337

- Frone, M. (1990). Intolerance of ambiguity as a moderator of the occupational role stress-strain relationship. *Journal of Organizational Behavior*, 11, 309-320.
- Furnham, A. (1992). *Personality at work: The role of individual differences in the workplace*. London: Routledge.
- Furnham, A. (1994). A content, correlational, and factor analytic study of four tolerance of ambiguity questionnaires. *Personality and Individual Differences*, 16(3), 403-410.
- Furnham, A., & Ribchester, T. (1995). Tolerance of ambiguity: A review of its concept, its measurement, and its applications. *Current Psychology: Developmental, Learning, Personality, Social*, 14(3), 179-200.
- Furnham, A., & Marks, J. (2013). Tolerance of ambiguity: A review of the recent literature. *Psychology*, 4(9), 717-728.
- George, J. M. (1992). The role of personality in organizational life: Issues and evidence. *Journal of Management*, 18, 185-213.
- George, J. M., & Brief, A. P. (2004). Personality and work-related distress. In B. Schneider & D. B. Smith (Eds.), *Personality and organizations* (pp. 193–219). Mahwah, NJ: Erlbaum.
- Giest, E. (2010). The anti-anxiety curriculum: Combating math anxiety in the classroom. *Journal of Instructional Psychology*, 37(1), 24-31.
- Gillespie, M. A., Balzer, W. K., Brodke, M. H., Garza, M., Berbec, E. N., Gillespie, J. Z., Gopalkrishnan, P., Lengyel, J. S., Sliter, K. A., Sliter, M. T., Withrow, S. A., & Yugo, J. E. (2015). Normative measurement of job satisfaction in the US. *Journal of Managerial Psychology*, 31(2), 516-536. doi: 0.1108/JMP-07-2014-0223
- Greenbaum, Z. (2019, October). The future of remote work. *APA Monitor on Psychology*, 50(9), 54.
- Grenier, S., Barrette, A. M., & Ladouceur, R. (2005). Intolerance of uncertainty and intolerance of ambiguity: Similarities and differences. *Personality and Individual Differences*, 39, 593-600.
- Goldberg, L. R., Johnson, J. A., Eber, H. W., Hogan, R., Ashton, M. C., Cloninger, C. R., & Gough, H. C. (2006). The International Personality Item Pool and the future of public-domain personality measures. *Journal of Research in Personality*, 40, 84-96.
- *Gottfried, M. (1980). *The relation between selected personality factors and aspects of figural creativity*. [Unpublished doctoral dissertation]. New York University.
- Hackman, J. R., & Oldham, G. R. (1975). Development of the job diagnostic survey. *Journal of Applied Psychology*, 60, 159-170.

- Hanisch, K. and Hulin, C. (1991). General attitudes and organizational withdrawal: An evaluation of a causal model. *Journal of Vocational Behavior*, 39, 110-128.
- Hardre, P. L. & Reeve, J. (2003). A motivational model of rural students' intentions to persist in, versus drop out of, high school. *Journal of Educational Psychology*, 95(2), 347-356.
- Harrer, M., Cuijpers, P., Furukawa, T., & Ebert, D. D. (2019). *dmetar: Companion R package for the guide 'Doing Meta-Analysis in R'*. R package version 0.0.9000. <http://dmetar.protectlab.org>.
- Hillen, M. A., Gutheil, C. M., Strout, T. D., Smets, E. M. A., & Han, P. K. J. (2017). Tolerance of uncertainty: Conceptual analysis, integrative model, and implications for healthcare. *Social Science & Medicine*, 180, 62-75.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1-55.
- *Hullsiek, B. (2011). *The effects of tolerance for ambiguity and ambiguous instructions on creativity*. [Unpublished master's thesis]. University of Nebraska, Omaha.
- Hunter, J. E., & Schmidt, F. L. (2000). Fixed effects vs. random effects meta-analysis models: Implications for cumulative research knowledge. *International Journal of Selection and Assessment*, 8(4), 275-292.
- Hunter, J. E., & Schmidt, F. L. (2004). *Methods of meta-analysis: Correcting error and bias in research findings (2nd ed.)*. Thousand Oaks, CA: Sage.
- *Jach, H. K., & Smillie, L. D. (2019). To fear or fly to the unknown: Tolerance for ambiguity and Big Five personality traits. *Journal of Research in Personality*, 79, 67-68.
- Jex, S. M. (1998). *Stress and job performance: Theory, research, and implication for managerial practice*. Thousand Oaks, CA: Sage.
- Johlke, M.C., & Iyer, R. (2013). A model of retail job characteristics, employee role ambiguity, external customer mind-set, and sales performance. *Journal of Retailing and Customer Services*, 20, 58-67.
- *Judge, T. A., Thorensen, C. J., Pucik, V., & Welbourne, T. M. (1999). Managerial coping with organizational change: A dispositional perspective. *Journal of Applied Psychology*, 84(1), 107-122.
- Kenny, D. T., & Ginsberg, R. (1958). The specificity of intolerance of ambiguity measures. *Journal of Abnormal Social Psychology*, 56, 300-304.
- King, L. A., & King, D. W. (1990). Role conflict and role ambiguity: A critical assessment of construct validity. *Psychological Bulletin*, 107, 48-64.

- *Koraman, D. (2005). *Understanding precursors of psychological distress for fathers of children with cancer: The role of coping styles, personality, and ambiguity tolerance*. [Unpublished doctoral dissertation]. New York University.
- Kornilova, T. V., Chumakova, M., A., & Izmailova, A. G. (2014). Implicit theories of intelligence and personality, Attitudes towards uncertainty, and academic achievement in college students: A cross-cultural study, presented at the 3rd International Academic Conference on Social Sciences: Tokyo, Japan.
- Kline, R. (2016). *Principles and practice of structural equation modeling (4th ed)*. The Guilford Press.
- Kristof, A. L. (1996). Person-organization fit: An integrative review of its conceptualizations, measurement, and implications. *Personnel Psychology, 49*, 1-49.
- Kruglanski, A.R. (2004). *The psychology of closed mindedness*. New York: Psychology Press.
- Kruglanski, A. W., & Webster, D. M. (1996). Motivated closing of the mind: “Seizing” and “freezing”. *Psychological Review, 103*(2), 263–283.
- Kuncel, N., Credé, M., & Thomas, L. L. (2005). The validity of self-reported grade point averages, class ranks, and test scores: A meta-analysis and review of the literature. *Review of Educational Research, 75*(1), 63-82. doi: 10.3102/00346543075001063
- Lange, R., & Houran, J. (1999). The role of fear in delusions of the paranormal. *Journal of Nervous and Mental Disease, 187*, 159-166.
- *Lauriola, M., Foschi, R., Mosca, O., & Weller, J. (2016). Attitude toward ambiguity: Empirically robust factors in self-report personality scales. *Assessment, 23*(3), 353-373.
- Lazarus, R. S. (1966). *Psychological stress and the coping process*. New York: McGraw-Hill.
- Lazarus, R. S. (1991). *Emotion and adaptation*. Oxford, England: Oxford University Press.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal and coping*. New York: Springer.
- Lazarus, R. S., & Folkman, S. (1987). Transactional theory and research on emotions and coping. In L. Laux & G. Vessel (Special Eds.), *Personality in biographical stress and coping research. European Journal of Personality, 1*, 141-169.
- Lazarus, R. S., & Launier, R. (1978). Stress-related transactions between persons and environment. In L. A. Pervin & M. Lewis (Eds.), *Perspectives in interactional psychology* (pp. 287-327). New York: Plenum.
- Locke, E. A. (1970). Job satisfaction and job performance: A theoretical analysis. *organizational Behavior and Human Performance, 5*(5), 484-500.
- Locke, E. A. (1976). The nature and causes of job satisfaction. In M. D. Dunnette (Ed.), *Handbook of industrial and organizational psychology* (pp. 1297-1343). Chicago: Rand McNally.

- Loher, B. T., Noe, R. A., Moeller, N. L., & Fitzgerald, M. P. (1985). A meta-analysis of the relation of job characteristics to job satisfaction. *Journal of Applied Psychology, 70*, 280-289.
- MacDonald, A. (1970). Revised scale for ambiguity tolerance: Reliability and validity. *Psychological Reports, 26*, 791-798.
- McCrae, R. R. (1996). Social consequences of experiential openness. *Psychological Bulletin, 120*, 323-337.
- McLain, D. L. (1993). The MSTAT-I: A new measure of an individual's tolerance for ambiguity. *Educational and Psychological Measurement, 53*, 183-189.
- Mol, S. T., Born, M. P., Willemsen, M. E., & van der Molen, H. T. (2005). Predicting expatriate job performance for selection purposes: A quantitative review. *Journal of Cross-Cultural Psychology, 36*(5), 590-620.
- Morse, J. (1975). Person-job congruence and individual adjustment and development. *Human Relations, 28*, 841-861.
- Muthén, L. K., & Muthén, B. O. (2002). How to use a Monte Carlo study to decide on sample size and determine power. *Structural Equation Modeling, 4*, 599-620.
- National Center for O*NET Development. Abilities: Category Flexibility. *O*NET OnLine*. Retrieved August 1, 2019, from <https://www.onetonline.org/find/descriptor/result/1.A.1.b.7?r=1>
- Norton, R. (1975). Measurement of ambiguity tolerance. *Journal of Personality Assessment, 39*, 607-619.
- O'Connor, P. (1952). Ethnocentrism, "intolerance of ambiguity" and abstract reasoning ability. *Journal of Abnormal and Social Psychology, 47*, 526-530.
- Örtqvist, D., & Wincent, J. (2006). Prominent consequences of role stress: A meta-analytic review. *International Journal of Stress Management, 13*, 399-422.
- *Pierce, M. F. (2004). *Tolerance for role ambiguity among executive teams of voluntary organizations*. [Unpublished doctoral dissertation]. University of Tennessee, Knoxville.
- Poropat, A. E. (2009). A meta-analysis of the five-factor model of personality and academic performance. *Psychological Bulletin, 135*(2), 322-338. doi:10.1037/a0014996
- Robbins, S. B., Lauver, K., Le, H., Davis, D., Langley, R., & Carlstrom, A. (2004). Do psychosocial and study skills factors predict college outcomes? A meta-analysis. *Psychological Bulletin, 130*, 261-288. doi: 10.1037/0033-2909.130.2.261

- Roets, A., Kruglanski, A. W., Kossowska, M., Pierro, A., & Hong, Y. Y. (2015). The motivated gatekeeper of our minds: New directions in need for cognitive closure theory and research. In J. M. Olson and M. P. Zanna (Eds.), *Advances in experimental social psychology Vol. 52* (pp. 221–283). London: Elsevier.
- Roets, A., & Van Hiel, A. (2011). Item selection and validation of a brief, 15-item version of the Need for Closure Scale. *Personality and Individual Differences, 50*, 90-94.
- Rokeach, M. (1960). *The open and closed mind*. New York: Basic Books.
- Rosen, N. O., Ivanova, E., & Knäuper, B. (2014). Differentiating intolerance of uncertainty from three related but distinct constructs. *Anxiety, Stress, & Coping, 27*(1), 55-73. doi: 10.1080/10615806.2013.815743
- Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software, 48*(2), 1-36.
- Roth, B., Becker, N., Romeyke, S., Schäfer, S., Domnick, F., & Spinath, F. M. (2015). Intelligence and school grades: A meta-analysis. *Intelligence, 53*, 118-137. doi: 10.1016/j.intell.2015.09.002
- *Rottenbacher de Rojas, J. M. (2012). Relationships between ambivalent sexism, political conservatism and cognitive rigidity in a sample of inhabitants from the city of Lima. *Psicología Desde el Caribe, Universidad del Norte, 29*(2), 229-256.
- Rozen, P. & Royzman, E. B. (2001). Negativity bias, negativity dominance, and contagion. *Personality and Social Psychology Bulletin, 5*(4), 296-320.
https://doi.org/10.1207/S15327957PSPR0504_2
- Rydell, S. & Rosen, E. (1966). Measurement and some correlates of need cognition. *Psychological Reports, 19*, 139- 165.
- Sackett, P. R. (2002). The structure of counterproductive workplace behaviors: Dimensionality and relationships with facets of job performance. *International Journal of Selection and Assessment, 10*(1-2), 5-11.
- Sakires, J., Doherty, A., & Misener, K. (2009). Role ambiguity in voluntary sport organizations. *Journal of Sport Management, 23*, 615-643.
- Schmidt, S., Roesler, U., Kusserow, T., & Rau, R. (2014). Uncertainty in the workplace: Examining role ambiguity and role conflict, and their link to depression—a meta-analysis. *European Journal of Work and Organizational Psychology, 23*(1), 91- 106.
- Schneider, B. (1987). The people make the place. *Personnel Psychology, 40*, 437-453.

- Schneider, B., Smith, D. B., Taylor, S., & Fleenor, J. (1998). Personality and organizations: A test of the homogeneity of personality hypothesis. *Journal of Applied Psychology, 83*(3), 462-470.
- Schriesheim, C. A., & Eisenbach, R. J. (1995). An exploratory and confirmatory factor-analytic investigation of item wording effect on the obtained factor structures of survey questionnaire measures. *Journal of Management, 21*(6), 1177-1193.
- Senfeld, L. (1995). *Math anxiety and its relationship to selected student attitudes and beliefs* (Unpublished doctoral dissertation). University of Miami: Coral Gables, Florida.
- Singh, J. & Rhoads, G. K. (1991). Boundary role ambiguity in marketing-oriented positions: A multidimensional, multifaceted operationalization. *Journal of Marketing Research, 28*(3), 328–338
- Snow, A. (2010). Ambiguity and the value of information. *Journal of Risk and Uncertainty, 40*, 133-145. doi: 10.1007/s11166-010-9088-7
- Spector, P. E., Bauer, J. A., & Fox, S. (2010). Measurement artifacts in the assessment of counterproductive work behavior and organizational citizenship behavior: Do we know what we think we know? *Journal of Applied Psychology, 95*(4), 781-790. doi: <http://dx.doi.org/10.1037/a0019477>
- Stanton, J. M., Balzer, W. K., Smith, P. C., Parra, L. F., & Ironson, G. (2001). A general measure of work stress: The stress in general scale. *Educational and Psychological Measurement, 61*(5), 866-888.
- Starcke, K., & Brand, M. (2016). Effects of stress on decisions under uncertainty: A meta-analysis. *Psychological Bulletin, 142*(9), 909-933.
- *Strauss, J. P., Connerly, M. L., & Ammermann, P. A. (2003). The “threat hypothesis.” personality, and attitudes toward diversity. *Journal of Behavioral Science, 39*(1), 32-52.
- *Swami, V., Stieger, S., Pietschnig, J., & Voracek, M. (2010). The disinterested play of thought: Individual differences and preference for surrealist motion pictures. *Personality and Individual Differences, 48*, 855-859. doi: 10.1016/j.paid.2010.02.013
- Tubre, T., & Collins, J. (2000). Jackson and Schuler (1985) revisited: A meta-analysis of the relationship between role ambiguity, role conflict and job performance. *Journal of Management, 26*, 155–169.
- van Hiel, A., Onraet, E., Crowson, H. M., & Roets, A. (2016) The relationship between right-wing attitudes and cognitive style: A comparison of self-report and behavioral measures of rigidity and intolerance of ambiguity *European Journal of Personality, 30*(6), 523-531.
- von Stumm, S., & Ackerman, P. L. (2013). Investment and intellect: A review and meta-analysis. *Psychological Bulletin, 139*(4), 841-869. doi: 10.1037/a0030746

- *Wang, S., Zhang, X., & Martocchio, J. (2011). Thinking outside the box when the box is missing: Role ambiguity and its linkage to creativity. *Creativity Research Journal*, 23(3), 211-221. doi: 10.1080/10400419.2011.595661
- Watson, D., & Clark, L.A. (1994). *The PANAS-X: Manual for the positive affect and negative affect schedule—expanded form*. Cedar Rapids: University of Iowa.
- Warr, P. (2007). *Work, happiness, and unhappiness*. London: Lawrence Erlbaum Associates.
- Webster, D. M., & Kruglanski, A. W. (1994). Individual differences in need for cognitive closure. *Journal of Personality and Social Psychology*, 67(6), 1049-1067.
- Williams, L. J., & Anderson, S. E. (1991). Job satisfaction and organizational commitment as predictors of organizational citizenship and in-role behaviors. *Journal of Management*, 17(3), 601-617.
- Yang, K., Tu, J., & Chen, T. (2019). Homoscedasticity: an overlooked critical assumption for linear regression. *General Psychiatry*, 32(5), e100148. doi: 10.1136/gpsych-2019-100148
- Yu, K. Y. T. (2009). Affective influences in PE fit theory: Exploring the role of affect as both cause and effect of PE fit. *Journal of Applied Psychology*, 94, 1210-1226.
- Yu, K. Y. T. (2013). A motivational model of person-environment fit: Psychological motives as drivers of change. In A. L. Kristof-Brown & J. Billsberry (Eds.) *Organizational fit: Key issues and new directions* (pp. 21-49). New York: Wiley-Blackwell
- *Zhang, Y. (2017). *Toward an explanation of HR professionals' intuition-based hiring in a decision-making context*. [Unpublished doctoral dissertation]. Bowling Green State University.

TABLES

Table 1. *Power analyses based on Monte Carlo simulations of bifactor models with MAAS parameters found by Lauriola and colleagues (2016)*

Sample Size	95% coverage	Power (β)
400	.908	.996
500	.918	.999
600	.927	1.00

Note: Power and 95% coverage values presented are the lowest values of all 42 item factor loadings. 95% coverage indicates the proportion of replications for which the simulated 95% confidence interval contains the true parameter value. Power indicates the proportion of replications for which null hypothesis – that the item loading is equal to zero – is correctly rejected at the .05 level.

Table 2. *Meta-analysis of Big Five personality traits and tolerance of ambiguity.*

	k	N	r_{obs}	sd_r	se_r	ρ	SD_ρ	CI 95%	CR 80%
Conscientiousness	13	3239	.08	.17	.05	.11	.20	-.02, .18	-.13, .29
Agreeableness	11	2967	.13	.12	.04	.17	.13	.05, .21	-.01, .27
Emotional Stability	16	5274	.20	.17	.04	.26	.22	.10, .29	-.03, .42
Extraversion	15	5490	.21	.10	.03	.26	.11	.15, .26	.09, .32
Openness	19	4983	.36	.15	.03	.47	.17	.29, .43	.18, .54

Note. k = number of studies; N = number of subjects; r_{obs} = sample size weighted mean observed correlation; sd_r = standard deviation of the sample size weighted mean observed correlation; ρ = true score correlation; SD_ρ = standard deviation of true score correlation; CI 95% = lower and upper bound of 95% confidence intervals; CR 80% = lower and upper bound of 80% credibility intervals.

Table 3. *Separate meta-analytic results of tolerance of ambiguity's relations to Big Five traits based on publication status*

	Published						Unpublished					
	k	N	r_{obs}	ρ	SD_{ρ}	CR 80%	k	N	r_{obs}	ρ	SD_{ρ}	CR 80%
Conscientiousness	5	1398	-.00	-.00	.22	-.35, .34	8	1841	.15	.19	.14	-.01, .39
Agreeableness	5	1402	.10	.13	.14	-.08, .35	6	1565	.15	.20	.14	-.00, .41
Emotional Stability	6	3293	.12	.17	.16	-.07, .40	10	1981	.31	.42	.23	.10, .73
Extraversion	7	3614	.21	.27	.12	.10, .44	8	1876	.20	.25	.10	.11, .40
Openness	10	2934	.37	.49	.15	.28, .71	9	2049	.34	.44	.21	.15, .73

Note: k = number of studies; N = number of subjects; r_{obs} = sample size weighted mean observed correlation; ρ = true score correlation; SD_{ρ} = standard deviation of true score correlation; CR 80% = lower and upper bound of 80% credibility intervals.

Table 4. *Confirmatory factor analyses testing alternative MAAS structures, fit estimates*

Model	χ^2	df	RMSEA	SRMR	CFI	TLI	BIC
Three-factor	482.83	186	.06	.06	.89	.87	40480.97
Hierarchical	482.82	186	.06	.06	.89	.87	40480.97
Bifactor	340.69	168	.05	.05	.93	.92	40424.99

Table 5. Correlations, internal consistencies, and descriptive statistics of Study 2 variables

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. MAAS Discomfort	4.89	.93	(.74)													
2. MAAS Moral	3.16	1.04	.07	(.81)												
3. MAAS Complexity	4.16	.97	.14	.00	(.79)											
4. MAAS Total	4.19	.56	.66	.57	.56	(.79)										
5. MAAS General	4.07	.60	.63	.61	.61	.97	(.75)									
6. Imagination	3.75	.65	.12	-.21	.29	.15	.10	(.83)								
7. Artistic	3.96	.65	.10	-.24	.22	.07	.03	.40	(.81)							
8. Emotionality	3.84	.65	.20	-.25	.03	.02	-.03	.30	.45	(.81)						
9. Adventurousness	3.28	.61	-.20	-.15	.33	-.01	-.01	.27	.33	.11	(.80)					
10. Intellect	3.46	.70	.02	-.22	.61	.19	.20	.38	.33	.19	.33	(.84)				
11. Liberalism	2.94	.72	.10	-.45	.18	-.09	-.11	.27	.29	.18	.19	.26	(.81)			
12. Openness Total	3.54	.42	.09	-.41	.44	.08	.05	.68	.73	.58	.57	.66	.59	(.91)		
13. NFC	3.91	.62	.44	.30	-.24	.31	.27	-.12	-.16	.00	-.50	-.26	-.24	-.33	(.82)	
14. Dogmatism	2.29	.51	-.19	.40	-.12	.05	.07	-.22	-.15	-.18	-.15	-.25	-.37	-.35	.16	(.88)
15. Dropout intentions	2.30	1.35	.14	.02	.04	.11	.10	.07	.01	-.04	-.04	-.08	.07	.00	.04	.03
16. Ambiguity PA	2.53	.61	-.16	.05	.30	.08	.11	.09	.08	-.06	.20	.19	-.04	.12	-.21	.05
17. Ambiguity NA	3.43	.52	.35	.11	-.09	.23	.19	-.03	.04	.16	-.18	-.16	-.05	-.06	.37	.01
18. GPA	3.29	.56	.05	-.20	.02	-.07	-.08	.04	.07	.12	.07	.21	.04	.15	.02	-.11
19. SAT	1193	147.63	-.05	-.27	.13	-.11	-.12	.17	-.11	.01	.23	.22	.24	.18	-.12	-.28
20. ACT	24.83	4.32	.05	-.26	.20	-.01	-.02	.18	.06	.07	.11	.45	.22	.29	-.11	-.23
21. HSGPA	3.67	.35	.02	-.20	-.04	-.12	-.12	-.05	.06	.12	-.02	.09	-.06	.04	.00	-.08
22. Attendance	88.51	13.25	.02	-.04	-.06	-.04	-.05	.01	.09	.08	-.01	.04	.00	.05	.03	-.01
23. Year	1.81	1.02	-.01	.04	.06	.03	.04	-.02	.00	-.10	.03	.06	.04	.01	-.02	.01
24. Age	19.58	1.86	.05	.04	.08	.08	.09	.08	.01	-.03	.05	.09	.07	.07	-.1	-.07
25. Gender (male)	1.28	.46	-.06	.06	.20	.10	.11	.05	-.28	-.29	-.01	.20	.00	-.08	.06	-.02

Note: Correlations significant at $p < .05$ are in bold. Internal consistency estimates are presented in parentheses on the diagonal. N = 563, except for correlations including NFC (N = 560), GPA (N = 554), SAT (N = 63), ACT (N = 497), HSGPA (N = 557), Year (N = 562), Gender (N = 562), and Race (N = 539). MAAS Total = Multidimensional Attitudes Toward Ambiguity scale average across all 30 items. MAAS General = average of the 21 items retained as a general factor in Lauriola et al. (2016) Study 2. NFC = need for cognitive closure. Ambiguity PA = ambiguity specific positive affect. Ambiguity NA = ambiguity specific negative affect.

Table 5 continued.

	M	SD	15	16	17	18	19	20	21	22	23	24
15. Dropout intentions	2.30	1.35	(.78)									
16. Ambiguity PA	2.53	.61	-.02	(.83)								
17. Ambiguity NA	3.43	.52	.12	-.25	(.89)							
18. GPA	3.29	.56	-.28	-.01	-.10	-						
19. SAT	1193	147.63	-.02	-.05	.14	.24	-					
20. ACT	24.83	4.32	-.11	.02	-.13	.39	.77	-				
21. HSGPA	3.67	.35	-.09	-.03	.05	.36	.22	.30	-			
22. Attendance	88.51	13.25	-.12	-.02	-.01	.30	-.11	.00	.13	-		
23. Year	1.81	1.02	-.02	.05	-.09	-.06	.15	.08	-.12	-.17	-	
24. Age	19.58	1.86	.05	.07	-.11	-.05	.14	.05	-.25	-.06	.63	-
25. Gender	1.28	.46	.03	.12	-.16	-.04	.19	.16	-.22	-.11	.10	-.06

Note: Correlations significant at $p < .05$ are in bold. Internal consistency estimates are presented in parentheses on the diagonal. N = 563, except for correlations including NFC (N = 560), GPA (N = 554), SAT (N = 63), ACT (N = 497), HSGPA (N = 557), Year (N = 562), Gender (N = 562), and Race (N = 539). MAAS Total = Multidimensional Attitudes Toward Ambiguity scale average across all 30 items. MAAS General = average of the 21 items retained as a general factor in Lauriola et al. (2016) Study 2. NFC = need for cognitive closure. Ambiguity PA = ambiguity specific positive affect. Ambiguity NA = ambiguity specific negative affect.

Table 6. Hierarchical multiple regression of the effect of tolerance of ambiguity, operationalized separately as both MAAS subscales and the MAAS general factor, on GPA, controlling for neighboring constructs and demographic variables.

	b	SE	β	t	p	R ² _{adj}
Step 1						.06
Year	-.00	.03	-.01	-.08	.94	
Age	-.01	.02	-.05	-.78	.44	
Gender	-.06	.06	-.05	-.98	.33	
Race	.08	.05	.07	1.59	.11	
Imagination	-.06	.04	-.07	-1.44	.14	
Artistic	-.05	.05	-.06	-1.06	.29	
Emotionality	.09	.04	.10	1.95	.05	
Adventure	.06	.05	.06	1.15	.25	
Intellect	.21	.04	.26	5.01	<.001	
Liberalism	-.00	.04	-.01	-.12	.90	
NFC	.09	.05	.10	1.89	.06	
Dogmatism	-.05	.05	-.05	-1.04	.30	
Step 2						.10
Discomfort with Ambiguity	.04	.03	.06	1.28	.20	
Moral Absolutism	-.11	.03	-.20	-3.90	<.001	
Need for Complexity	-.07	.03	-.13	-2.14	.03	
Step 2*						.09
	-.15	.04	-.16	-3.40	<.001	

Note: NFC = Need for Cognitive Closure. MAAS General = Multidimensional Attitudes Toward Ambiguity general factor. R²_{adj} = adjusted R². Step 2* = repeated analysis using the MAAS general factor instead of the three facets comprised of the same items.

Table 7. Hierarchical multiple regression of the effect of tolerance of ambiguity, operationalized separately as both MAAS subscales and the MAAS general factor, on intentions to drop out of college, controlling for neighboring constructs and demographic variables.

	b	SE	β	<i>t</i>	<i>p</i>	R^2_{adj}
Step 1						.02
Year	-.14	.08	-.11	-1.87	.06	
Age	.09	.04	.12	2.08	.04	
Gender	.13	.15	.04	.86	.39	
Race	.12	.12	.05	1.04	.29	
Imagination	.23	.10	.11	2.18	.03	
Artistic	.07	.12	.04	.62	.53	
Emotionality	-.19	.11	-.09	-1.80	.07	
Adventure	-.06	.12	-.03	-.47	.64	
Intellect	-.27	.10	-.14	-2.66	.01	
Liberalism	.19	.09	.10	2.02	.04	
NFC	.06	.11	.03	.53	.58	
Dogmatism	.09	.13	.03	.68	.50	
Step 2						.05
Discomfort with Ambiguity	.25	.08	.18	3.25	.001	
Moral Absolutism	-.00	.07	-.00	-.06	.95	
Need for Complexity	.11	.08	.08	1.38	.17	
Step 2*						.04
	.33	.11	.15	3.12	.001	

Note: NFC = Need for Cognitive Closure. MAAS General = Multidimensional Attitudes Toward Ambiguity general factor. R^2_{adj} = adjusted R^2 . Step 2* = repeated analysis using the MAAS general factor instead of the three facets comprised of the same items.

Table 8. Correlations, internal consistencies, and descriptive statistics of Study 3 variables

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. MAAS Discomfort	4.22	1.09	(.83)												
2. MAAS Moral	4.02	1.33	.38	(.89)											
3. MAAS Complexity	4.34	1.10	.26	.42	(.84)										
4. MAAS General	4.19	.89	.71	.83	.73	(.92)									
5. Ambiguity PA	2.80	.78	-.19	.17	.24	.11	(.88)								
6. Ambiguity NA	2.40	.73	.26	-.28	-.23	-.13	-.19	(.96)							
7. UT	2.56	.75	.44	.22	.06	.32	.10	.33	(.90)						
8. Job Ambiguity	2.53	1.20	.20	.09	.19	.21	.20	.06	.22	(.96)					
9. ONET Ambiguity	47.53	6.32	.04	.04	-.02	.02	-.06	-.16	-.12	-.21	-				
10. Job Satisfaction	2.17	.67	-.08	-.10	.05	-.06	.38	.03	.13	.52	-.20	(.85)			
11. Job Stress	1.18	.75	.07	-.06	-.05	-.02	-.19	.18	-.05	-.17	.07	-.43	(.82)		
12. Job Withdrawal	1.73	.92	-.10	-.17	-.03	-.14	.11	.41	.15	.00	-.12	.12	-.04	(.90)	
13. CWB	1.41	.56	-.06	-.05	-.07	-.08	.13	.27	.21	-.21	.00	.03	-.05	.43	(.92)
14. OCB	2.74	.75	.03	.15	.22	.18	.31	.01	.12	.37	-.12	.29	.08	.24	.11
15. Performance	4.11	.67	.15	-.07	.09	.06	.13	.18	.12	.74	-.16	.45	-.12	.06	-.24
16. Age	43.29	10.93	-.11	-.27	-.22	-.27	-.10	.19	-.05	.33	-.15	.26	-.15	.08	-.08
17. Gender (male)	1.41	.49	-.14	.07	.08	.01	.28	-.17	.00	-.02	.03	.17	-.25	.00	.25
18. Tenure	12.17	8.22	.02	.11	-.06	.04	-.21	-.15	-.10	-.08	.07	-.24	.15	-.26	-.26
19. Supervisor (no)	1.63	.48	-.04	-.14	-.22	-.17	-.18	.01	-.10	-.04	.02	-.09	.02	-.04	.01

Note: Correlations significant at $p < .05$ are in bold. Internal consistency estimates are presented in parentheses on the diagonal. $N = 252$, except for correlations including ONET Ambiguity ($N = 240$), Age ($N = 249$), Gender ($N = 250$), Tenure ($N = 243$), and Supervisor ($N = 248$). MAAS General = average of the 21 items retained as a general factor in Lauriola et al. (2016) Study 2. Ambiguity PA = ambiguity specific positive affect. Ambiguity NA = ambiguity specific negative affect. UT = uncertainty tolerance. ONET Ambiguity = category flexibility levels retrieved from the ONET database. CWB = counterproductive workplace behaviors. OCB = organizational citizenship behaviors. Gender (male) = female scored as 1, male scored as 2. Tenure = number of years at current job. Supervisor (no) = supervising role reported scored as 1, no supervising role reported scored as 2.

Table 8 continued.

	M	SD	14	15	16	17	18
14. OCB	2.74	.75	(.89)				
15. Performance	4.11	.67	.26	(.83)			
16. Age	43.29	10.93	-.05	.34	-		
17. Gender (male)	1.41	.49	.07	-.14	-.10	-	
18. Tenure	12.17	8.22	-.27	.00	.29	-.13	-
19. Supervisor (no)	1.63	.48	-.21	-.06	.05	-.14	-.09

Note: Correlations significant at $p < .05$ are in bold. Internal consistency estimates are presented in parentheses on the diagonal. $N = 252$, except for correlations including ONET Ambiguity ($N = 240$), Age ($N = 249$), Gender ($N = 250$), Tenure ($N = 243$), and Supervisor ($N = 248$). MAAS General = average of the 21 items retained as a general factor in Lauriola et al. (2016) Study 2. Ambiguity PA = ambiguity specific positive affect. Ambiguity NA = ambiguity specific negative affect. UT = uncertainty tolerance. ONET Ambiguity = category flexibility levels retrieved from the ONET database. CWB = counterproductive workplace behaviors. OCB = organizational citizenship behaviors. Gender (male) = female scored as 1, male scored as 2. Tenure = number of years at current job. Supervisor (no) = supervising role reported scored as 1, no supervising role reported scored as 2.

Table 9. Multiple regression of the effect of tolerance of ambiguity (measured as either MAAS general, Uncertainty Tolerance, or Ambiguity Negative Affect) and job ambiguity (measured as either self-reported job ambiguity or O*NET category flexibility) on job satisfaction.

	<u>MAAS General</u>						<u>Uncertainty Tolerance</u>						<u>Ambiguity Negative Affect</u>						
	b	SE	β	<i>t</i>	<i>p</i>	R ² _{adj}	b	SE	β	<i>t</i>	<i>p</i>	R ² _{adj}	b	SE	β	<i>t</i>	<i>p</i>	R ² _{adj}	
						.30						.27							.27
Intolerance of Ambiguity	-.13	.04	-.17	-3.23	.001		.01	.05	.01	.20	.85		.00	.05	.00	.06	.95		
Job Ambiguity	.31	.03	.56	10.36	<.001		.29	.03	.52	9.42	<.001		.29	.03	.52	9.69	<.001		
						.31						.27							.28
Intolerance of Ambiguity	.00	.08	.00	.01	.99		.21	.22	.23	.95	.34		.61	.25	.66	2.40	.02		
Job Ambiguity	.14	.10	-.25	1.44	.15		.39	.11	.69	3.61	<.001		.59	.13	1.06	4.69	<.001		
Intolerance of ambiguity * Job Ambiguity	.04	.03	-.06	-1.87	.06		-.04	.04	-.05	-.93	.35		-.13	.05	-.14	-2.44	.02		
						.04						.04							.03
Intolerance of Ambiguity	-.06	.05	-.08	-1.20	<.001		.09	.06	.10	1.53	.13		.02	.06	.02	.27	.79		
Category flexibility	-.02	.01	-.19	-3.07	.002		-.02	.01	-.19	-	.01		-.02	.01	-.19	-3.01	.003		
						.04				2.91		.04							.03
Intolerance of Ambiguity	.35	.37	.47	.95	.34		-.10	.40	-.11	-.24	.81		-.00	.42	-.00	-.01	.99		
Category flexibility	.01	.03	.13	.44	.66		-.03	.02	-.28	-	.18		-.02	.02	-.20	-.95	.34		
Intolerance of ambiguity * Category flexibility	-.01	.01	-.01	-1.11	.27		.00	.01	.00	.46	.65		.00	.01	.00	.05	.96		
										1.33									

Table 10. Multiple regression of the effect of tolerance of ambiguity (measured as either MAAS general, Uncertainty Tolerance, or Ambiguity Negative Affect) and job ambiguity (measured as either self-reported job ambiguity or O*NET category flexibility) on job performance.

	<u>MAAS General</u>						<u>Uncertainty Tolerance</u>						<u>Ambiguity Negative Affect</u>						
	b	SE	β	t	p	R ² _{adj}	b	SE	β	t	p	R ² _{adj}	b	SE	β	t	p	R ² _{adj}	
						.56						.55							.57
Intolerance of Ambiguity	-.07	.03	-.09	-2.17	.03		-.05	.04	-.05	-1.16	.25		.12	.04	.14	3.25	.001		
Job Ambiguity	.43	.02	.76	17.70	<.001		.42	.02	.75	17.34	<.001		.41	.02	.73	17.62	<.001		
						.56						.55							.56
Intolerance of Ambiguity	.10	.09	-.24	1.12	.26							.55	.28	.20	.30	4.96	<.001		
Job Ambiguity	.57	.08	1.02	7.40	<.001		-.21	.17	.61	-1.24	.22		.49	.10	.87	4.96	<.001		
Intolerance of ambiguity * Job Ambiguity	-.04	.02	-.05	-1.99	<.05		.34	.08	.04	1.01	.32		-.03	.04	-.03	-.79	.43		
						.02						.03							.04
Intolerance of Ambiguity	.06	.38	.07	1.15	.25		.09	.06	.11	1.65	.10		.15	.06	.16	2.50	.01		
Category flexibility	-.02	.01	-.16	-2.51	.01		-.02	.01	-.15	-2.28	.02		-.01	.01	-.13	-2.08	.04		
						.02						.03							.04
Intolerance of Ambiguity	-.40	.38	-.53	-1.06	.29		.34	.41	.38	.83	.41		.29	.42	.31	.68	.50		
Category flexibility	-.06	.03	-.52	-1.72	.09		-.00	.02	-.03	-.12	.90		-.01	.02	-.07	-.31	.76		
Intolerance of ambiguity * Category flexibility	.01	.01	.01	1.22	.22		-.01	.01	-.01	-.61	.55		-.00	.01	-.00	.33	.74		

Table 11. Multiple regression of the effect of tolerance of ambiguity (measured as either MAAS general, Uncertainty Tolerance, or Ambiguity Negative Affect) and job ambiguity (measured as either self-reported job ambiguity or O*NET category flexibility) on job stress.

	<u>MAAS General</u>						<u>Uncertainty Tolerance</u>						<u>Ambiguity Negative Affect</u>						
	b	SE	β	t	p	R ² _{adj}	b	SE	β	t	p	R ² _{adj}	b	SE	β	t	p	R ² _{adj}	
						.02						.02							.05
Intolerance of Ambiguity	.03	.05	.03	.51	.61		-.02	.06	.02	-.27	.79		.18	.06	.18	2.85	.005		
Job Ambiguity	-.10	.04	-.16	-2.56	.01		-.09	.04	-.15	-2.39	.02		-.10	.04	-.17	-2.71	.007		
						.02						.02							.06
Intolerance of Ambiguity	.23	.15	.28	1.52	.13		-.22	.28	-.23	-.81	.42		-.38	.32	-.38	-1.20	.23		
Job Ambiguity	.07	.13	.12	.57	.57		-.20	.14	-.32	-1.42	.16		-.38	.16	-.62	-2.40	.02		
Intolerance of ambiguity * Job Ambiguity	-.05	.03	-.06	-1.44	.15		.04	.06	.04	.77	.45		.12	.07	.12	1.80	.07		
						.00						.00							.03
Intolerance of Ambiguity	.00	.05	.00	-.01	.93		-.04	.06	-.04	-.65	.51		.19	.07	.18	2.84	.005		
Category flexibility	.01	.01	.07	1.08	.28		.01	.01	.06	.99	.32		.01	.01	.10	1.53	.13		
						.00						.00							.03
Intolerance of Ambiguity	-.52	.42	-.62	-1.23	.22		.09	.46	.09	.18	.86		.83	.47	.81	1.76	.08		
Category flexibility	-.04	.04	-.30	-.98	.33		.01	.03	.12	.57	.57		.05	.03	.38	1.77	.08		
Intolerance of ambiguity * Category flexibility	.01	.01	.01	1.23	.22		-.00	.01	-.00	-.28	.78		-.01	.01	-.01	-1.37	.17		

Table 12. Multiple regression of the effect of tolerance of ambiguity (measured as either MAAS general, Uncertainty Tolerance, or Ambiguity Negative Affect) and job ambiguity (measured as either self-reported job ambiguity or O*NET category flexibility) on organizational citizenship behaviors.

	<u>MAAS General</u>						<u>Uncertainty Tolerance</u>						<u>Ambiguity Negative Affect</u>						
	b	SE	β	t	p	R ² _{adj}	b	SE	β	t	p	R ² _{adj}	b	SE	β	t	p	R ² _{adj}	
						.14						.13							.13
Intolerance of Ambiguity	.09	.05	.11	1.81	.07		.04	.06	.04	.61	.54		-.01	.06	-.01	-.19	.85		
Job Ambiguity	.21	.04	.34	5.75	<.001		.22	.04	.36	5.94	<.001		.23	.04	.37	6.22	<.001		
						.14						.18							.18
Intolerance of Ambiguity	-.12	.14	-.15	-.88	.37		1.03	.25	1.05	4.06	<.001		1.18	.30	1.16	3.96	<.001		
Job Ambiguity	.03	.12	.05	.25	.80		.71	.13	1.14	5.62	<.001		.82	.15	1.32	5.48	<.001		
Intolerance of ambiguity * Job Ambiguity	.05	.03	.06	1.61	.11		-.21	.05	-.21	-4.03	<.001		-.25	.06	-.24	-4.07	<.001		
						.03						.02							.01
Intolerance of Ambiguity	.14	.05	.16	2.59	.01		.10	.06	.11	1.64	.10		.02	.07	.02	.24	.81		
Category flexibility	-.01	.01	-.12	-1.97	.05		-.01	.01	-.11	-1.68	.09		-.01	.01	-.12	-1.81	.07		
						.03						.05							.02
Intolerance of Ambiguity	-.31	.41	-.38	-.77	.44		-1.24	.44	-1.29	-2.81	.01		-.85	.46	-.85	-1.85	.07		
Category flexibility	-.05	.04	-.46	-1.50	.13		-.08	.02	-.71	-3.45	<.001		-.06	.03	-.51	-2.36	.02		
Intolerance of ambiguity * Category flexibility	.01	.01	.01	1.12	.26		.03	.01	.03	3.07	.002		.02	.01	.02	1.90	.06		

Table 13. Multiple regression of the effect of tolerance of ambiguity (measured as either MAAS general, Uncertainty Tolerance, or Ambiguity Negative Affect) and job ambiguity (measured as either self-reported job ambiguity or O*NET category flexibility) on counterproductive workplace behaviors.

	<u>MAAS General</u>						<u>Uncertainty Tolerance</u>						<u>Ambiguity Negative Affect</u>						
	b	SE	β	t	p	R ² _{adj}	b	SE	β	t	p	R ² _{adj}	b	SE	β	t	p	R ² _{adj}	
						.04						.11							.12
Intolerance of Ambiguity	-.02	.04	-.04	-.57	.57		.20	.05	.27	4.42	<.001		.21	.05	.28	4.68	<.001		
Job Ambiguity	-.10	.03	-.21	-3.28	.001		-.13	.03	-.27	-4.49	<.001		-.11	.03	-.23	-3.88	<.001		
						.08						.11							.11
Intolerance of Ambiguity	-.40	.11	-.64	-3.58	<.001		.46	.20	.62	2.31	.02		.30	.23	.39	1.29	.20		
Job Ambiguity	-.41	.09	-.89	-4.46	<.001		-.00	.10	-.00	-.02	.98		-.06	.12	-.14	-.55	.58		
Intolerance of ambiguity * Job Ambiguity	.09	.02	.14	3.60	<.001		-.05	.04	-.07	-1.34	.18		-.02	.05	-.02	-.39	.70		
						.00						.04							.06
Intolerance of Ambiguity	-.04	.04	-.06	-.89	.37		.16	.05	.21	3.30	.001		.20	.05	.25	4.00	<.001		
Category flexibility	.00	.01	.01	.09	.93		.00	.01	.03	.46	.65		.00	.01	.05	.71	.48		
						.00						.04							.05
Intolerance of Ambiguity	-.07	.32	-.11	-.22	.83		-.36	.34	-.48	-1.05	.29		-.07	.35	-.09	-.20	.84		
Category flexibility	-.00	.03	-.03	-.08	.93		-.02	.02	-.27	-1.31	.19		-.01	.02	-.11	-.52	.61		
Intolerance of ambiguity * Category flexibility	.00	.01	.00	.10	.92		.01	.01	.01	1.53	.13		.01	.01	.01	.77	.45		

Table 14. Multiple regression of the effect of tolerance of ambiguity (measured as either MAAS general, Uncertainty Tolerance, or Ambiguity Negative Affect) and job ambiguity (measured as either self-reported job ambiguity or O*NET category flexibility) on job withdrawal.

	<u>MAAS General</u>						<u>Uncertainty Tolerance</u>						<u>Ambiguity Negative Affect</u>						
	b	SE	β	t	p	R ² _{adj}	b	SE	β	t	p	R ² _{adj}	b	SE	β	t	p	R ² _{adj}	
						.01						.02							.16
Intolerance of Ambiguity	-.15	.07	-.15	-2.29	.03		.19	.08	.16	2.43	.02		.52	.07	.41	7.18	<.001		
Job Ambiguity	.02	.05	.03	.53	.60		-.02	.05	-.03	-.48	.63		-.02	.04	-.02	-.35	.73		
						.03						.02							.19
Intolerance of Ambiguity	-.53	.19	-.51	-2.76	.01		.70	.34	.58	2.05	.04		1.56	.37	1.23	4.24	<.001		
Job Ambiguity	-.29	.16	-.38	-1.83	.07		.23	.17	.29	1.33	.18		.50	.18	.65	2.71	.01		
Intolerance of ambiguity * Job Ambiguity	.09	.04	.09	2.09	.04		-.11	.07	-.09	-1.54	.13		-.22	.08	-.17	-2.87	.004		
						.02						.03							.15
Intolerance of Ambiguity	-.11	.07	-.11	-1.64	.10		.17	.08	.14	2.18	.03		.48	.08	.38	6.36	<.001		
Category flexibility	-.02	.01	-.11	-1.79	.07		-.01	.01	-.10	-1.57	.12		-.01	.01	-.06	-.93	.35		
						.01						.02							.18
Intolerance of Ambiguity	-.40	.52	-.39	-.77	.44		-.07	.56	-.06	-.12	.91		1.14	.53	-.91	-2.15	.03		
Category flexibility	-.04	.04	-.28	-.93	.35		-.03	.03	-.19	-.89	.38		-.09	.03	-.64	-3.23	.001		
Intolerance of ambiguity * Category flexibility	.01	.01	.01	.57	.57		.00	.01	.00	.43	.67		.03	.01	.03	3.09	.002		

FIGURES

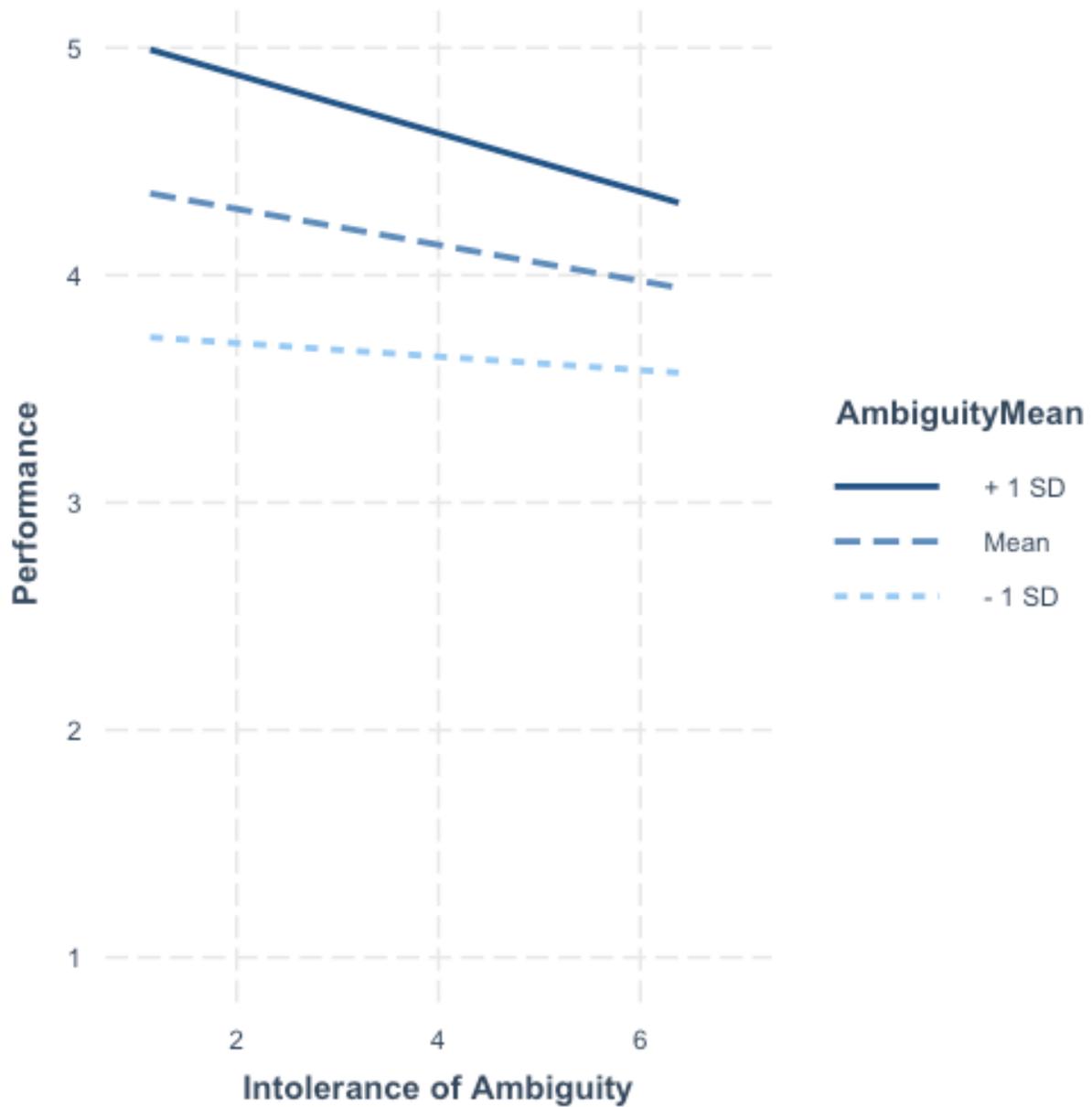


Figure 1. Intolerance of ambiguity (MAAS General) predicting job performance, moderated by levels of job ambiguity. *Note:* N = 252.

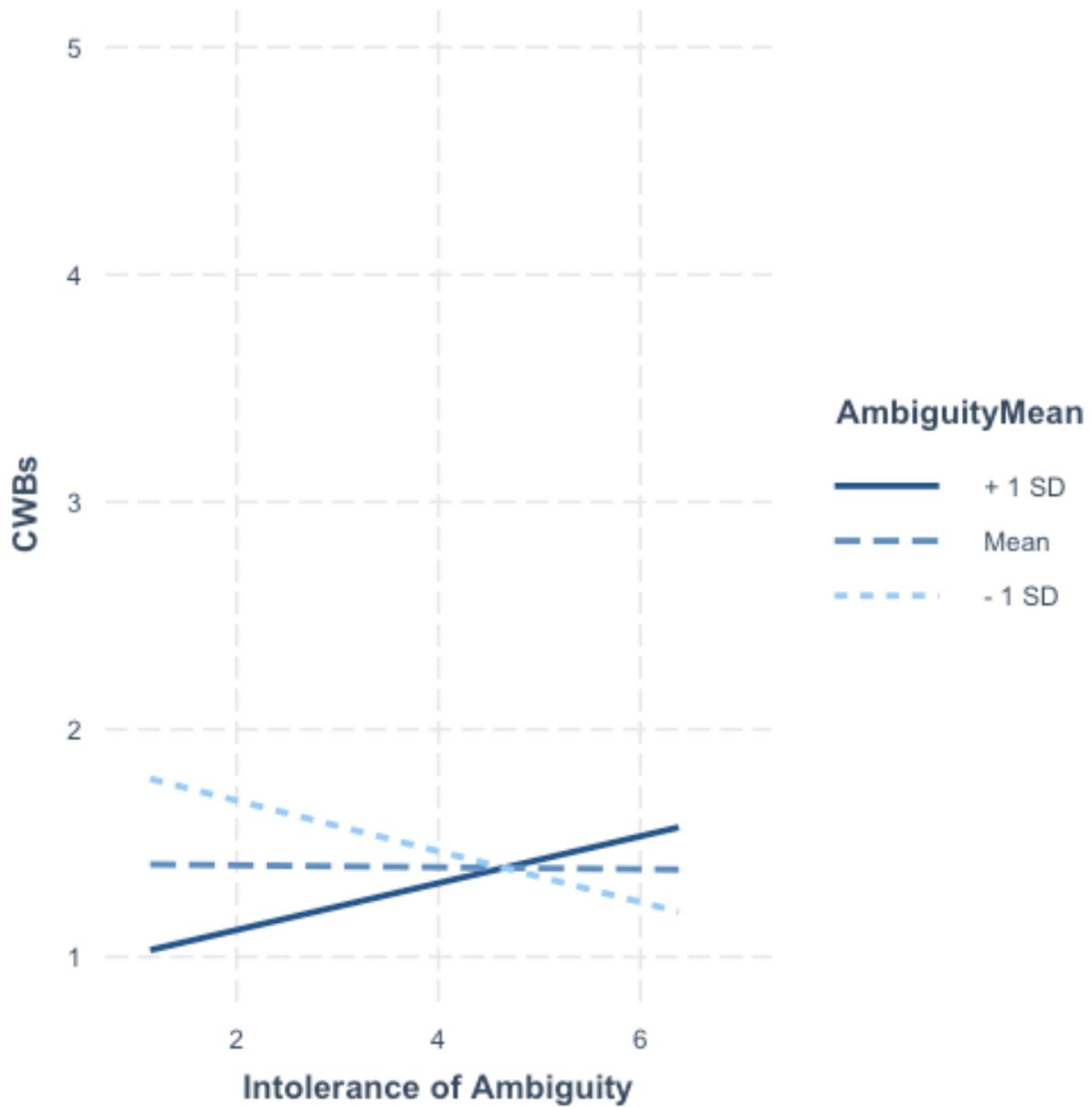


Figure 2. Intolerance of ambiguity (MAAS General) predicting counterproductive workplace behaviors, moderated by levels of job ambiguity. *Note:* N = 252.

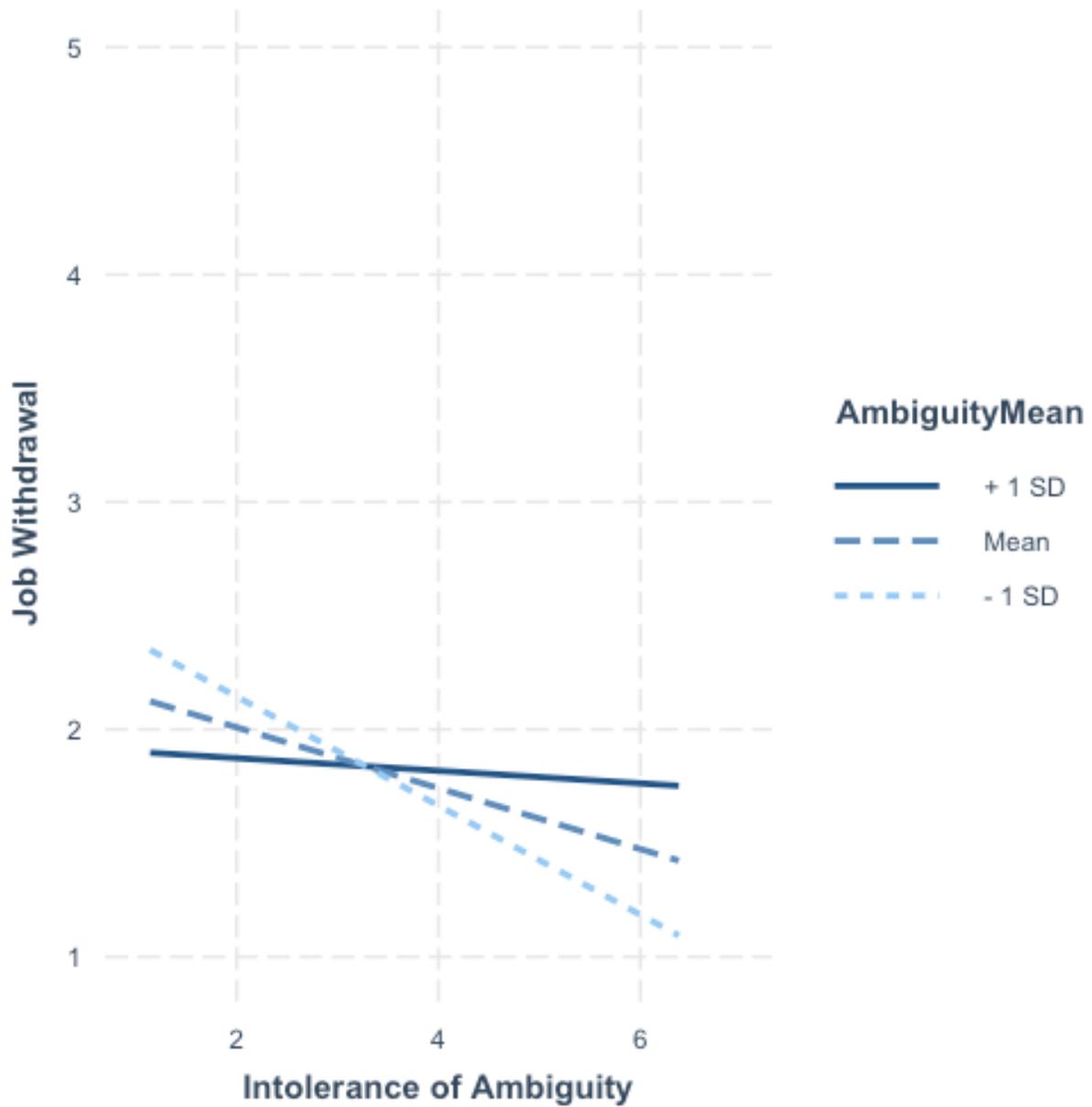


Figure 3. Intolerance of ambiguity (MAAS General) predicting job withdrawal, moderated by levels of job ambiguity. *Note:* N = 252.

APPENDIX A: STUDY MATERIALS

The Multidimensional Attitude Toward Ambiguity Scale (MAAS)

On this page, we are interested in how people respond when they confront particular situations in their lives. This questionnaire asks you to indicate what you generally do and feel when you experience these situations. Try to respond to each item independently from other items on the questionnaire. Choose your answers thoughtfully, making your responses as true for you as possible. There are no correct or incorrect answers, we are most interested in the response that is accurate for you, not what you think “most people” would feel. You are asked to express your feeling about each by selecting the number 1, 2, 3, 4, 5, 6, or 7 after each item.

1 = I strongly disagree

2 = I disagree enough

3 = I mildly disagree

4 = I neither agree nor disagree

5 = I mildly agree

6 = I agree enough

7 = I strongly agree

	1	2	3	4	5	6	7
1. There are two kinds of people in the world: the weak and the strong.	•	•	•	•	•	•	•
2. I pursue problems situations which are so complex, some people call them “mind boggling.”	•	•	•	•	•	•	•
3. It intensely disturbs me when I am uncertain of how my actions will affect others.	•	•	•	•	•	•	•
4. A person either knows the answer to a question or they don't.	•	•	•	•	•	•	•
5. I often find myself looking for something new, rather than trying to hold things constant in my life.	•	•	•	•	•	•	•
6. I don't feel comfortable with people until I can find out something about them.	•	•	•	•	•	•	•
7. There are two kinds of people: the good and the bad.	•	•	•	•	•	•	•
8. I am drawn to situations which can be interpreted in more than one way.	•	•	•	•	•	•	•
9. I am just a little uncomfortable with people unless I feel that I can understand their behavior.	•	•	•	•	•	•	•
10. You can classify almost all people as either honest or crooked.	•	•	•	•	•	•	•

11. I generally prefer novelty over familiarity.	•	•	•	•	•	•	•
12. I get pretty anxious when I'm in a social situation involving me which I have little control of.	•	•	•	•	•	•	•
13. Personally, I tend to think that there is a right way and a wrong way to do almost everything.	•	•	•	•	•	•	•
14. Vague and impressionistic pictures appeal to me more than realistic pictures.	•	•	•	•	•	•	•
15. It bothers me when I don't know how other people react to me.	•	•	•	•	•	•	•
16. Nothing gets accomplished in this world unless you stick to some basic rules.	•	•	•	•	•	•	•
17. I tend to like obscure or hidden symbolism.	•	•	•	•	•	•	•
18. I always want to know what people are laughing at.	•	•	•	•	•	•	•
19. There's a right way and a wrong way to do almost everything.	•	•	•	•	•	•	•
20. Some problems are so complex that just trying to understand them is fun.	•	•	•	•	•	•	•
21. I get pretty anxious when I'm in a social situation over which I have no control.	•	•	•	•	•	•	•
22. Generally, the more meanings a poem or story has, the better I like it.	•	•	•	•	•	•	•
23. If I am uncertain about the responsibilities of a job, I get very anxious.	•	•	•	•	•	•	•
24. A good job is one where what is to be done and how it is to be done are always clear.	•	•	•	•	•	•	•
25. It is more fun to tackle a complicated problem than to solve a simple one.	•	•	•	•	•	•	•
26. A person is either 100% patriotic or they aren't.	•	•	•	•	•	•	•
27. I enjoy carefully rehashing my conversations in my mind afterwards.	•	•	•	•	•	•	•
28. I enjoy tackling problems which are complex enough to be ambiguous.	•	•	•	•	•	•	•

29. If I don't get the punch line of a joke, I don't feel right until I understand it.	•	•	•	•	•	•	•
30. Our thinking would be a lot better off if we would just forget about words like "probably," "approximately," and "perhaps."	•	•	•	•	•	•	•

Note: Discomfort with Ambiguity is the average score of items 3, 6, 9, 12, 15, 23, and 29.

Moral absolutism/Splitting is the average of score of items 1, 4, 7, 10, 19, 26, and 30. Need for Complexity and Novelty is the average score of items 2, 8, 14, 17, 20, 25, and 28.

Need for Cognitive Closure

Please select your rate of agreement with the following statements.

	Completely disagree	Disagree	Slightly disagree	Slightly agree	Agree	Completely agree
1. I don't like situations that are uncertain.	•	•	•	•	•	•
2. I dislike questions which could be answered in many different ways.	•	•	•	•	•	•
3. I find that a well ordered life with regular hours suits my temperament.	•	•	•	•	•	•
4. I feel uncomfortable when I don't understand the reason why an event occurred in my life.	•	•	•	•	•	•
5. I feel irritated when one person disagrees with what everyone else in a group believes.	•	•	•	•	•	•
6. I don't like to go into a situation without knowing what I can expect from it.	•	•	•	•	•	•
7. When I have made a decision, I feel relieved	•	•	•	•	•	•
8. When I am confronted with a problem, I'm dying to reach a solution very quickly.	•	•	•	•	•	•
9. I would quickly become impatient and irritated if I would not find a solution to a problem immediately.	•	•	•	•	•	•
10. I don't like to be with people who are capable of unexpected actions.	•	•	•	•	•	•
11. I dislike it when a person's statement could mean many different things.	•	•	•	•	•	•
12. I find that establishing a consistent routine enables me to enjoy life more.	•	•	•	•	•	•

13. I enjoy having a clear and structured mode of life.	•	•	•	•	•	•
14. I do not usually consult many different opinions before forming my own view.	•	•	•	•	•	•
15. I dislike unpredictable situations.	•	•	•	•	•	•

Openness to Experience

On this page, there are phrases describing people's behaviors. Please use the rating scale below to describe how accurately each statement describes you. Describe yourself as you generally are now, not as you wish to be in the future. So that you can describe yourself in an honest manner, your responses will be kept in absolute confidence. Please read each statement carefully, and then select the bubble that corresponds to the appropriate accuracy rating on the scale.

	Very Inaccurate	Inaccurate	Neither Inaccurate Nor Accurate	Accurate	Very Accurate
Imagination (O1)					
I have a vivid imagination.	•	•	•	•	•
I enjoy wild flights of fantasy.	•	•	•	•	•
I love to daydream	•	•	•	•	•
I like to get lost in thought.	•	•	•	•	•
I indulge in my fantasies.	•	•	•	•	•
I spend time reflecting on things.	•	•	•	•	•
I seldom daydream.	•	•	•	•	•
I do not have a good imagination.	•	•	•	•	•
I seldom get lost in thought.	•	•	•	•	•
I have difficulty imagining things.	•	•	•	•	•
Artistic interests (O2)					
I believe in the importance of art.	•	•	•	•	•
I like music.	•	•	•	•	•
I see beauty in things that others might not notice.	•	•	•	•	•
I love flowers.	•	•	•	•	•
I enjoy the beauty of nature.	•	•	•	•	•
I do not like art.	•	•	•	•	•
I do not like poetry.	•	•	•	•	•
I do not enjoy going to art museums.	•	•	•	•	•
I do not like concerts.	•	•	•	•	•
I do not enjoy watching dance performances.	•	•	•	•	•

	Very Inaccurate	Inaccurate	Neither Inaccurate Nor Accurate	Accurate	Very Accurate
Emotionality (O3)					
I experience my emotions intensely.	•	•	•	•	•
I feel others' emotions	•	•	•	•	•
I am passionate about causes.	•	•	•	•	•
I enjoy examining myself and my life.	•	•	•	•	•
I try to understand myself.	•	•	•	•	•
I seldom get emotional.	•	•	•	•	•
I am not easily affected by my emotions.	•	•	•	•	•
I rarely notice my emotional reactions.	•	•	•	•	•
I experience very few emotional highs and lows.	•	•	•	•	•
I don't understand people who get emotional.	•	•	•	•	•
Adventurousness (O4)					
I prefer variety to routine.	•	•	•	•	•
I like to visit new places.	•	•	•	•	•
I am interested in many things.	•	•	•	•	•
I like to begin new things.	•	•	•	•	•
I prefer to stick with things that I know.	•	•	•	•	•
I dislike changes.	•	•	•	•	•
I don't like the idea of change.	•	•	•	•	•
I am a creature of habit.	•	•	•	•	•
I dislike new foods.	•	•	•	•	•
I am attached to conventional ways.	•	•	•	•	•

	Very Inaccurate	Inaccurate	Neither Inaccurate Nor Accurate	Accurate	Very Accurate
Intellect (O5)					
I like to solve complex problems.	•	•	•	•	•
I love to read challenging material.	•	•	•	•	•
I have a rich vocabulary.	•	•	•	•	•
I can handle a lot of information.	•	•	•	•	•
I enjoy thinking about things.	•	•	•	•	•
I am not interested in abstract ideas.	•	•	•	•	•
I avoid philosophical discussions.	•	•	•	•	•
I have difficulty understanding abstract ideas.	•	•	•	•	•
I am not interested in theoretical discussions.	•	•	•	•	•
I avoid difficult reading material.	•	•	•	•	•
Liberalism (O6)					
I tend to vote for liberal political candidates.	•	•	•	•	•
I believe that there is no absolute right or wrong.	•	•	•	•	•
I believe that criminals should receive help rather than punishment.	•	•	•	•	•
I believe in one true religion.	•	•	•	•	•
I tend to vote for conservative political candidates.	•	•	•	•	•
I believe that too much tax money goes to support artists.	•	•	•	•	•
I believe laws should be strictly enforced.	•	•	•	•	•
I believe that we coddle criminals too much.	•	•	•	•	•
I believe that we should be tough on crime.	•	•	•	•	•
I like to stand during the national anthem.	•	•	•	•	•

Uncertainty tolerance

Please select the option that best corresponds to how much you believe each statement is characteristic of you.

	Not at all characteristic of me	A little characteristic of me	Somewhat characteristic of me	Very characteristic of me	Entirely characteristic of me
1. Unforeseen events upset me greatly.	•	•	•	•	•
2. It frustrates me not having all the information I need.	•	•	•	•	•
3. Uncertainty keeps me from living a full life.	•	•	•	•	•
4. One should always look ahead so as to avoid surprises.	•	•	•	•	•
5. A small unforeseen event can spoil everything, even with the best of planning.	•	•	•	•	•
6. When it's time to act, uncertainty paralyzes me.	•	•	•	•	•
7. When I am uncertain, I can't function very well.	•	•	•	•	•
8. I always want to know what the future has in store for me.	•	•	•	•	•
9. I can't stand being taken by surprise.	•	•	•	•	•
10. The smallest doubt can stop me from acting.	•	•	•	•	•

11. I should be able to organize everything in advance.	•	•	•	•	•
12. I must get away from all uncertain situations.	•	•	•	•	•

Dogmatism

Please select your rate of agreement with the following statements.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1. I may be wrong about some of the little things in life, but I am quite certain I am right about all the BIG issues.					
2. Someday I will probably think that many of my present ideas were wrong.	•	•	•	•	•
3. Anyone who is honestly and truly seeking the truth will end up believing what I believe.	•	•	•	•	•
4. There are so many things we have not discovered yet, nobody should be absolutely certain their beliefs are right.	•	•	•	•	•
5. The things I believe in are so completely true, I could never doubt them.	•	•	•	•	•
6. I have never discovered a system of beliefs that explains everything to my satisfaction.	•	•	•	•	•
7. It is best to be open to all possibilities and ready to reevaluate all your beliefs.	•	•	•	•	•
8. My opinions are right and will stand the test of time.	•	•	•	•	•
9. Flexibility is a real virtue in thinking, since you may well be wrong.	•	•	•	•	•
10. My opinions and beliefs fit together perfectly to make a crystal-clear "picture" of things.	•	•	•	•	•
11. There are no discoveries or facts that could possibly make me change my mind about the things that matter most in life.	•	•	•	•	•
12. I am a long way from reaching final conclusions about the central issues in life.	•	•	•	•	•

13. The person who is absolutely certain they have the truth will probably never find it.	•	•	•	•	•
14. I am absolutely certain that my ideas about the fundamental issues in life are correct.	•	•	•	•	•
15. The people who disagree with me may well turn out to be right.	•	•	•	•	•
16. I am so sure I am right about the important things in life, there is no evidence that could convince me otherwise.	•	•	•	•	•
17. If you are “open-minded” about the most important things in life, you will probably reach the wrong conclusions.	•	•	•	•	•
18. Twenty years from now, some of my opinions about the important things in life will probably have changed.	•	•	•	•	•
19. “Flexibility in thinking” is another name for being “wishy-washy”	•	•	•	•	•
20. No one knows all the essential truths about the central issues in life.	•	•	•	•	•
21. Someday I will probably realize my present ideas about the BIG issues are wrong.	•	•	•	•	•
22. People who disagree with me are just plain wrong and often evil as well.	•	•	•	•	•

Note: Items 1 and 2 are not scored.

STUDY 3 SCALES

Occupation

1. What is your official job title? _____

2. Please list at least three key words associated with your job

(for example: “sales,” “automotive,” “manager”) _____

3. Please select the category of jobs below that is most similar to your current occupation.

Agriculture, Food, and Natural resources	Architecture and Construction	Arts, Audio/Video Technology & Communications	Business Management & Administration
Education & Training	Finance	Government & Public Administration	Health Science
Hospitality and Tourism	Human Services	Information technology	Law, Public Safety, Corrections, & Security
Manufacturing	Marketing	Science, Technology, Engineering, & Mathematics	Transportation, Distribution, & Logistics

4. Do you supervise other employees at work? Yes • No •

5. If you answered “Yes” to question 3, how many employees do you supervise directly?

Job Ambiguity

Please rate your agreement with each of the following statement by selecting the number 1, 2, 3, 4, 5, 6, or 7 after each item.

1 = I strongly disagree

2 = I disagree enough

3 = I mildly disagree

4 = I neither agree nor disagree

5 = I mildly agree

6 = I agree enough

7 = I strongly agree

	1	2	3	4	5	6	7
1. I am certain about how to go about getting my job done (the methods to use).	•	•	•	•	•	•	•
2. I know what is the best way (approach) to go about getting my work done.	•	•	•	•	•	•	•
3. I know how to get my work done (what procedures to use).	•	•	•	•	•	•	•
4. I know when I should be doing a particular aspect (part) of my job.	•	•	•	•	•	•	•
5. I am certain about the sequencing of my work activities (when to do what).	•	•	•	•	•	•	•
6. My job is such that I know when I should be doing a given work activity.	•	•	•	•	•	•	•
7. I know what my supervisor considers satisfactory work performance.	•	•	•	•	•	•	•
8. It is clear to me what is considered acceptable performance by my supervisor.	•	•	•	•	•	•	•
9. I know what level of performance is considered acceptable by my supervisor.	•	•	•	•	•	•	•

Job satisfaction

Think of your job in general. All in all, what is it like most of the time?

Select "Yes" if it describes your job,

"No" if it does not describe your job,

or "?" if you cannot decide

	Yes	No	?
Pleasant	•	•	•
Bad	•	•	•
Great	•	•	•
Waste of time	•	•	•
Good	•	•	•
Undesirable	•	•	•
Worthwhile	•	•	•
Worse than most	•	•	•
Acceptable	•	•	•
Superior	•	•	•
Better than most	•	•	•
Disagreeable	•	•	•
Makes me content	•	•	•
Inadequate	•	•	•
Excellent	•	•	•
Rotten	•	•	•
Enjoyable	•	•	•
Poor	•	•	•

Stress

Think of your job in general. All in all, what is it like most of the time?

Select "Yes" if it describes your job,

"No" if it does not describe your job,

or "?" if you cannot decide

	Yes	No	?
Demanding	•	•	•
Pressured	•	•	•
Hectic	•	•	•
Calm	•	•	•
Relaxed	•	•	•
Many things are stressful	•	•	•
Pushed	•	•	•
Irritating	•	•	•
Under control	•	•	•
Nerve-wracking	•	•	•
Hassled	•	•	•
Comfortable	•	•	•
More stressful than I'd like	•	•	•
Smooth running	•	•	•
Overwhelming	•	•	•

Job withdrawal

Please read each one of the following statements and use the response options to indicate the degree to which each of the statements accurately describes your thoughts and intentions regarding your current job.

	Very Inaccurate	Inaccurate	Neither Inaccurate Nor Accurate	Accurate	Very Accurate
I have thought about leaving the organization.	•	•	•	•	•
I have made plans to leave the organization	•	•	•	•	•
I have talked to people about another job.	•	•	•	•	•
I have made plans to change jobs within the organization.	•	•	•	•	•
I have tried to find another job.	•	•	•	•	•

Counterproductive workplace behaviors

How often have you done each of the following things on your present job?

	Never	Once or twice	Once or twice per month	Once or twice per week	Every day
1. Purposely wasted your employer's materials/supplies
2. Complained about insignificant things at work
3. Told people outside the job what a lousy place you work for
4. Came to work late without permission
5. Stayed home from work and said you were sick when you weren't
6. Insulted someone about their job performance
7. Made fun of someone's personal life
8. Ignored someone at work
9. Started an argument with someone at work
10. Insulted or made fun of someone at work

Organizational citizenship behaviors

How often have you done each of the following things on your present job?

	Never	Once or twice	Once or twice per month	Once or twice per week	Every day
1. Took time to advise, coach, or mentor a co-worker.	•	•	•	•	•
2. Helped co-worker learn new skills or shared job knowledge.	•	•	•	•	•
3. Helped new employees get oriented to the job.	•	•	•	•	•
4. Lent a compassionate ear when someone had a work problem.	•	•	•	•	•
5. Offered suggestions to improve how work is done.	•	•	•	•	•
6. Helped a co-worker who had too much to do.	•	•	•	•	•
7. Volunteered for extra work assignments.	•	•	•	•	•
8. Worked weekends or other days off to complete a project or task.	•	•	•	•	•
9. Volunteered to attend meetings or work on committees on own time.	•	•	•	•	•
10. Gave up meal and other breaks to complete work.	•	•	•	•	•

Job performance

Please read each one of the following statements and use the response options to indicate the degree to which you agree with each of the statements.

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
I adequately complete my assigned duties.	•	•	•	•	•
I fulfill responsibilities specified in my job description.	•	•	•	•	•
I perform tasks that are expected of me.	•	•	•	•	•
I meet formal performance requirements of my job.	•	•	•	•	•
I engage in activities that will directly affect my performance evaluation.	•	•	•	•	•
I neglect aspects of the job I am obligated to perform.	•	•	•	•	•
I fail to perform essential duties.	•	•	•	•	•

APPENDIX B: JOB OCCUPATION CODING SAMPLE

Job Title Reported	Keywords	O*NET Career Cluster	O*NET Job Title	O*NET Job Code	Category Flexibility
sales manager	sales manager	Business Management and Administration	Sales managers	11-2022.00	52
Controller	numbers, accounting, revenue	Finance	Treasurers and controllers	11-3031.01	52
freelance/self employed	online, consultant, business service	Business Management and Administration	Management analysts	13-1111.00	50
Engineers	Geological Engineers	Business Management and Administration	Mining and geological engineers	17-2151.00	59
Physicians	Specialist Physicians	Health Science	Preventative medicine physicians	29-1069.09	64
Physicians	Physicians	Health Science	Preventative medicine physicians	29-1069.09	64
Managers	Accommodation Service Managers	Hospitality and Tourism	Lodging managers	11-9081.00	43
No special title	Listen, write down, finish the order	Hospitality and Tourism	Waiters and waitresses	35-3031.00	30
Officers	Officers	Human Services	Police patrol officers	33-3051.01	43
Managers	Agricultural	Business Management and Administration	Farmers ranchers and agricultural managers	11-9013.02	52
Representatives	Representative	Manufacturing	Sales Representatives Wholesale and Manufacturing Technical and Scientific Products	41-4011.00	43
Managers	Aquaculture Operators	Agriculture Food and Natural Resources	Aquaculture Manager	11-9013.03	50
Superintendent	Personnel, Finance, Daily School Operations	Education and Training	Education administrators elementary and secondary school	11-9032.00	57
Architects	Architects	Architecture and Construction	Architects except Landscape and naval	17-1011.00	63
owner	construction, manufacturer, gutters	Architecture and Construction	Construction managers	11-9021.00	50
CFO		Finance	Chief executives	11-1011.00	59

HR	DATA HUMAN RESOURCES	Business Management and Administration	HR Assistants	43-4161.00	41
Technicians	Technicians	Manufacturing	Manufacturing Production Technicians	17-3029.09	45
Assessors	Assessors	Marketing	Assessors	13-2021.01	54
Investment Managers	Investment Managers	Finance	Investment fund managers	11-9199.03	54

